

CTP

Content Standards Manual



CTP COMPREHENSIVE
TESTING PROGRAM

If you have any questions, please contact ERB Support at (866) 683-2335
or (646) 503-2699 or send an e-mail to CTPOperations@erblearn.org.

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DEAR ERB MEMBER SCHOOL

Welcome to the CTP Content Standards Manual. If you are reading this, you are most likely one of the many ERB member schools that use the CTP, ERB's Comprehensive Testing Program, and are interested in learning more about our standards and this assessment.

ERB, a non-profit educational institution founded in 1927, was built on quality achievement assessments and high standards. ERB's tests provide rigorous, level-appropriate assessments of student progress in meeting these essential academic standards. And now, we're taking our commitment even further, making all of our assessments available online for instant, actionable results. CTP is no exception and is now available in the traditional paper-pencil version (CTP 4) and an online version (CTP Online).

Whether you are administering the CTP online, or using our CTP4 paper and pencil version, you will find that this guidebook will be a valuable and useful resource. It is designed to help you, and your faculty, understand both the standards that are the foundation of the CTP assessment, and the types of items that students address when taking the CTP. It is also a useful tool to have on hand when conferencing with parents as to their child's results.

This Content Standards Manual (CSM) has two sections. The first section outlines the standards by level and provides references to related sample test items. The second section holds sample items for each subtest and level, so you can see how the item is formatted and appears to the student. In combination, the CSM allows you to see what the student is being asked, and how it may be asked, by giving you item samples associated with that standard across all levels.

We hope that you will find this to be a very useful and valuable tool. It will certainly assist you and others as you analyze the data offered through our many CTP reports and reflect on your curriculum in the year ahead!

WITH WARM REGARDS

The ERB Staff

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SUPPORT & CONTACTS

ERB offers on-going assistance to its CTP users throughout the entire testing process!

The CTP Portal Help and Resources Page

The CTP Portal is your one-stop-shop for all things CTP! Video tutorials, manuals, and other charts and guides can be found here that will answer a variety of testing questions.

CTP Operations

For assistance with using the CTP Portal please call CTP Operations at (866)-683-2335 or (646) 503-2699 or email CTPOperations@erblearn.org.

ERB Academic Professionals

For assistance with reports, scheduling, or suggestions for distribution of reports, please contact the ERB Academic Professional in your region by visiting www.erblearn.org/schoolsupport.

Presentations, Workshops, and Conferences

ERB offers presentations to inform schools about ERB's products and services. ERB also offers workshops in person or online to help teachers and administrators analyze and interpret test results. Presenters and workshop leaders are ERB staff members and specially trained consultants. The content and length of presentations and workshops are tailored to the needs of the particular group or audience. ERB also provides mini-workshops for special groups, such as parents and boards of education. Additionally, every year in the late fall ERB hosts an informative and exciting member conference that our schools find very worthwhile. For more information on workshops, please call ERB at (800)-989-3721 or visit www.erblearn.org/schoolsupport to contact the ERB Academic Professional in your region.

WHAT IS CTP?

The Comprehensive Testing Program (CTP) is a rigorous assessment of individual student and group achievement of essential standards and learning domains in English language arts and mathematics. All CTP subject subtests were developed by Educational Testing Services (ETS) and ERB to align with the National Council of Teachers of English, International Reading Association and the National Council of Teachers of Mathematics Principles and Standards. In addition, in review of the Common Core Standards, CTP has strong alignment, having been a rigorous and well developed assessment based on these standards from its inception well before the Common Core.

The CTP provides useful information about student performance in grades 1-11 in listening, reading, vocabulary, writing, mathematics, and science*. In addition, CTP assesses verbal and quantitative reasoning skills and abilities in Levels 3–11. The combined measures can be used to compare more content-specific, curriculum-based indicators of performance (scores on the achievement tests) to the more conceptual knowledge base that helps to gauge potential and support school achievement (scores on the reasoning tests). This comparison can prove highly useful, especially for students whose reasoning and achievement scores exhibit marked discrepancies. In addition, the CTP offers schools the ability to offer testing accommodations as needed.

**CTP Online only*

What information does CTP provide to guide instruction and chart student growth? Our score reports are powerful tools helping to guide learning decisions on both an individual and group level. For faster, more efficient reporting, all CTP 4 and CTP Online reports are now available through our CTP portal. There are many types of CTP reports in a variety of formats; individual, group, roster and customizable data downloads. All CTP score reports provide robust information on the student, class, and school level to help inform teaching and learning, and enable next step instruction. Comparative information (national, suburban public, independent school, and association norm groups, as well as local/school norms) is always available. Reports can be also be customized on the portal by the school to illuminate class level or group level data. Data is held for three years on the CTP Portal allowing your school to access reports over time. Growth reports become available in year two of testing. Parent reports are also among the report options available to schools.

When can I administer the CTP? The CTP is a diagnostic instructional tool that works best when administered in the natural flow of the school year. There are two testing windows (fall and spring). We consider the CTP to be a low stakes test that is designed to assist teaching and learning. As such, we recommend that you consider how and when you need the data and offer the test in a season that fits your schedule.

What types of questions are on the CTP? CTP tests whether administered online, or paper /pencil, are composed of multiple choice questions. There is an optional constructed-response (open ended) section on the CTP 4, requiring students to write short answers. In addition, CTP Online offers schools the ability to test students in Science for Levels 3 and up. The Reasoning sections (Levels 3 and up) are Verbal Reasoning and Quantitative Reasoning. The Achievement sections complement this vital information through a series of English Language Arts Achievement Subtests and Mathematics Subtests. Comparisons between Reasoning results and Achievement results are unique to the CTP and very valuable data to consider.

HOW DO I USE THE CTP CONTENT STANDARDS MANUAL?

With reports in hand, or to answer questions that you may have on our standards, we suggest that you find the test level or the standard you wish to explore and then review the associated items that may help you understand how the student was asked to show their understanding of the concepts.

Scope and Sequence The Scope and Sequence chart provides an overview of the general content areas tested at each level of the CTP.

Content Categories As mentioned above, this manual documents the developmentally appropriate standard as outlined and addressed in each subtest in each domain by level. The standards are presented in sequence and associated sample items are highlighted in each area/level. Descriptions provide more detailed information about the concepts and skills tested at each level. At most levels, specific skills are linked to sample questions that appear later in the book; the relevant sample questions are indicated by bold, orange text e.g. **Reading Comprehension Sample Question 1**.

Sample Questions and Explanations The sample questions are intended to provide a general idea of the kinds of questions that will appear on the CTP. The questions in this book were all administered operationally in pilot tests and represent a cross section of the content areas and skills assessed in operational tests. The questions are clustered into groups by level, and each question is followed by an explanation of the correct answer and an indication of the content category exemplified by the question.

WHAT ARE THE CTP COMPONENT TESTS?

Verbal Tests

The CTP Verbal tests emphasize the development of reading and language skills necessary for effective communication both in academic settings and in the world beyond the classroom. The CTP Verbal Test assesses students in the following areas: Word Analysis, Auditory Comprehension, Verbal Reasoning, Vocabulary, Reading Comprehension, Writing Mechanics, and Writing Concepts and Skills.

Each of these seven subtests represents a distinct facet of verbal ability, but the skills measured are interrelated, and the tests should be considered parts of a whole and compared to each other as well as to comparative norm groups. Verbal Reasoning assesses the student's ability to conceptualize relationships among words and concepts and draw conclusions based on incomplete information reasoning analytically, categorically, and logically. Vocabulary addresses the notion that reading fluency depends upon an extensive vocabulary and the ability to use words appropriately given the context and to distinguish meaning. Reading comprehension measures a student's ability to comprehend, evaluate and draw conclusions using a variety of strategies to analyze both fiction and nonfiction text.

The verbal skills and concepts tested in each subtest at each level build on one another as well as on skills already mastered. At Levels 1 and 2, for example, the Word Analysis tests specifically emphasize the phonemic awareness and decoding skills that are vital for beginning readers. As students move through the years, these skills are measured using developmentally appropriate, but also challenging and complex texts, that assume students will draw upon strategies and skills with increasing fluency and comprehension over time.

The CTP Writing Mechanics subtest asks students to identify misspellings, recognize and correct mistakes in capitalization, and punctuation. The Writing Concepts and Skills subtest integrates a student's growing facility with grammar and usage, their understanding of and recognition of the essential elements/traits outlined in the writing process through an analysis of sentences presented. Overall, the Verbal tests offer a rich lens with which to view a student's achievement and reasoning skills in English Language Arts.

Mathematics Tests

The CTP Mathematics subtests consist of Mathematics, Quantitative Reasoning, and an Algebra I test at the appropriate level. Constructed-response is also available. Each subtest includes questions that assess students' understanding and application of a variety of content and process areas in mathematics. The CTP Mathematics tests parallel the NCTM's categories, with slight modifications that are appropriate for each grade level. Students are presented items in mathematics content areas important for students in grades K through 12 grouped under five main categories: Number and Operations, Algebra, Geometry, Measurement, and Data Analysis and Probability. CTP Mathematics content areas should be viewed as complementary rather than exclusive.

The CTP questions also assess the following mathematical processes: Conceptual Understanding, Procedural Knowledge, and Problem Solving. Questions that are classified under Conceptual Understanding ask students to recognize and manipulate fundamental ideas in mathematics. Questions that are classified under Procedural Knowledge ask students to recall factual information about mathematics or to demonstrate understanding of basic algorithms. Questions that are classified under Problem Solving ask students to apply and integrate concepts or to identify appropriate strategies.

Levels 3 to 10 of the CTP include Quantitative Reasoning tests to assess students' ability to engage in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics. In the test questions, students must use mathematics to make comparisons, formulate extensions or generalizations of mathematical concepts, and analyze mathematical situations.

For levels 5 through 10 of the CTP Mathematics Tests, calculators are allowed on one section of the multiple-choice achievement tests. In the NCTM Standards, the responsible use of calculators is encouraged. Technology is said to "aid in assessment," by allowing an alternate means to examine students' processes. However, the NCTM Standards also state that "technology should not be used as a replacement for basic understandings and intuitions." The CTP tests therefore do not allow the use of calculators on any of the following tests: the constructed-response component of the achievement tests, the Quantitative Reasoning tests, and the Algebra I test. This statement does not in any way diminish the benefits of CTP Online, which follows the same guidelines and standards, however, uses technology to enhance the testing experience, thereby engaging the modern student.

SCOPE AND SEQUENCE: **VERBAL TESTS**

Spring to Fall Grades:	Level 1 1 to 2	Level 2 2 to 3	Level 3 3 to 4	Level 4 4 to 5	Level 5 5 to 6	Level 6 6 to 7	Level 7 7 to 8	Level 8 8 to 9	Level 9 9 to 10	Level 10 10 to 11
Word Analysis	●	●								
Sight Words	●	●								
Phonic Analysis	●	●								
Structural Analysis	●	●								
Auditory Comprehension	●	●	●							
Vocabulary in Context	●	●	●							
Explicit Information	●	●	●							
Inference	●	●	●							
Analysis	●	●	●							
Reading Comprehension	●	●	●	●	●	●	●	●	●	●
Vocabulary in Context	●	●	●							
Explicit Information	●	●	●	●	●	●	●	●	●	●
Inference	●	●	●	●	●	●	●	●	●	●
Analysis	●	●	●	●	●	●	●	●	●	●
Reading for Understanding (optional CTP 4 only constructed-response section)	●	●	●	●	●	●	●	●	●	●
Writing Mechanics		●	●	●	●	●	●	●	●	●
Spelling		●	●	●	●	●				
Capitalization		●	●	●	●	●				
Punctuation		●	●	●	●	●				
Usage		●	●	●	●	●	●	●	●	●
Spelling, Capitalization, and Punctuation (combined)							●	●	●	●
Sentence Construction							●	●	●	●
Writing Concepts and Skills			●	●	●	●	●	●	●	●
Organization			●	●	●	●	●	●	●	●
Purpose, Audience, and Focus			●	●	●	●	●	●	●	●
Supporting Details			●	●	●	●	●	●	●	●
Style and Craft			●	●	●	●	●	●	●	●
Verbal Reasoning			●	●	●	●	●	●	●	●
Analogical Reasoning			●	●	●	●	●	●	●	●
Categorical Reasoning			●	●	●	●	●	●	●	●
Logical Reasoning			●	●	●	●	●	●	●	●
Vocabulary				●	●	●	●	●	●	●
Word Meanings				●	●	●	●	●	●	●
Precision				●	●	●	●	●	●	●
Application				●	●	●	●	●	●	●

SCOPE AND SEQUENCE: MATHEMATICS TESTS

Spring to Fall Grades:	Level 1 1 to 2	Level 2 2 to 3	Level 3 3 to 4	Level 4 4 to 5	Level 5 5 to 6	Level 6 6 to 7	Level 7 7 to 8	Level 8 8 to 9	Level 9 9 to 10	Level 10 10 to 11
Mathematics	●	●	●	●	●	●	●	●	●	●
Number Sense and Operations with Whole Numbers	●	●	●	●						
Number Sense and Operations with Fractions and Decimals			●	●						
Number Systems and Number Theory					●	●	●	●		
Number and Number Relationships					●	●	●	●	●	●
Geometry and Spatial Sense	●	●	●	●	●	●	●	●	●	●
Measurement	●	●	●	●	●	●	●	●		
Probability					●	●	●	●		
Statistics					●	●	●	●		
Pre-Algebra					●	●	●	●		
Data Analysis, Statistics, and Probability	●	●	●	●						
Patterns, Functions, and Pre-Algebra	●	●	●	●						
Algebra									●	●
Functions										●
Conceptual Understanding	●	●	●	●	●	●	●	●	●	●
Procedural Knowledge	●	●	●	●	●	●	●	●	●	●
Problem Solving	●	●	●	●	●	●	●	●	●	●
Math Communication (optional CTP 4 only constructed-response section)	●	●	●	●	●	●	●	●	●	●
Quantitative Reasoning			●	●	●	●	●	●	●	●
Comparison			●	●	●	●	●	●	●	●
Extensions/Generalizations			●	●	●	●	●	●	●	●
Analysis			●	●	●	●	●	●	●	●
Algebra 1							●	●	●	
Expressions, Statements, and Matrices							●	●	●	
Equations and Inequalities							●	●	●	
Tables, Graphs, and Algebraic Geometry							●	●	●	
Situations Involving Variable Quantities							●	●	●	

AUDITORY COMPREHENSION

The CTP Auditory Comprehension test at Level 1 measures students' ability to understand and interpret information presented orally. In addition to being able to listen to and follow the directions for taking the test itself, students must also be able to recognize and understand important words and plot points and to interpret and analyze information presented in a story read aloud. The development of good listening skills parallels and reinforces the development of good reading skills, and the skills tested in the Auditory Comprehension test therefore parallel those tested in the Reading Comprehension test. The following is a list of the skills measured by the CTP Auditory Comprehension test at Level 1.

Vocabulary in Context

The student will be able to use context clues to determine the meaning of a word or phrase in a text read aloud and choose the correct definition or synonym.

Explicit Information

The student will be able to identify explicit details from a passage read aloud and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text. **Levels 1-2 Sample Questions 1 & 2**

Inference

The student will be able to:

- Use implicit information from a passage read aloud to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage read aloud to summarize or draw conclusions.

Analysis

The student will be able to:

- Draw connections between and among various pieces of information in a text read aloud.
- Synthesize explicit and implicit information to make predictions or draw conclusions about a text read aloud.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 1 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text," including "word identification strategies" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 1.

Vocabulary in Context

The student will be able to use context clues to determine the meaning of a word or phrase in a text and choose the correct definition or synonym. **Levels 1-2 Sample Question 3**

Explicit Information

The student will be able to identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to summarize or draw conclusions. **Levels 1-2 Sample Questions 4 & 6**

Analysis

The student will be able to:

- Draw connections between and among various pieces of information in a text. **Levels 1-2 Sample Question 7**
- Synthesize explicit and implicit information to make predictions or draw conclusions about a text. **Levels 1-2 Sample Question 5**

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 1, most of the questions focus on information that is explicitly stated in the passages. The student will be able to:

- Describe the main idea of a passage.
- Describe a supporting idea in a passage. **Levels 1-2 Sample Question 8**
- Compare and contrast elements from two texts. **Levels 1-2 Sample Question 9**
- Synthesize information from two texts to make predictions or draw conclusions

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WORD ANALYSIS

Systematic vocabulary development is essential for reading fluency, and building phonemic awareness — learning the sound structure of language — is important for students in grades 1-3. Students must be able not only to recognize familiar words but to decode unfamiliar ones. The CTP Word Analysis test at Level 1 measures students' ability to recognize and decode words. In addition, the test measures understanding of basic structural elements of the English language, including morphemes and root/base words. The following is a list of the skills measured by the CTP Word Analysis test at Level 1.

Sight Words

The student will be able to recognize common words that are vital to reading fluency, especially those that do not follow basic rules of sound-letter correspondence.

Phonemic Analysis

The student will be able to recognize vowel and consonant sounds and blends in varying positions within a word (initial, medial, and final).

Structural Analysis

The student will be able to:

- Recognize compound words. **Levels 1-2 Sample Question 10**
- Understand the correct use of contractions and what they mean.
- Choose the root/base word with the appropriate inflectional ending in the context of a sentence.

MATHEMATICS

The five content strands in the Level 1 Mathematics tests are: 1) Numbers and Operations with Whole Numbers; 2) Geometry and Spatial Sense; 3) Measurement; 4) Data Analysis, Statistics, and Probability; and 5) Patterns, Functions, and Pre-Algebra. Along with subscores in the content areas, students receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics Achievement test at Level 1.

Number Sense and Operations with Whole Numbers

The student will be able to:

- Use place value, read, write, and compare whole numbers, use models to represent numbers, and use expanded notation.
- Add and subtract whole numbers, multiply single-digit numbers, know the language of basic operations, understand the relationship between addition and multiplication, and estimate sums, differences, products, and quotients.

- Understand the properties of arithmetic operations, including operations with zero, understand even and odd numbers, and multiply by multiples of 10.
- Solve real-life problems involving number operations, including basic money problems. **Levels 1-2 Sample Question 15**

Geometry and Spatial Sense

The student will be able to:

- Identify basic geometric figures and describe shapes, including circles, triangles, and rectangles. **Levels 1-2 Sample Question 16**
- Understand basic properties of figures, including closure, number of sides, vertices, and angles, and characterize lines as intersecting or parallel. **Levels 1-2 Sample Question 17**
- Identify relationships between figures and images under transformations; identify lines of symmetry and the effects of combining, subdividing, and changing basic shapes; and graph coordinates on a map grid.

Measurement

The student will be able to:

- Know the approximate sizes of customary and metric units and the relationships between measures within the same system and select appropriate units of measure
- Work with the basic measure of perimeter and area
- Solve real-life problems involving coins, elapsed time, calendars, temperature, weight, or distance and read time on a standard clock and degrees on a thermometer

Data Analysis, Statistics, and Probability

The student will be able to read and interpret various types of simple graphs, including bar, line, circle, pictorial graphs, and tables and tallies.

Patterns, Functions, and Pre-Algebra

The student will be able to:

- Recognize a wide variety of patterns and the rules that explain them.
- Select number sentences to represent problem situations. **Levels 1-2 Sample Question 18**

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Achievement tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: completing charts, making graphs, writing number sentences, understanding monetary units represented by coins, extending patterns, and constructing geometric figures to represent problems. **Levels 1-2 Sample Questions 19 & 20**

** Available for CTP 4 only*

AUDITORY COMPREHENSION

The CTP Auditory Comprehension test at Level 2 measures students' ability to understand and interpret information presented orally. In addition to being able to listen to and follow the directions for taking the test itself, students must also be able to recognize and understand important words and plot points and to interpret and analyze information presented in a story read aloud. The development of good listening skills parallels and reinforces the development of good reading skills, and the skills tested in the Auditory Comprehension test therefore parallel those tested in the Reading Comprehension test. The following is a list of the skills measured by the CTP Auditory Comprehension test at Level 2.

Vocabulary in Context

The student will be able to use context clues to determine the meaning of a word or phrase in a text read aloud and choose the correct definition or synonym.

Explicit Information

The student will be able to identify explicit details from a passage read aloud and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.

Inference

The student will be able to:

- Use implicit information from a passage read aloud to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage read aloud to summarize or draw conclusions.

Analysis

The student will be able to:

- Draw connections between and among various pieces of information in a text read aloud.
- Synthesize explicit and implicit information to make predictions or draw conclusions about a text read aloud.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 2 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text," including "word identification strategies" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 2.

Vocabulary in Context

The student will be able to use context clues to determine the meaning of a word or phrase in a text and choose the correct definition or synonym.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to summarize or draw conclusions.

Analysis

The student will be able to:

- Draw connections between and among various pieces of information in a text.
- Synthesize explicit and implicit information to make predictions or draw conclusions about a text.

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 2, most of the questions focus on information that is explicitly stated in the passages.

The student will be able to:

- Describe the main idea of a passage.
- Describe a supporting idea in a passage.
- Compare and contrast elements from two texts.
- Synthesize information from two texts to make predictions or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

** Available for CTP 4 only.*

WORD ANALYSIS

Systematic vocabulary development is essential for reading fluency, and building phonemic awareness — learning the sound structure of language — is important for students in grades 1-3. Students must be able not only to recognize familiar words but to decode unfamiliar ones. The CTP Word Analysis test at Level 2 measures students' ability to recognize and decode words and to choose words appropriate for the context of a sentence or passage. In addition, the test measures students' increasingly sophisticated understanding of basic structural elements of the English language, including morphemes and root/base words and correct plural and adjectival forms. The following is a list of the skills measured by the CTP Word Analysis test at Level 2.

Sight Words

The student will be able to recognize common words that are vital to reading fluency, especially those that do not follow basic rules of sound-letter correspondence.

Phonemic Analysis

The student will be able to recognize vowel and consonant sounds and blends in varying positions within a word (initial, medial, and final). **Levels 1-2 Sample Questions 11 & 12**

Structural Analysis

The student will be able to:

- Recognize compound words.
- Understand the correct use of contractions and what they mean.
- Choose the root/base word with the appropriate inflectional ending in the context of a sentence.
- Choose the correct plural form of a word in context.
- Understand the correct use of comparative and superlative adjectives.
- Use context clues to choose the appropriate word to fill in a blank in a sentence.

WRITING MECHANICS

The development of a foundational understanding of language conventions and mechanics is essential as students move from copying letters and words to writing sentences to composing paragraphs. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to “apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts” (36). The CTP Writing Mechanics test at Level 2 measures students' growing understanding of English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 2.

Spelling

The student will be able to identify misspellings of commonly used words, including words with affixes and words that display improper pluralization.

Capitalization

The student will be able to recognize correct and incorrect capitalization. Specific rules tested include:

- Capitalization of proper nouns.
- Capitalization of the first word of a sentence.

Punctuation

The student will be able to recognize correct and incorrect punctuation. Specific rules tested include:

- Proper punctuation for dialogue and letter writing.
- Correct end punctuation.
- The correct use of the comma.
- The correct use of the apostrophe in contractions and possessives. **Levels 1-2 Sample Question 13**

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Rules of diction within the context of a sentence.
- Correct verb form and tense, including subject-verb agreement. **Levels 1-2 Sample Question 14**

MATHEMATICS

The five content strands in the Level 2 Mathematics tests are: 1) Numbers and Operations with Whole Numbers; 2) Geometry and Spatial Sense; 3) Measurement; 4) Data Analysis, Statistics, and Probability; and 5) Patterns, Functions, and Pre-Algebra. The content strands for Level 2 are the same as the Level 1 content strands; however, the questions are appropriately more challenging. Additionally, Level 2 contains a few more questions on Patterns, Functions, and Pre-Algebra than Level 1, and there are topics included in Level 2 that are not included in Level 1. These topics are:

- Understanding the basic concept of chance.
- Understanding the basic concept of an equality relationship.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics Achievement test at Level 2.

Number Sense and Operations with Whole Numbers

The student will be able to:

- Use place value, read, write, and compare whole numbers, use models to represent numbers, and use expanded notation.
- Add and subtract whole numbers, multiply single-digit numbers, know the language of basic operations, understand the relationship between addition and multiplication, and estimate sums, differences, products, and quotients.
- Understand the properties of arithmetic operations, including operations with zero, understand even and odd numbers, and multiply by multiples of 10.
- Solve real-life problems involving number operations, including basic money problems.

Geometry and Spatial Sense

The student will be able to:

- Identify basic geometric figures and describe shapes, including circles, triangles, and rectangles.
- Understand basic properties of figures, including closure, number of sides, vertices, and angles, and characterize lines as intersecting or parallel.
- Identify relationships between figures and images under transformations; identify lines of symmetry and the effects of combining, subdividing, and changing basic shapes; and graph coordinates on a map grid.

Measurement

The student will be able to:

- Know the approximate sizes of customary and metric units and the relationships between measures within the same system and select appropriate units of measure.
- Work with the basic measure of perimeter and area.
- Solve real-life problems involving coins, elapsed time, calendars, temperature, weight, or distance, and read time on a standard clock and degrees on a thermometer.

Data Analysis, Statistics, and Probability

The student will be able to:

- Read and interpret various types of simple graphs, including bar, line, circle, pictorial, table, and tallies.
- Understand the concept of chance.

Patterns, Functions, and Pre-Algebra

The student will be able to:

- Recognize a wide variety of patterns and the rules that explain them.
- Select number sentences to represent problem situations.
- Understand the concept of equality.

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Mathematics test assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: listing mathematically sound results for a problem, naming geometric shapes, and displaying lines of symmetry.

** Available for CTP 4 only.*

VERBAL REASONING

The CTP Verbal Reasoning test at Level 3 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 3 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 3.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship. **Level 3 Sample Question 1**
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words.
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided.
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence. **Level 3 Sample Question 2**

AUDITORY COMPREHENSION

The CTP Auditory Comprehension test at Level 3 measures students' ability to understand and interpret information presented orally. In addition to being able to listen to and follow the directions for taking the test itself, students must also be able to recognize and understand important words and plot points and to interpret and analyze information presented in a story read aloud. The development of good listening skills parallels and reinforces the development of good reading skills, and the skills tested in the Auditory Comprehension test therefore parallel those tested in the Reading Comprehension test. The following is a list of the skills measured by the CTP Auditory Comprehension test at Level 3.

Vocabulary in Context

The student will be able to use context clues to determine the meaning of a word or phrase in a text read aloud and choose the correct definition or synonym. **Level 3 Sample Question 3**

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text. **Level 3 Sample Question 4**

Inference

The student will be able to:

- Use implicit information from a passage read aloud to make inferences about the motives or behaviors of characters. **Level 3 Sample Question 5**
- Use implicit information from a passage read aloud to summarize or draw conclusions.

Analysis

The student will be able to:

- Draw connections between and among various pieces of information in a text read aloud.
- Synthesize explicit and implicit information to make predictions or draw conclusions about a text read aloud.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 3 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text," including "word identification strategies" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 3.

Vocabulary in Context

The student will be able to use context clues to determine the meaning of a word or phrase in a text and choose the correct definition or synonym.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text. **Level 3 Sample Question 6**
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text. **Level 3 Sample Question 7**

READING COMPREHENSION CONTINUED**Inference**

The student will be able to:

- Use implicit information from a passage to summarize or draw conclusions.
- Use implicit information from a passage to make inferences about the motives or behaviors of characters. **Level 3 Sample Question 8**

Analysis

The student will be able to:

- Draw connections between and among various pieces of information in a text.
- Synthesize explicit and implicit information to make predictions or draw conclusions about a text. **Level 3 Sample Question 9**

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 3, most of the questions focus on information that is explicitly stated in the text. The student will be able to:

- Describe the main idea of a passage.
- Describe a supporting idea in a passage. **Level 3 Sample Question 10**
- Compare and contrast elements from two texts.
- Synthesize information from two texts to make predictions or draw conclusions. **Level 3 Sample Question 11**

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

**Available for CTP 4 only.*

WRITING MECHANICS

The development of a foundational understanding of language conventions and mechanics is essential as students move from copying letters and words to writing sentences to composing paragraphs. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to “apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts” (36). The CTP Writing Mechanics test at Level 3 measures students' growing understanding of English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 3.

Spelling

The student will be able to identify misspellings of commonly used words, including words with affixes and words that display improper pluralization.

Capitalization

The student will be able to recognize correct and incorrect capitalization. Specific rules tested include:

- Capitalization of proper nouns. **Level 3 Sample Question 12**
- Capitalization of the first word of a sentence.
- Capitalization in titles and forms of address.

Punctuation

The student will be able to recognize correct and incorrect punctuation. Specific rules tested include:

- The correct use of the comma.
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and letter writing.
- Correct end punctuation. **Level 3 Sample Question 13**

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence.
- Rules of sentence boundaries, including avoiding run-ons and fragments.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 3 begins to integrate students' developing facility with English grammar and usage with a growing understanding of writing and the writing process. As students begin to develop more comprehensive paragraphs and to learn the stages of the writing process, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 3.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions. **Level 3 Sample Question 14**
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Effectively and logically sequence information within a paragraph or passage.

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece. **Level 3 Sample Question 15**

Supporting Details

The student will be able to:

- Choose the appropriate main idea or topic sentence for a paragraph.
- Identify effective and relevant details to support a given idea or thesis. **Level 3 Sample Question 16**

Style and Craft

The student will be able to:

- Effectively combine two or more sentences into one logical sentence.
- Recognize and identify accurate and appropriate word choices in a piece of writing.
- Recognize and identify well-crafted sentences that exhibit rhetorical precision. **Level 3 Sample Question 17**

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 3.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes. **Level 3 Sample Question 18**
- Consider the relative measures of geometric shapes.
- Recognize relative sizes of units of measure, including between systems.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment.
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns and geometric representation of real-life situations. **Level 3 Sample Question 19**

Analysis

The student will be able to:

- Interpret symbolic representation of numerical quantities.
- Interpret charts, graphs, statistical measures, and basic probability.
- Model geometric transformations.

MATHEMATICS (PART 1 AND 2)

The six content strands in the Level 3 Mathematics test are: 1) Numbers and Operations with Whole Numbers; 2) Numbers and Operations with Fractions and Decimals; 3) Geometry and Spatial Sense; 4) Measurement; 5) Data Analysis, Statistics, and Probability; and 6) Patterns, Functions, and Pre-Algebra. The content strands for Level 3 differ from those for Level 2 in the addition of the strand about fractions and decimals. Even where the strands are the same, some topics are included in Level 3 but not in Level 2. Examples of such topics are:

- Using two- and three-dimensional models to represent whole numbers.
- Dividing whole numbers, including understanding the meaning of remainder.
- Understanding the concepts of mode and range.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 3.

Number Sense and Operations with Whole Numbers

The student will be able to:

- Use place value; read, write, and compare whole numbers; use models to represent, order, and compare whole numbers; and understand expanded notation.
- Perform arithmetic operations on whole numbers, know the language of basic operations, understand the relationship between addition and multiplication, and estimate sums, difference, products, and quotients.
- Understand the properties of arithmetic operations, including operations with zero, understand even and odd numbers, and multiply by multiples of 10. **Level 3 Sample Question 20**
- Solve real-life problems involving number operations.

Number Sense and Operations with Fractions and Decimals

The student will be able to:

- Use place value in relation to decimal numbers, recognize relative magnitude of fractions and decimals, and use models to represent order of fractions and decimals.
- Add and subtract simple fractions and find half of an even number.
- Solve real-life problems involving fractions and decimals, including money problems. **Level 3 Sample Questions 21 & 22**

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to describe and name shapes, including circles, triangles, and rectangles.
- Understand basic properties of figures, including number of sides, vertices, and angles, and characterize lines as intersecting or parallel.
- Identify relationships between figures and images under transformation and identify lines of symmetry and the effects of combining, subdividing, and changing basic shapes.

Measurement

The student will be able to:

- Understand approximate sizes in customary and metric units and the relationships between measures within the same system. **Level 3 Sample Question 23**
- Use appropriate units of measurement and appropriate tools for a given measurement and understand basic measure of perimeter and area.
- Solve real-life problems involving coins, elapsed time, calendars, temperature, weight, or distance.

Data Analysis, Statistics, and Probability

The student will be able to:

- Read and interpret various types of simple graphs, including bar, line, circle, pictorial, tables, and tallies.
- Understand the concepts of mean, mode, and range.
- Understand the concept of chance.

Patterns, Functions, and Pre-Algebra

The student will be able to:

- Recognize a wide variety of patterns and the rules that explain them.
- Solve simple open sentences involving operations on whole numbers and select number sentences to represent problem situations.

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: plotting points on a grid, estimating solutions, and graphically representing fractions. **Level 3 Sample Question 24 & 25**

** Available for CTP 4 only.*

VERBAL REASONING

The CTP Verbal Reasoning test at Level 4 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 4 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 4.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship.
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words.
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided.
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 4 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 4, vocabulary words are tested exclusively in the context of a sentence or passage. The following is a list of the skills measured by the CTP Vocabulary test at Level 4.

Word Meaning

The student will be able to:

- Understand the meaning of a word in the context of a sentence and identify the correct definition.
- Understand the meaning of a word in the context of a sentence and identify a synonym for that word.
- Understand the meaning of a word in the context of a sentence and identify an antonym of that word.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence.

Application

The student will be able to:

- Understand the meaning of a word in the context of a passage and identify the correct definition.
- Understand the meaning of a word in the context of a passage and identify a synonym for that word.
- Understand the meaning of a word in the context of a passage and identify an antonym of that word.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 4 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 4.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to answer specific questions about a text.

Analysis

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion.
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text.

READING COMPREHENSION CONTINUED

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 4, some questions require students to make elementary inferences about information that is not explicitly stated in the text. The student will be able to:

- Describe the main idea in a passage.
- Describe a supporting idea in a passage.
- Compare and contrast elements from two texts.
- Make inferences about a character's feelings or motivation.
- Synthesize information from two texts to make predictions or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WRITING MECHANICS

The development of a foundational understanding of language conventions and mechanics is essential as students move from copying letters and words to writing sentences to composing paragraphs. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 4 measures students' growing understanding of English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 4.

Spelling

The student will be able to identify misspellings of commonly used words, including words with affixes and words that display improper pluralization.

Capitalization

The student will be able to recognize correct and incorrect capitalization. Specific rules tested include:

- Capitalization of proper nouns.
- Capitalization of the first word of a sentence.
- Capitalization in titles and forms of address.

Punctuation

The student will be able to recognize correct and incorrect punctuation. Specific rules tested include:

- The correct use of the comma.
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and letter writing.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence.
- Rules of sentence boundaries, including avoiding run-ons and fragments.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 4 integrates students' developing facility with English grammar and usage with a growing understanding of writing and the writing process. As students begin to develop more comprehensive paragraphs and to learn the stages of the writing process, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 4.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Effectively and logically sequence information within a paragraph or passage.

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece.

Supporting Details

The student will be able to:

- Identify effective and relevant details to support a given idea or thesis.
- Choose the appropriate main idea or topic sentence for a paragraph.

Style and Craft

The student will be able to:

- Effectively combine two or more sentences into one logical sentence.
- Recognize and identify accurate and appropriate word choices in a piece of writing.
- Recognize and identify well-crafted sentences that exhibit rhetorical precision.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 4.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes.
- Recognize relative sizes of units of measure, including between systems.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment.
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret symbolic representation of numerical quantities.
- Interpret charts, graphs, statistical measures, and probability.
- Model geometric transformations.

MATHEMATICS (PART 1 AND 2)

The six content strands in the Level 4 Mathematics test are: 1) Numbers and Operations with Whole Numbers; 2) Numbers and Operations with Fractions and Decimals; 3) Geometry and Spatial Sense; 4) Measurement; 5) Data Analysis, Statistics, and Probability; and 6) Patterns, Functions, and Pre-Algebra. Some topics included in Level 4 but not in Level 3 are:

- Using powers of ten.
- Understanding squares of numbers.
- Understanding properties such as the commutative property, associative property, and the use of parentheses.
- Comparing fractions with unlike denominators.
- Modeling simple percents such as 25%, 50%, and 75%.
- Adding and subtracting fractions with like denominators or simple fractions with unlike denominators (e.g., halves and fourths).
- Naming and describing simple three-dimensional figures.

MATHEMATICS CONTINUED

- Naming the types of angles.
- Understanding a wider range of units of measurement, such as some units of capacity and mass.
- Finding the mean, median, and mode of a set of data.
- Using simple sample spaces to find probabilities.
- Using basic counting techniques.
- Understanding the concept of a variable.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 4.

Number Sense and Operations with Whole Numbers

The student will be able to:

- Use place value; read, write, and compare whole numbers; use models to represent, order, and compare whole numbers.
- Understand expanded notation, powers of ten, and squares of numbers.
- Perform arithmetic operations on whole numbers, know the language of basic operations, understand the relationship between addition and multiplication, and estimate sums, difference, products, and quotients.
- Understand the properties of arithmetic operations, including operations with zero, understand even and odd numbers, and multiply by multiples of 10.
- Solve real-life problems involving number operations and rate problems.

Number Sense and Operations with Fractions and Decimals

The student will be able to:

- Use place value in relation to decimal numbers, recognize relative magnitude of fractions and decimals, use models to represent order of fractions and decimals, and estimate fractions and decimals with pictures.
- Add and subtract decimals, simple fractions, and mixed numbers.
- Multiply and divide amounts of money by a single digit and find half of an even number and a quarter of a multiple of 4.
- Solve real-life problems involving fractions and decimals.

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to describe and name shapes, and identify segments, rays, lines, and angles.
- Understand basic properties of figures, including number of sides, vertices, angles, edges, and faces and characterize lines as intersecting, parallel, or perpendicular and angles as right, acute, or obtuse.
- Identify relationships between figures and images under transformation and identify lines of symmetry and the effects of combining, subdividing, and changing basic shapes.

Measurement

The student will be able to:

- Understand approximate sizes in customary and metric units and the relationships between measures within the same system.
- Use appropriate units of measurement and appropriate tools for a given measurement.
- Understand the basic measure of perimeter and area.
- Solve real-life problems involving elapsed time, calendars, temperature, capacity, weight, distance, or map scale.

Data Analysis, Statistics, and Probability

The student will be able to:

- Read and interpret various types of simple graphs, including bar, line, circle, pictorial, tables, and tallies.
- Understand and compute mean, median, mode, and range.
- Understand the concept of chance and basic counting techniques used to describe an event.

Patterns, Functions, and Pre-Algebra

The student will be able to:

- Recognize a wide variety of patterns and the rules that explain them and understand graphs of coordinates.
- Solve simple open sentences, including inequalities and select number sentences to represent problem situations.
- Understand the basic concept of an equality relationship and the concept of a variable.

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: solving problems that involve multiplication and division, showing alternate ways to solve a problem, generalizing output of a function machine, and interpreting a Venn diagram.

** Available for CTP 4 only.*

VERBAL REASONING

The CTP Verbal Reasoning test at Level 5 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 5 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 5.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship.
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words.
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided.
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 5 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 5, vocabulary words are tested exclusively in the context of a sentence or passage. The following is a list of the skills measured by the CTP Vocabulary test at Level 5.

Word Meaning

The student will be able to:

- Understand the meaning of a word in the context of a sentence and identify the correct definition.
- Understand the meaning of a word in the context of a sentence and identify a synonym for that word.
- Understand the meaning of a word in the context of a sentence and identify an antonym of that word.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence.

Application

The student will be able to:

- Understand the meaning of a word in the context of a passage and identify a synonym for that word.
- Understand the meaning of a word in the context of a passage and identify an antonym of that word.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 5 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 5.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.
- Understand connections between and among explicit pieces of information from a passage.
- Put pieces of information from the passage in the correct chronological order.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to answer specific questions about a text.

READING COMPREHENSION CONTINUED

Analysis

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion.
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage.
- Recognize cause-and-effect relationships among elements in a text.
- Categorize and combine pieces of information in a text.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text.

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 5, some questions require students to make inferences about information that is not explicitly stated in the text. The student will be able to:

- Describe the main idea in a passage.
- Describe a supporting idea in a passage.
- Compare and contrast elements from two texts.
- Make inferences about a character's feelings or motivation.
- Synthesize information from two texts to make predictions or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WRITING MECHANICS

The development of a foundational understanding of language conventions and mechanics is essential as students begin to write more complex texts. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 5 measures students' growing understanding of English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 5.

Spelling

The student will be able to identify misspellings of commonly used words, including words with affixes and words that display improper pluralization.

Capitalization

The student will be able to recognize correct and incorrect capitalization. Specific rules tested include:

- Capitalization of proper nouns.
- Capitalization of the first word of a sentence.
- Capitalization in titles and forms of address.

Punctuation

The student will be able to recognize correct and incorrect punctuation. Specific rules tested include:

- The correct use of the comma.
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and letter writing.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence.
- Rules of sentence boundaries, including avoiding run-ons and fragments.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 5 integrates students' developing facility with English grammar and usage with a growing understanding of writing and the writing process. As students continue to develop their writing skills and to learn the stages of the writing process, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 5.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Effectively and logically sequence information within a paragraph or passage.

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece.

Supporting Details

The student will be able to:

- Identify effective and relevant details to support a given idea or thesis.
- Choose the appropriate main idea or topic sentence for a paragraph.

Style and Craft

The student will be able to:

- Recognize and identify accurate and appropriate word choices in a piece of writing.
- Recognize and identify well-crafted sentences that exhibit rhetorical precision.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 5.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes.
- Recognize relative sizes of units of measure, including between systems.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment.
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret symbolic representation of numerical quantities.
- Evaluate statistical arguments.
- Model geometric transformations.

MATHEMATICS (PART 1 AND 2)

The seven content strands in the Level 5 Mathematics test are:

1) Numbers and Number Relationships; 2) Number Systems and Number Theory; 3) Geometry and Spatial Sense; 4) Measurement; 5) Statistics; 6) Probability; and 7) Pre-Algebra. The Number Sense and Operations strands from Levels 1 through 4 are replaced at Level 5 with two new number strands, recognizing the more advanced work at this level in arithmetic and properties of numbers. The Data strand from Levels 1 through 4 has been divided at Level 5 into two strands, reflecting the increased emphasis on statistics and probability. The Patterns strand from Levels 1 through 4 has been replaced with Pre-Algebra, recognizing the move at this level toward more formal algebra. Some topics included in Level 5 but not in Level 4 are:

- Using expanded notation and exponential forms of numbers.
- Working with percents:
- Understanding order of operations.
- Understanding prime numbers and composite numbers.

MATHEMATICS CONTINUED

- Understanding least common multiple and greatest common factor.
- Adding and subtracting fractions with unlike denominators.
- Understanding congruence and similarity.
- Identifying lines, line segments, rays and angles.
- Using coordinate geometry.
- Finding the range of a set of data.
- Using Venn diagrams and tree diagrams.
- Finding probabilities of related events.
- Formulating equations from word sentences.
- Applying the concepts of variable, expression, and equation to solve problems.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test. The following is a list of the skills measured by the CTP 4 Mathematics test at Level 5.

Numbers and Number Relationships

The student will be able to:

- Understand equivalent forms of fractions, decimals, and percents and use number sense for numbers in these forms.
- Understand multiple representation of numbers, including expanded notation and exponential forms.
- Apply numbers using multiple representations and understand plotting fractions on a real number line.

Number Systems and Number Theory

The student will be able to:

- Understand place value with whole numbers and decimals and recognize ordering of fractions and decimals.
- Understand multiples, factors, primes, and composites.
- Understand order of operations with whole numbers.
- Apply operations with fractions and decimals and number theory concepts in everyday mathematical situations.

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to identify, describe, and name shapes.
- Understand basic characteristics and properties of figures, including applications in coordinate geometry.
- Apply geometric properties and relationships, including congruence of figures, lines of symmetry, sum of angle measures in a triangle, images, under transformation, and two- and three-dimensional shape changes.

Measurement

The student will be able to:

- Understand systems of measurement and the relationships among units of the same system.
- Use units appropriately and estimate measures using scale.
- Understand the measures of figures, including perimeter, circumference, surface area, volume and angles (figures include rectangular solids).
- Understand the application of formulas in deriving measures and solve simple rate problems.

Statistics

The student will be able to:

- Read and interpret various types of simple graphs, including bar, single and double line, circle, pictorial, and tables.
- Understand and compute mean, median, mode, and range.

Probability

The student will be able to:

- Determine probabilities, solve problems of chance using ratios and related probabilities, and make predictions based on mathematical probabilities.
- Understand counting techniques, including the use of probability to determine amounts.

Pre-Algebra

The student will be able to:

- Represent patterns and mathematical situations involving tables, graphs, and equations.
- Understand the use of variables, balancing equations, and completing simple mathematical sentences to find an unknown.
- Apply variables, expressions, and equations to solve real-world problems and formulate equations from word sentences.

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Achievement tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: solving rate problems, evaluating strategies used to solve a problem, and displaying information that satisfies given constraints.

** Available for CTP 4 only.*

VERBAL REASONING

The CTP Verbal Reasoning test at Level 6 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 6 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 6.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship. **Levels 4-6 Sample Question 1**
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words. **Levels 4-6 Sample Question 2**
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided. **Levels 4-6 Sample Question 3**
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 6 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 6, vocabulary words are tested exclusively in the context of a sentence or passage. The following is a list of the skills measured by the CTP Vocabulary test at Level 6.

Word Meaning

The student will be able to:

- Understand the meaning of a word in the context of a sentence and identify the correct definition.
- Understand the meaning of a word in the context of a sentence and identify a synonym for that word.

- Understand the meaning of a word in the context of a sentence and identify an antonym of that word.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence. **Levels 4-6 Sample Questions 4 & 5**

Application

The student will be able to:

- Understand the meaning of a word in the context of a passage and identify the correct definition of that word.
- Understand the meaning of a word in the context of a passage and identify a synonym for that word.
- Understand the meaning of a word in the context of a passage and identify an antonym of that word.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 6 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 6.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text. **Levels 4-6 Sample Questions 6, 7, 8, 11, & 12**
- Understand connections between and among explicit pieces of information from a passage.
- Put pieces of information from the passage in the correct chronological order.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters. **Levels 4-6 Sample Question 13**
- Use implicit information from a passage to answer specific questions about a text.

READING COMPREHENSION CONTINUED**Analysis**

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion. **Levels 4-6 Sample Question 9**
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage.
- Compare and contrast elements in a text.
- Categorize and combine pieces of information in a text.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text. **Levels 4-6 Sample Questions 10 & 14**

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 6, most questions require students to make inferences about information that is not explicitly stated in the text. The student will be able to:

- Describe the main idea in a passage.
- Describe the overall theme of a passage.
- Describe a supporting idea in a passage. **Levels 4-6 Sample Question 15**
- Compare and contrast elements from two texts. **Levels 4-6 Sample Question 16**
- Make inferences about a character's feelings or motivation.
- Synthesize information from two texts to describe supporting ideas, make predictions, or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WRITING MECHANICS

The development of a foundational understanding of language conventions and mechanics is essential as students begin to write more complex texts. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 6 measures students' growing understanding of English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 6.

Spelling

The student will be able to identify misspellings of commonly used words, including words with affixes and words that display improper pluralization. **Levels 4-6 Sample Question 17**

Capitalization

The student will be able to recognize correct and incorrect capitalization. Specific rules tested include:

- Capitalization of proper nouns.
- Capitalization of the first word of a sentence.
- Capitalization in titles and forms of address.

Punctuation

The student will be able to recognize correct and incorrect punctuation. Specific rules tested include:

- The correct use of the comma.
- The correct use of the apostrophe in contractions and possessives. **Levels 4-6 Sample Question 18**
- Proper punctuation for dialogue and letter writing.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence. **Levels 4-6 Sample Question 19**
- Rules of sentence boundaries, including avoiding run-ons and fragments. **Levels 4-6 Sample Question 20**

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 6 integrates students' developing facility with English grammar and usage with a growing understanding of writing and the writing process. As students continue to develop their writing skills and to learn the stages of the writing process, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 6.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Effectively and logically sequence information within a paragraph or passage. **Levels 4-6 Sample Questions 21 & 22**

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece. **Levels 4-6 Sample Question 23**

Supporting Details

The student will be able to:

- Identify effective and relevant details to support a given idea or thesis. **Levels 4-6 Sample Question 24**
- Choose the appropriate main idea or topic sentence for a paragraph. **Levels 4-6 Sample Question 25**

Style and Craft

The student will be able to:

- Recognize and identify accurate and appropriate word choices in a piece of writing.
- Recognize and identify well-crafted sentences that exhibit rhetorical precision.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 6.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes. **Levels 4-6 Sample Question 26**
- Recognize relative sizes of units of measure, including between systems.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment. **Levels 4-6 Sample Question 27**
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret symbolic representation of numerical quantities. **Levels 4-6 Sample Question 28**
- Evaluate statistical arguments.
- Model geometric transformations. **Levels 4-6 Sample Question 29**

MATHEMATICS (PART 1 AND 2)

The seven content strands in the Level 6 Mathematics test are: 1) Numbers and Number Relationships; 2) Number Systems and Number Theory; 3) Geometry and Spatial Sense; 4) Measurement; 5) Statistics; 6) Probability; and 7) Pre-Algebra. Some topics included in Level 6 but not in Level 5 are:

- Using scientific notation to represent numbers.
- Understanding similarity of geometric figures.
- Using the triangle inequality.
- Understanding the volume and surface area of triangular prisms.
- Understanding the volume of cylinders.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 6.

Numbers and Number Relationships

The student will be able to:

- Understand equivalent forms of fractions, decimals, and percents and use number sense for numbers in these forms. **Levels 4-6 Sample Question 30**
- Understand multiple representation of numbers, including expanded notation, exponential forms, and scientific notation.
- Apply numbers using multiple representations and understand plotting fractions on a real number line.

Number Systems and Number Theory

The student will be able to:

- Understand place value with whole numbers and decimals and recognize ordering of fractions and decimals.
- Understand multiples, factors, primes, and composites.
- Understand order of operations with whole numbers.
- Apply operations with fractions and decimals and number theory concepts in everyday mathematical situations. **Levels 4-6 Sample Question 31**

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to describe and name shapes. **Levels 4-6 Sample Question 32**
- Understand basic properties of figures, including applications in coordinate geometry. **Levels 4-6 Sample Question 33**
- Apply geometric properties and relationships, including congruence of figures, lines of symmetry, sum of angle

measures in a triangle, triangle inequality, images under transformation, and two- and three- dimensional shape changes.

Measurement

The student will be able to:

- Understand systems of measurement and the relationships among units of the same system.
- Use units appropriately and estimate measures using scale.
- Understand the measures of figures, including perimeter, circumference, surface area, volume, and angles (figures include rectangular and triangular solids). **Levels 4-6 Sample Questions 34, 35, & 36**
- Understand the application of formulas in deriving measures and solve simple rate problems.

Statistics

The student will be able to:

- Read and interpret various types of simple graphs, including bar, single and double line, circle, pictorial, and tables.
- Understand and compute mean, median, mode, and range. **Levels 4-6 Sample Questions 37 & 38**

Probability

The student will be able to:

- Determine probabilities, solve problems of chance using ratios and related probabilities, and make predictions based on mathematical probabilities. **Levels 4-6 Sample Question 39**
- Understand counting techniques, including the use of probability to determine amounts.

Pre-Algebra

The student will be able to:

- Represent patterns and mathematical situations involving tables, graphs, and equations.
- Understand the use of variables, balancing equations, and completing simple mathematical sentences to find an unknown.
- Apply variables, expressions, and equations to solve real-world problems and formulate equations from word sentences.

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: using mathematical argument to support a conclusion, representing percents in a circle graph, and supplying an example to demonstrate a statistical problem. **Levels 4-6 Sample Questions 40 & 41**

** Available for CTP 4 only.*

VERBAL REASONING

The CTP Verbal Reasoning test at Level 7 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 7 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 7.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship.
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words.
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided.
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 7 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 7, vocabulary words are tested both in and out of context. The following is a list of the skills measured by the CTP Vocabulary test at Level 7.

Word Meaning

The student will be able to:

- Identify a synonym for a word, either in the context of a sentence or alone.
- Identify an antonym of a word, either in the context of a sentence or alone.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence.

Application

The student will be able to:

- Understand the meaning of a word in the context of a passage and identify the correct definition of that word.
- Understand the meaning of a word in the context of a passage and identify a synonym for that word. **Levels 7-10 Sample Questions 7-10**
- Understand the meaning of a word in the context of a passage and identify an antonym of that word.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 7 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 7.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.
- Understand connections between and among explicit pieces of information from a passage.
- Put pieces of information from the passage in the correct chronological order.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to answer specific questions about a text.

Analysis

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion.
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage.
- Compare and contrast elements in a text.
- Categorize and combine pieces of information in a text.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text.

READING COMPREHENSION CONTINUED**Reading for Understanding**

Optional Constructed-Response Section

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 7, most questions require students to make inferences about information that is not explicitly stated in the text. The student will be able to:

- Describe the main idea in a passage.
- Describe the overall theme of a passage.
- Describe a supporting idea in a passage.
- Compare and contrast elements from two texts.
- Make inferences about a character's feelings or motivation.
- Make inferences about the author's purpose.
- Synthesize information from two texts to describe supporting ideas, make predictions, or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

** Available for CTP 4 only.*

WRITING MECHANICS

The development of an increasingly sophisticated understanding of language conventions and mechanics is essential as students continue to write more and more complex texts. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 7 measures students' growing facility with English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 7.

Spelling, Capitalization, and Punctuation

The student will be able to recognize spelling, capitalization, and punctuation errors. Specific elements tested include:

- Spelling of commonly used words, including words with affixes and words that display improper pluralization.
- Capitalization of proper nouns.
- Capitalization in titles and forms of address.
- The correct use of the comma, semicolon, and colon.
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and letter writing.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence.

Sentence Construction

The student will be able to apply rules regarding sentence boundaries, including recognizing run-on sentences and sentence fragments.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 7 integrates students' developing facility with English grammar and usage with a growing understanding of writing and the writing process. As students continue to develop their writing skills and to learn the stages of the writing process, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 7.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Effectively and logically sequence information within a paragraph or passage.

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece.

Supporting Details

The student will be able to:

- Identify effective and relevant details to support a given idea or thesis.
- Choose the appropriate main idea or topic sentence for a paragraph.

Style and Craft

The student will be able to:

- Recognize and identify accurate and appropriate word choices in a piece of writing.
- Effectively combine two or more sentences into one logical sentence.
- Recognize and identify well-crafted sentences that exhibit rhetorical precision.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 7.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment.
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret algebraic representations.
- Evaluate statistical arguments, including counting principles and basic interpretation of probabilities.
- Model geometric transformations.

MATHEMATICS (PART 1 AND 2)

The content strands in the Level 7 Mathematics test are: 1) Numbers and Number Relationships; 2) Number Systems and Number Theory; 3) Geometry; 4) Measurement; 5) Probability; 6) Statistics; and 7) Pre-Algebra. Some topics included in Level 7 but not in Level 6 are:

- Representing numbers in one- and two-dimensional graphs.
- Estimating square roots.
- Applying theories of whole numbers, and signed numbers in context.
- Using the Pythagorean Theorem.
- Computing perimeter and area of irregular figures.
- Solving linear equations and inequalities.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 7.

Numbers and Number Relationships

The student will be able to:

- Understand equivalent forms of fractions, decimals, and percents; use estimates of these numbers and square roots; and use multiple representation of numbers, including exponential and scientific notations.
- Recognize the form of a number appropriate for use in a given situation and apply ratio, percent, and proportion in a variety of situations.
- Represent number relationships in one- and two-dimensional graphs.

Number Systems and Number Theory

The student will be able to:

- Recognize the need for numbers beyond whole numbers, including signed numbers, decimals, and fractions.
- Identify perfect squares, factors, or multiples of integers, including least common multiple and greatest common divisor.
- Apply operations with fractions, decimals, and signed numbers and number theory concepts in everyday mathematical situations.
- Understand order of arithmetic operations.

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to classify and characterize properties of geometric figures.
- Apply geometric properties and relationships to two- and three- dimensional figures, including the Pythagorean Theorem, congruence and similarity of figures, lines of symmetry, sum of angle measures in a triangle, triangle inequality, and transformation in the coordinate plane.

Measurement

The student will be able to:

- Apply concepts of measure, including perimeter, circumference, surface area, volume, weight, and angle measure (figures include irregular shapes).
- Use units appropriately and estimate measures using scale.
- Develop formulas to solve problems of measure and solve simple rate problems.

Probability

The student will be able to:

- Determine probabilities, solve problems of chance using ratios and related probabilities, and make predictions based on mathematical probabilities.
- Understand counting techniques, including the use of permutations and combinations.

Statistics

The student will be able to:

- Generate, organize, evaluate, and interpret various data representations.
- Understand and compute mean, median, mode, and range.

Pre-Algebra

The student will be able to:

- Represent patterns and mathematical situations involving tables, graphs, verbal rules, and equations.
- Solve simple linear equations and inequalities.
- Apply variables, expressions, and equations to solve real-world problems and mathematical problems.

Math Communication*Optional Constructed-Response Section**

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: showing application of the Pythagorean Theorem to solve a problem, placing fractions and decimals on a number line, and expressing a relationship algebraically.

** Available for CTP 4 only.*

VERBAL REASONING

The CTP Verbal Reasoning test at Level 8 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 8 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 8.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship. **Levels 7-10 Sample Question 1**
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words. **Levels 7-10 Sample Question 2**
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided. **Levels 7-10 Sample Question 3**
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 8 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 8, vocabulary words are tested both in and out of context. The following is a list of the skills measured by the CTP Vocabulary test at Level 8.

Word Meaning

The student will be able to identify synonyms and antonyms of words.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence. **Levels 7-10 Sample Questions 4 & 5**

Application

The student will be able to:

- Identify the correct definition of a word in the context of a passage. **Levels 7-10 Sample Question 6**
- Identify a synonym or antonym of a word in the context of a passage.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 8 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 8.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.
- Understand connections between and among explicit pieces of information from a passage.
- Put pieces of information from the passage in the correct chronological order.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to answer specific questions about a text.

Analysis

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion.
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text.

READING COMPREHENSION CONTINUED**Reading for Understanding***Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 8, most questions require students to make inferences about information that is not explicitly stated in the text. The student will be able to:

- Describe the main idea or overall theme of a passage and/or summarize the main points of a passage.
- Describe a supporting idea in a passage. **Levels 7-10 Sample Question 22**
- Compare and contrast elements from two texts.
- Make inferences about a character's motivation or the author's purpose.
- Synthesize information from two texts to describe supporting ideas, make predictions, or draw conclusions. **Levels 7-10 Sample Question 23**

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WRITING MECHANICS

The development of an increasingly sophisticated understanding of language conventions and mechanics is essential as students continue to write more and more complex texts. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 8 measures students' growing facility with English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 8.

Spelling, Capitalization, and Punctuation

The student will be able to recognize spelling, capitalization, and punctuation errors. Specific elements tested include:

- Spelling of commonly used words, including words with affixes and words that display improper pluralization. **Levels 7-10 Sample Question 24**
- Capitalization of proper nouns and in titles and forms of address.
- The correct use of the comma, semicolon, and colon. **Levels 7-10 Sample Question 25**
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and quotations.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence. **Levels 7-10 Sample Question 26**

Sentence Construction

The student will be able to apply rules regarding sentence boundaries, including recognizing run-on sentences and sentence fragments.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 8 integrates students' developing facility with English grammar and usage with an increasingly sophisticated understanding of the writing process. As students continue to develop their writing skills, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 8.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Effectively and logically sequence information. **Levels 7-10 Sample Questions 27 & 28**

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece. **Levels 7-10 Sample Question 29**

Supporting Details

The student will be able to:

- Identify effective and relevant details to support a given idea or thesis.
- Choose the appropriate main idea or topic sentence for a paragraph. **Levels 7-10 Sample Questions 30 & 31**

Style and Craft

The student will be able to:

- Recognize and identify accurate and appropriate word choices in a piece of writing.
- Effectively combine two or more sentences into one logical sentence.
- Recognize and identify well-crafted sentences that exhibit rhetorical precision.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 8.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes.
- Recognize relative sizes of units of measure, including between systems.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment. **Levels 7-10 Sample Question 32**
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns logic problems, and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret algebraic representations. **Levels 7-10 Sample Questions 33 & 34**
- Evaluate statistical arguments, including counting principles and basic interpretation of probabilities.

MATHEMATICS (PART 1 AND 2)

The seven content strands in the Level 8 Mathematics test are: 1) Numbers and Number Relationships; 2) Number Systems and Number Theory; 3) Geometry; 4) Measurement; 5) Probability; 6) Statistics; and 7) Pre-Algebra. At Level 8 there is an increased emphasis on questions in Pre-Algebra. Additionally, some topics included in Level 8 but not in Level 7 are:

- Using properties of three-dimensional figures.
- Computing volume and surface area of irregular three-dimensional figures.
- Graphing lines in the coordinate plane.
- Simplifying simple algebraic expressions.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 7.

Numbers and Number Relationships

The student will be able to:

- Understand equivalent forms of fractions, decimals, and percents; use estimates of these numbers and square roots; and use multiple representation of numbers, including exponential and scientific notations. **Levels 7-10 Sample Question 35**
- Recognize the form of a number appropriate for use in a given situation and apply ratio, percent, and proportion in a variety of situations. **Levels 7-10 Sample Questions 36 & 37**
- Represent number relationships in one- and two-dimensional graphs.

Number Systems and Number Theory

The student will be able to:

- Recognize the need for numbers beyond whole numbers, including signed numbers, decimals, and fractions.
- Identify perfect squares, factors, or multiples of integers, including least common multiple and greatest common divisor.
- Apply operations with fractions, decimals, and signed numbers and number theory concepts in everyday mathematical situations.
- Understand order of arithmetic operations.

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to classify and characterize properties of geometric figures including three-dimensional figures.

- Apply geometric properties and relationships to two- and three-dimensional figures including the Pythagorean Theorem, congruence and similarity of figures, lines of symmetry, sum of angle measures in a polygon, triangle inequality, and transformation in the coordinate plane.

Levels 7-10 Sample Question 38

Measurement

The student will be able to:

- Apply concepts of measure, including perimeter, circumference, surface area, volume, weight, and angle measure (figures include irregular shapes).
- Use units appropriately and estimate measures using scale.
- Develop formulas to solve problems of measure and solve simple rate problems.

Probability

The student will be able to:

- Determine probabilities, solve problems of chance using ratios and related probabilities and make predictions based on mathematical probabilities. **Levels 7-10 Sample Question 39**
- Understand counting techniques including use of permutations and combinations.

Statistics

The student will be able to:

- Generate, organize, evaluate, and interpret various data representations.
- Understand and compute mean, median, mode, and range.

Pre-Algebra

The student will be able to:

- Represent patterns and mathematical situations involving tables, graphs, verbal rules, and equations. **Levels 7-10 Sample Question 40**
- Solve simple linear equations and inequalities, simplify algebraic expression and graph linear equations and inequalities on a number line or in the coordinate plane. **Levels 7-10 Sample Question 41**
- Apply variables, expressions and equations to solve real-world problems and mathematical problems including simple non-linear equations. **Levels 7-10 Sample Questions 42 & 43**

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: drawing a three-dimensional solid resulting from a transformation, citing a counterexample to disprove a statement, and writing a linear equation from information given about the line. **Levels 7-10 Sample Questions 44 & 45**

** Available for CTP 4 only.*

ALGEBRA I

The Algebra I test is an end-of-course test and should be administered at the completion of a first-year course in Algebra. The four content strands in the Algebra I test are 1) Expressions, Statements, and Matrices; 2) Equations and Inequalities; 3) Tables, Graphs, and Algebraic Geometry; and 4) Situations Involving Variable Quantities. The following is a list of the skills measured by the CTP Algebra I test at Level 8.

Expressions, Statements, and Matrices

The student will be able to:

- Simplify algebraic expressions in various forms by applying arithmetic properties (forms include rational and exponential expressions).
- Understand equivalent algebraic expressions, including expressions that are obtained by factoring.
- Evaluate algebraic expressions for given values.

Equations and Inequalities

The student will be able to:

- Solve linear equations/inequalities, simple systems of linear equations, and literal equations for one variable. **Levels 7-10 Sample Questions 46 & 47**
- Identify arithmetic properties.
- Apply algebraic equations to solve real-life problems and mathematical situations.
- Solve simple quadratic equations. **Levels 7-10 Sample Question 48**
- Understand relationships of coefficients for equivalent quadratic expressions.

Tables, Graphs, and Algebraic Geometry

The student will be able to:

- Understand the xy -coordinate system and graphs of points, linear equations, and linear inequalities. **Levels 7-10 Sample Question 49**
- Identify linear equations and their characteristics, including slope and x - and y -intercepts.
- Recognize relationships between parallel and perpendicular lines.

Situations Involving Variable Quantities

The student will be able to translate real-life and mathematical situations into algebraic expressions or equations. **Levels 7-10 Sample Question 50**

VERBAL REASONING

The CTP Verbal Reasoning test at Level 9 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 9 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 9.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship.
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words.
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided.
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 9 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 9, vocabulary words are tested both in and out of context. The following is a list of the skills measured by the CTP Vocabulary test at Level 9.

Word Meaning

The student will be able to identify synonyms and antonyms of words.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence.

Application

The student will be able to:

- Understand the meaning of a word in the context of a passage and identify the correct definition of that word.
- Understand the meaning of a word in the context of a passage and identify a synonym for that word.
- Understand the meaning of a word in the context of a passage and identify an antonym of that word.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 9 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 9.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text. **Levels 7-10 Sample Question 11**
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text. **Levels 7-10 Sample Question 17**
- Understand connections between and among explicit pieces of information from a passage.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to answer specific questions about a text. **Levels 7-10 Sample Questions 12, 18, 19, & 20**

READING COMPREHENSION CONTINUED**Analysis**

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion.
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage. **Levels 7-10 Sample Questions 13, 14, 15, & 21**
- Compare and contrast elements in a text.
- Categorize and combine pieces of information in a text.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text.
- Identify the style, tone, or theme of a text. **Levels 7-10 Sample Question 16**

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 9, most questions require students to make inferences about information that is not explicitly stated in the text. At this level, students are also asked to apply their growing understanding of figurative language to answer some questions. The student will be able to:

- Describe the main idea or overall theme of a passage and/or summarize the main points of a passage.
- Describe the overall theme of a passage.
- Describe a supporting idea in a passage.
- Apply understanding of figurative language to describe aspects of a passage.
- Compare and contrast elements from two texts.
- Make inferences about a character's motivation or the author's purpose.
- Synthesize information from two texts to describe supporting ideas, make predictions, or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WRITING MECHANICS

The development of an increasingly sophisticated understanding of language conventions and mechanics is essential as students continue to write more and more complex texts. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) ... to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 9 measures students' growing facility with English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 9.

Spelling, Capitalization, and Punctuation

The student will be able to recognize spelling, capitalization, and punctuation errors. Specific elements tested include:

- Spelling of commonly used words.
- Capitalization of proper nouns.
- Capitalization in titles and forms of address.
- The correct use of the comma, semicolon, and colon.
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and quotations.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence.
- Rules regarding sentence boundaries, including avoiding run-ons and fragments and recognizing sentence types.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 9 integrates students' developing facility with English grammar and usage with an increasingly sophisticated understanding of the writing process. As students continue to develop their writing skills, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 9.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Recognize effective and logical organization and organizational strategies.

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece.

Supporting Details

The student will be able to:

- Draw conclusions based on supporting details in a passage.
- Determine the stated or implied purpose of supporting details within the context of a passage.
- Make judgments about the relative importance of supporting details to the passage as a whole.

Style and Craft

The student will be able to:

- Identify rhetorical features that contribute to the overall precision and style of a piece of writing.
- Identify the author's tone or voice in a piece of writing.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics. The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 9.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment.
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns, logic problems, and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret algebraic representations, including those in real-life situations.
- Interpret geometric representations, including applying properties in coordinate geometry.
- Evaluate statistical arguments, including counting principles, measures of central tendency, and interpretation of probabilities.

MATHEMATICS (PART 1 AND 2)

The four content strands in the Level 9 Mathematics test are: 1) Numbers and Number Relationships; 2) Geometry and Spatial Sense; 3) Data Analysis, Probability, and Statistics; and 4) Algebra. Level 9 is the first level that has an Algebra content strand, and the number of questions in Geometry at this level is significantly greater than the number at any prior level. Additionally, topics included in Level 9 but not in Level 8 are:

- Applying the different forms of real numbers, including radicals, in a variety of situations.
- Performing operations with different forms of real numbers.
- Understanding properties of quadrilaterals, triangles, and circles and applying basic theorems related to them.
- Solving a literal equation for a variable.
- Applying variables, expressions, and equations to solve problems.
- Understanding the concepts of slope and x - and y -intercepts, and applying these concepts to finding the equation of a line, making predictions, and to solving rate problems.

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 9.

Numbers and Number Relationships

The student will be able to:

- Understand different forms of real numbers and the relationships between them including fractions, decimals, percents, and exponential and scientific notation.
- Understand properties of operations and perform operations with different forms of real numbers.
- Apply different forms of real numbers in a variety of situations (forms include radicals).
- Apply theories of whole numbers in a variety of situations.

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to classify and characterize properties of geometric figures including quadrilaterals, triangles, circles, and three-dimensional figures.
- Apply geometric properties and relationships to two- and three-dimensional figures, including the Pythagorean Theorem, sum of angle measures in a polygon, and triangle inequality; develop formulas to solve geometric problems; and use number line and coordinate geometry.

- Apply concepts of measure, including perimeter, circumference, surface area, volume, weight, angle measure, distance, and slope as they relate to parallel or perpendicular lines.
- Apply concepts of congruence, similarity, and simple transformation.

Data Analysis, Statistics, and Probability

The student will be able to:

- Generate, organize, evaluate, and interpret various data representations, including graphs, charts, and histograms.
- Understand counting techniques for solving problems, including the use of permutations and combinations; understand and compute mean, median, mode, and range; and make conjectures and inferences from data provided.
- Determine probabilities, solve problems of chance using ratios and related probabilities, and make predictions based on mathematical probabilities.

Algebra

The student will be able to:

- Represent patterns and mathematical situations using tables, graphs, verbal rules, and equations.
- Understand properties of operations, including commutative and associative, and simplify algebraic expressions.
- Solve linear equations and inequalities in one variable and solve literal equations for a variable.
- Apply variables, expressions, and equations to solve real-world problems and mathematical problems including nonlinear equations.
- Understand slope and x - and y -intercepts and apply these concepts to find an equation of a line, make predictions, and solve rate problems.

Math Communication*Optional Constructed-Response Section*

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: showing the solution of a system of equations, explaining properties of parallel lines used to find angle measures, and using formulas to compute geometric measures.

** Available for CTP 4 only.*

ALGEBRA I

The Algebra I test is an end-of-course test and should be administered at the completion of a first-year course in Algebra. The four content strands in the Algebra I test are:

1) Expressions, Statements, and Matrices; 2) Equations and Inequalities; 3) Tables, Graphs, and Algebraic Geometry; and 4) Situations Involving Variable Quantities. The following is a list of the skills measured by the CTP Algebra I test at Level 9.

Expressions, Statements, and Matrices

The student will be able to:

- Simplify algebraic expressions in various forms by applying arithmetic properties (forms include rational and exponential expressions).
- Understand equivalent algebraic expressions, including expressions that are obtained by factoring.
- Evaluate algebraic expressions for given values.

Equations and Inequalities

The student will be able to:

- Solve linear equations/inequalities, simple systems of linear equations, and literal equations for one variable.
- Identify arithmetic properties.
- Apply algebraic equations to solve real-life problems and mathematical situations.
- Solve simple quadratic equations.
- Understand relationships of coefficients for equivalent quadratic expressions.

Tables, Graphs, and Algebraic Geometry

The student will be able to:

- Understand the xy -coordinate system and graphs of points, linear equations, and linear inequalities.
- Identify linear equations and their characteristics, including slope and x - and y -intercepts.
- Recognize relationships between parallel and perpendicular lines.

Situations Involving Variable Quantities

The student will be able to translate real-life and mathematical situations into algebraic expressions or equations.

VERBAL REASONING

The CTP Verbal Reasoning test at Level 10 measures students' ability to conceptualize relationships among words and concepts and to draw conclusions based on incomplete information. The ability to infer information that is not explicitly stated in a text is an essential aspect of fluency in reading; the CTP Verbal Reasoning test at Level 10 evaluates students' developing proficiency in this area. The following is a list of the skills measured by the CTP Verbal Reasoning test at Level 10.

Analogical Reasoning

The student will be able to:

- Recognize the relationship between two words and identify another pair of words with the same relationship.
- Identify the definition that accurately describes the relationship between a pair of words.

Categorical Reasoning

The student will be able to:

- Recognize which of several elements does or does not fit into a thematically grouped list of words.
- Generalize about a thematically grouped list of words and choose an appropriate heading for the list.

Logical Reasoning

The student will be able to:

- Solve deductive ordering problems and draw conclusions that are directly deducible from the information provided.
- Solve inductive reasoning problems by reasoning from details or evidence to a generalization or hypothesis that makes sense of the evidence.

VOCABULARY

Reading fluency depends on both an extensive learned vocabulary and the ability to decode unfamiliar words. The CTP Vocabulary test at Level 10 measures students' expanding vocabulary and their developing ability to distinguish more subtle differences among related words. At Level 10, vocabulary words are tested both in and out of context. The following is a list of the skills measured by the CTP Vocabulary test at Level 10.

Word Meaning

The student will be able to identify synonyms and antonyms of words.

Precision

The student will be able to distinguish among subtle shades of meaning in choosing the appropriate word or words to fill in the blank(s) in a sentence.

Application

The student will be able to:

- Identify the correct definition of a word in the context of a passage.
- Identify a synonym or antonym of a word in the context of a passage.

READING COMPREHENSION

The CTP Reading Comprehension test at Level 10 measures students' ability to understand and interpret written text. The NCTE/IRA *Standards for the English Language Arts* emphasizes the importance of being able to use a "wide range of strategies to comprehend, interpret, evaluate, and appreciate text" (31). The CTP Reading Comprehension test requires students to draw on these strategies to interpret and analyze a range of texts, both fiction and nonfiction. The following is a list of the skills measured by the CTP Reading Comprehension test at Level 10.

Explicit Information

The student will be able to:

- Use explicit information to identify the main idea or primary purpose of a text or part of a text.
- Identify explicit details from a passage and provide answers to "who," "what," "where," "when," "why," and "how" questions about the text.
- Understand connections between and among explicit pieces of information from a passage.
- Put pieces of information from the passage in correct chronological order.

Inference

The student will be able to:

- Use implicit information from a passage to make inferences about the motives or behaviors of characters.
- Use implicit information from a passage to answer specific questions about a text.

Analysis

The student will be able to:

- Determine whether information included in a passage consists of fact or opinion.
- Use explicit and implicit information to determine the author's likely intent for writing a passage or for including certain information in a passage.
- Compare and contrast elements in a text.
- Categorize and combine pieces of information in a text.
- Synthesize explicit and implicit information to make predictions, draw conclusions, or formulate hypotheses about a text.
- Identify the style, tone, or theme of a text.

READING COMPREHENSION CONTINUED

Reading for Understanding

*Optional Constructed-Response Section**

Students use their developing productive language skills to answer questions about text, employing comprehension strategies to interpret and analyze the texts, describe important aspects of the texts, synthesize information from two texts, and compare and contrast elements within a text and/or between two texts. At level 10, most questions require students to make inferences about information that is not explicitly stated in the text. At this level, students are also asked to apply their growing understanding of figurative language to answer some questions. The student will be able to:

- Describe the main idea or overall theme of a passage and/or summarize the main points of a passage.
- Describe a supporting idea in a passage.
- Apply understanding of figurative language to describe aspects of a passage.
- Compare and contrast elements from two texts.
- Make inferences about a character's motivation.
- Make inferences about the author's purpose.
- Synthesize information from two texts to describe supporting ideas, make predictions, or draw conclusions.

NOTE: Although the Reading for Understanding section does require students to write their answers, it is a test of reading comprehension and not writing ability. Students' responses are evaluated based on how completely and thoroughly they answer the questions; misspellings, grammatical mistakes, and other writing errors do not count against them. The questions are scored on a 0-2 scale.

* Available for CTP 4 only.

WRITING MECHANICS

The development of an increasingly sophisticated understanding of language conventions and mechanics is essential as students continue to write more and more complex texts. The NCTE/IRA *Standards for the English Language Arts* indicates that students should be able to "apply knowledge of language structure and language conventions (e.g., spelling and punctuation) . . . to create, critique, and discuss print and non-print texts" (36). The CTP Writing Mechanics test at Level 10 measures students' growing facility with English sentence structure and language conventions. The following is a list of the skills measured by the CTP Writing Mechanics test at Level 10.

Spelling, Capitalization, and Punctuation

The student will be able to recognize spelling, capitalization, and punctuation errors. Specific elements tested include:

- Spelling of commonly used words, including words with affixes and words that display improper pluralization.
- Capitalization of proper nouns.
- Capitalization in titles and forms of address.
- The correct use of the comma, semicolon, and colon.
- The correct use of the apostrophe in contractions and possessives.
- Proper punctuation for dialogue and quotations.
- Correct end punctuation.

Usage

The student will be able to apply rules of English diction and grammar. Specific rules tested include:

- Correct pronoun use, including pronoun-antecedent agreement.
- Correct verb form and tense, including subject-verb agreement and parallelism.
- Rules of correct and effective expression at the sentence level, including proper modification.
- Rules of diction within the context of a sentence.
- Rules regarding sentence boundaries, including avoiding run-ons and fragments and recognizing sentence types.

WRITING CONCEPTS AND SKILLS

The CTP Writing Concepts and Skills test at Level 10 integrates students' developing facility with English grammar and usage with an increasingly sophisticated understanding of the writing process. As students continue to develop their writing skills, the ability to organize complex information and to recognize the multiple purposes and audiences for writing becomes increasingly important. According to the NCTE/IRA *Standards for the English Language Arts*, it is important that students be able to "employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes" (35). The following is a list of the skills measured by the CTP Writing Concepts and Skills test at Level 10.

Organization

The student will be able to:

- Recognize thesis statements, topic sentences, and conclusions.
- Recognize effective transitions between ideas, sentences, and paragraphs.
- Recognize effective and logical organization in a piece of writing.
- Understand and recognize various organizational strategies.

WRITING CONCEPTS AND SKILLS CONTINUED

Purpose, Audience, and Focus

The student will be able to:

- Recognize the role of the audience within varying contexts and draw logical conclusions about the intended audience for a given passage.
- Understand how the purpose for and focus of a piece of writing help determine the kind of information included and the appropriate style and tone of the piece.

Supporting Details

The student will be able to:

- Draw conclusions based on supporting details in a passage.
- Determine the stated or implied purpose of supporting details within the context of a passage.
- Make judgments about the relative importance of supporting details to the passage as a whole.
- Recognize effective and relevant details to support points made in a piece of writing.

Style and Craft

The student will be able to:

- Identify rhetorical features that contribute to the overall precision and style of a piece of writing.
- Identify the author's tone or voice in a piece of writing.

QUANTITATIVE REASONING

The Quantitative Reasoning test assesses students' ability to engage, in age-level appropriate ways, in pattern recognition, classification, and reasoning in all content areas, including logic, arithmetic, algebra, geometry, probability, and statistics.

The following is a list of the skills measured by the CTP Quantitative Reasoning test at Level 10.

Comparison

The student will be able to:

- Consider numerical quantities in various forms and compare their sizes.
- Consider the relative measures of geometric shapes.

Extensions and Generalizations

The student will be able to:

- Formulate arithmetic conclusions based on observation and mathematical judgment.
- Formulate geometric conclusions based on observation and mathematical judgment.
- Recognize patterns, logic problems, and geometric representation of real-life situations.

Analysis

The student will be able to:

- Interpret algebraic representations, including those in real-life situations.
- Interpret geometric representations, including applying properties in coordinate geometry.
- Evaluate statistical arguments, including counting principles, measures of central tendency, and interpretation of probabilities.

MATHEMATICS (PART 1 AND 2)

The five content strands in the Level 10 Mathematics test are: 1) Numbers and Number Relationships; 2) Geometry and Spatial Sense; 3) Data Analysis, Probability, and Statistics; 4) Algebra; and 5) Functions. This is the first level that specifically includes a content strand in functions. Additionally, topics included in Level 10 but not in Level 9 are:

- Understanding real and complex numbers.
- Performing operations with complex numbers.
- Understanding the application of mutually exclusive and independent events in probabilities.
- Solving and graphing second-degree equations and inequalities.
- Solving and graphing linear inequalities and solving linear programming problems.
- Understanding matrices and performing operations with matrices.
- Understanding conic sections and their relationships, with an emphasis on circles and parabolas.
- Understanding the properties and relationships of rational exponents.
- Understanding systems of equations and/or inequalities and their applications.
- Understanding functions and their graphs, including domain and range, and operations with functions such as composition.
- Understanding absolute value, logarithmic, and exponential functions.
- Using functions to represent and interpret real-world applications.
- Understanding and applying trigonometric functions in basic right- triangle situations.
- Using the trigonometric identity $\sin^2 x + \cos^2 x = 1$ in various situations.

MATHEMATICS CONTINUED

Along with subscores in the content strands, students will receive subscores in three process areas: Conceptual Understanding, Procedural Knowledge, and Problem Solving. In addition, students receive a subscore in Mathematics Communication if they take the constructed-response component of the achievement test (available for CTP 4 only). The following is a list of the skills measured by the CTP Mathematics test at Level 10.

Numbers and Number Relationships

The student will be able to:

- Understand different forms of complex and real numbers and the relationships between them, including rational and irrational real numbers and exponential and scientific notation.
- Understand properties of operations and perform operations with different forms of real numbers and complex numbers.
- Apply different forms of real numbers in a variety of situations (forms include radicals).
- Apply theories of whole numbers in a variety of situations.

Geometry and Spatial Sense

The student will be able to:

- Use basic geometric language to classify and characterize properties of geometric figures, including quadrilaterals, triangles, circles, and three-dimensional figures, and apply basic theorems to these figures.
- Apply geometric properties and relationships to two- and three-dimensional figures, including the Pythagorean Theorem, sum of angle measures in a polygon, and triangle inequality; develop formulas to solve geometric problems; and use number line and coordinate geometry.
- Apply concepts of measure, including perimeter, circumference, surface area, volume, weight, angle measure, distance, and slope as they relate to parallel or perpendicular lines.
- Apply concepts of congruence, similarity, and simple transformation.

Data Analysis, Statistics, and Probability

The student will be able to:

- Generate, organize, evaluate, and interpret various data representations, including graphs, charts, and histograms.
- Understand counting techniques for solving problems, including the use of permutations and combinations; understand and compute mean, median, mode, range, and standard deviation; and make conjectures or inferences from data provided.
- Determine probabilities, solve problems of chance using ratios and related probabilities, and make predictions based on mathematical probabilities and apply probabilities to mutually exclusive and independent events.

Algebra

The student will be able to:

- Represent patterns and mathematical situations using tables, graphs, verbal rules, and equations.
- Understand properties of operations, including commutative and associative, and simplify algebraic rational expressions.
- Solve and graph first- and second-degree equations and inequalities in one variable, solve literal equations for a variable, and understand conic sections and their equations.
- Understand systems of equations and inequalities and their applications and understand matrices and perform basic operations with them.
- Apply variables, expressions, and equations to solve real-world problems and mathematical problems including nonlinear equations.
- Understand slope, x - and y -intercepts, and relationships between parallel and perpendicular lines and apply these concepts to find an equation of a line, make predictions, and solve rate problems.

Functions

The student will be able to:

- Understand properties of functions and their graphs, including domains and ranges.
- Understand the relationships between functions, their transformations, and their inverses and apply composition and other operations with functions.
- Apply trigonometric functions in right-triangle situations and use the fundamental trigonometric identity $\sin^2 x + \cos^2 x = 1$.
- Understand absolute value, logarithmic and exponential functions, and their applications to real-world problems, including exponential growth and decay and predictions of business trends.

Math Communication

*Optional Constructed-Response Section**

The constructed-response component of the Mathematics tests assesses students' ability to communicate in mathematics. At this level, the work students will be able to do includes: evaluating data using standard deviation, using properties of similar triangles, sketching the graph of a quadratic equation, and using triangle inequality and special triangles to find lengths of sides.

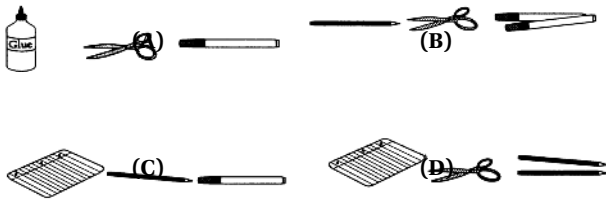
** Available for CTP 4 only.*

AUDITORY COMPREHENSION

(Material read aloud to students is indicated in italics.)

Sample Question 1: *It was time for art class. Miss Wang said, "Clear the papers from your tables. Then take out a pencil, scissors, and two markers."*

Which picture shows what should be on the table?



Content Category: Explicit Information / Detail

This question asks students to recognize what each student in Miss Wang’s class should have on his or her table after following the teacher’s directions. The teacher told the students to “take out a pencil, scissors, and two markers.” The correct answer, therefore, is (B).

Sample Question 2: *What did Miss Wang ask the class to do before they got out their art supplies?*

- | | | | |
|----------------------------|--------------------------|---------------------------|------------------------|
| Put on their
art smocks | Take out some
markers | Clear off their
tables | Take out some
paper |
| (A) | (B) | (C) | (D) |

Content Category: Explicit Information / Detail

In this question, students are expected to recognize what Miss Wang’s students were first instructed to do in preparation for the art class. Miss Wang told the students first to “clear the papers from [their] tables” and then to take out their art supplies (pencil, scissors, and two markers). Therefore, the correct answer is (C).

READING COMPREHENSION

Sample Questions 3-5 are based on the following passage.

Puddles the Duck did not like to be dry. He liked to be wet. “Where can I splash?” said Puddles. Puddles looked for a wet place. All of the places that once were wet, now were dry.

“Where can I find water?” he asked. He went to find Cow. “Hi, Cow,” said Puddles. “I am looking for water.”

“It has been very dry. But there is water by the barn,” said the cow. “Farmer Dodd put a tub of water there.”

“Oh, boy!” cried Puddles. “Water!” Away ran Puddles.



Sample Question 3: What does cried mean in the story?

- (A) Yelled
- (B) Looked
- (C) Sobbed
- (D) Splashed

Content Category: Vocabulary in Context

This question asks students to recognize the meaning of the word “cried” as it is used in the story. While one meaning of crying is to “sob,” nothing in the passage indicates that Puddles is sad; therefore, (C) can be eliminated. In the story, Puddles cried “Oh, boy!” and “Water!” The use of the exclamation marks in these comments and Puddles’ running indicate his excitement. Puddles most likely “yelled” these comments. Therefore, (A) is the correct answer.

Sample Question 4: What is the best title for this story?

- (A) The Duck Who Liked to Be Dry
- (B) Fun in the Barn
- (C) Farmer Dodd’s Cow
- (D) Puddles the Duck

Content Category: Inference / Summarize

The question asks for the best title to this story. Option (A) can be eliminated because it contradicts the story, which indicates that Puddles would rather be wet than dry. Option (B) can easily be eliminated, since having fun in the barn is not mentioned in the story. Choice (C) is more plausible, since Cow is mentioned in the story; however, the story’s main focus is not on Cow. The story is about Puddles. Therefore, (D) is the best answer.

READING COMPREHENSION CONTINUED

Sample Question 5: What will Puddles do next?

- (A) Run to the puddle
- (B) Run to the tub of water
- (C) Ask Cow where to find water
- (D) Ask Farmer Dodd to get some water

Content Category: Analysis / Prediction

In the story, Puddles is looking for water, and Cow tells him that there is a tub of water by the barn. The question asks students to predict what Puddles is likely to do next. Puddles' excitement at Cow's response clearly indicates that Puddles is headed for the water Cow described. The correct answer, therefore, is (B).

Sample Questions 6 and 7 are based on the following passage.



Be the first to have a new
STAR WING SUPERSONIC PLANE

This toy is made of tough plastic painted with flames that look real. It comes with a pilot and his own parachute.

Includes small map and compass.

You can make this plane do loops, dips, and big circles by moving it through the air.

Real flying sounds like sirens and the roar of jet engines.
Batteries not included.

The Plane is 12 inches across and 5 inches high.

ONLY \$15.00

Hurry! Supplies limited!
At a toy store near you!

Sample Question 6: What can make this plane move through the air?

- (A) The pilot
- (B) Batteries
- (C) Jet engines
- (D) The person playing with it

Content Category: Inference / Draw Conclusions

The question asks students to recognize how this toy plane moves through the air. Choice (A) might appeal because "pilots" do fly planes; however, this is a toy that must be operated by a person. Options (B) and (C) are also likely to appeal, but they too are incorrect; the batteries supply the sounds of the jet engines. The correct answer is (D). According to the ad "you can make this plane do loops, dips, and big circles by moving it through the air."

Sample Question 7: Why is this ad in the paper?

- (A) So you will have fun
- (B) So you will buy batteries
- (C) So you will buy this toy plane
- (D) So you will tell your friends

Content Category: Analysis / Make Connections

In this question, students are expected to understand the primary reason for this ad being in the newspaper. While having fun (A) and buying batteries (B) might result from owning the plane, and telling your friends about the plane (D) might make more people want to buy it, the description of the toy plane and the mention of its cost clearly indicate that the primary purpose of this ad is to get the reader to buy the plane. This purpose is reinforced by the closing statements "Hurry!" "Supplies limited!" "At a toy store near you!" Therefore, (C) is the correct answer.

READING COMPREHENSION

Optional Constructed-Response Questions (CTP 4 Only)



Read Passage 1 to find out about a boy who sees sea lions at the circus.

Sea Lions at the Circus

The circus was here! Ramon and his dad got there early. They found good seats in the front row with excellent views. They wanted to see the sea lions. They laughed as the sea lions waddled into the circus ring. They all looked so clumsy. Their trainer held up a horn to their mouths and the sea lions played music. Ramon and his dad clapped. Then the sea lions clapped their flippers together. That made Ramon and his dad clap even more.

The trainer threw a beach ball to the first sea lion. That sea lion threw it to another one. Soon all the sea lions were playing catch. Every time the sea lions did a trick, the trainer threw a fish treat to them. At the end of the show, the sea lions climbed up a ladder and shot down the slide. When they hit the water, Ramon and his dad got splashed. They got very wet and cold, but they knew they would dry off soon. They clapped and clapped. The sea lions clapped too.

Maybe some day Ramon and his dad can watch the sea lions in the water where they live. In the circus ring, the sea lions look funny and make us laugh. But in the sea they are fast and graceful.

Sample Question 8: Name the tricks that the sea lions did at the circus. Include at least three examples in your response.

Content Category: Reading for Understanding

In order to receive a 2 (the highest score) on this question, the student must show clear and solid understanding of the tricks that the sea lions did at the circus. The response must include at least three of the following tricks:

- Played music/played horns.
- Clapped.
- Played catch/threw ball.
- Climbed ladder.
- Went down the slide.
- Splashed people.

A score of 1 indicates that a student shows basic (but in some way incomplete) understanding of the tricks that the sea lions did at the circus; the response must include one or two of the tricks listed above.

A score of 0 indicates that a student shows very little or no understanding of the tricks that the sea lions did at the circus; a response in this category mentions none of the tricks listed above or gives only incorrect information.

READING COMPREHENSION CONTINUED
Optional Constructed-Response Questions (CTP 4 Only)



Read Passage 2 to learn about how sea lions live in the sea.

Sea Lions in the Sea

People like to watch the sea lions at the circus. The sea lions look funny as they drag their large, heavy bodies around the ring. We laugh at them because they look really clumsy.

The best place to watch the sea lions is in the sea, not on dry land. At home in the water, they swim fast and they are graceful.

To get their food, sea lions must chase fish. The fish swish back and forth, hoping they will not get caught. But the sea lions follow them at great speed. They twist and turn their necks close behind the fish. The sea lions are even faster than the fish. One sea lion can catch up to 40 pounds of fish every day.

Sea lions have their babies in the spring. A baby sea lion stays with its mother for about a year. The mother will keep it safe. Mothers will also make sure their babies have plenty to eat. The babies spend their time eating and growing. They eat fish, octopus, and seabirds.

Sample Question 9: These two stories tell how sea lions are different at the circus and in the sea. Fill in this chart to show how they are different in those two places.

Sea Lions at the Circus	Sea Lions in the Sea
This is what the sea lions eat at the circus:	This is what the sea lions eat in the sea:
This is how the sea lions move at the circus:	This is how the sea lions move in the sea:
This is how the sea lions get their food at the circus:	This is how the sea lions get their food in the sea:

Content Category: Reading for Understanding
In order to receive a 2 (the highest score) on this question, the student must show clear and solid understanding of how sea lions are different at the circus and in the sea. The student must fill in each of five or six cells with at least one correct response, as indicated by the following list.

- **Sea Lions at the Circus**
What they eat: fish/fish treats.
How they move: clumsy/funny/drag their bodies/waddle.
How they get their food: from doing tricks/from the trainer.
- **Sea Lions in the Sea**
What they eat: fish/octopus/seabirds/40 pounds of fish.
How they move: fast/graceful.
How they get their food: catch fish.

A score of 1 indicates that the student shows basic (but in some way incomplete) understanding of how sea lions are different at the circus and in the sea; the student must fill in three or four cells with at least one correct response (as indicated by the list above).

A score of 0 indicates that the student shows very little or no understanding of how sea lions are different at the circus and in the sea. To receive a score of 0, the student must have filled in only one or two of the above cells with a correct response or given only incorrect information.

WORD ANALYSIS

(Material read aloud to students is indicated in italics.)

Sample Question 10: *Look at the four underlined words in the sentence. Fill in the bubble under the one that is a compound word.*

The children may not use the school playground when it is raining.
(A) (B) (C) (D)

Content Category: Structural Analysis / Compound Words

In this question, students are to select the choice that is a compound word. (C) is the correct answer because it is the only word made up of two independent words with distinctive meanings.

Sample Question 11: *Which word has the same vowel sound as the word seem?*

top seat wet shoe
(A) (B) (C) (D)

Content Category: Phonemic Analysis / Medial Vowel

Sounds The question asks students which word has the same vowel sound as the word seem. Recognition of the long e sound is being tested. "Seat" is most similar in sound to the word "seem"; therefore, (B) is the correct answer.

Sample Question 12: *Which word ends with the same sound as the word band?*

sing long any wind
(A) (B) (C) (D)

Content Category: Phonemic Analysis / Final Consonant

Sounds This question asks students to recognize which word ends with the same sound as the word band. "Wind," (D), and "band" end in the same sound, the consonant blend "nd." Therefore, (D) is the correct answer.

WRITING MECHANICS

For Sample Questions 13 and 14, find the word that goes in the blank to make the sentence correct.

Sample Question 13: _____ going to take a long time to fix the car.

Its' It It's Its
(A) (B) (C) (D)

Content Category: Punctuation / Apostrophe

In this question, students are being tested on the difference between "its," meaning "belonging to it" and "it's," meaning "it is." In this sentence, the blank represents a missing subject and verb; therefore, the correct answer is (C).

Sample Question 14: Most little _____ puppies.

kid like kids like kids likes kid likes
(A) (B) (C) (D)

Content Category: Usage / Verb Form and Tense

This question asks students to select the choice that reflects correct subject-verb usage, thereby making the sentence correct. The use of the word "Most" indicates that the subject of this sentence will be plural; therefore, the correct answer must have a plural subject with a corresponding plural verb. Option (A) is incorrect because the subject is singular and also because the verb form is plural; subject and verb must agree in number. Option (D), though correct in subject-verb agreement, is still wrong, since the subject is again singular, and option (C), with its plural subject, is incorrect because the verb is singular. Option (B) is therefore the correct answer.

MATHEMATICS

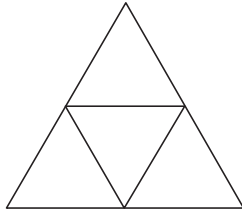
(Material read aloud to students is indicated in italics.)

Sample Question 15: *There were 58 children on the playground outside. After recess, 27 went back inside. How many were still on the playground outside?*

- 31 35 49 85
(A) (B) (C) (D)

Content Category: Number Sense and Operations with Whole Numbers / Problem Solving There were initially 58 children on the playground outside, and 27 children went back inside after recess. The number of children that were still on the playground outside is given by the difference $58 - 27$. This difference is 31. The correct answer is choice (A).

Sample Question 16: *How many triangles are in the picture?*



- 2 3 4 5
(A) (B) (C) (D)

Content Category: Geometry and Spatial Sense / Problem Solving To solve this problem, notice that there are four smaller triangles inside of one larger triangle. Therefore, the total number of triangles in the picture is 5. The correct answer is choice (D).

Sample Question 17: *How many of the shapes have only straight edges?*



- 1 2 3 4
(A) (B) (C) (D)

Content Category: Geometry and Spatial Sense / Conceptual Understanding The only shapes that contain only straight sides are the rectangle, the triangle, and the star. There are 3 shapes having only straight sides. The correct answer, therefore, is choice (C).

Sample Question 18: *A class of 13 boys and 16 girls went on a field trip. Two teachers also went on the field trip. Which number sentence can be used to find how many people went on the field trip?*

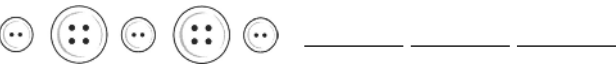
- $13 + 16 + 2 = \square$ $13 + 16 - \square = 31$ $13 - 16 + 2 = \square$ $13 + 16 + \square = 29$
(A) (B) (C) (D)

Content Category: Patterns, Functions, and Pre-Algebra / Conceptual Understanding The problem asks for a number sentence that can be used to find the total number of people that went on the field trip. This total number is the sum of the numbers of boys, girls, and teachers that went on the field trip. Since 13 boys, 16 girls, and 2 teachers went on the field trip, the correct number sentence requires the expression $13 + 16 + 2$. The correct answer is choice (A).

MATHEMATICS

Optional Constructed-Response Questions (CTP 4 Only)

Sample Question 19: A pattern of buttons is shown below.
Draw the next 3 buttons in the pattern.



Content Category: Math Communication

Notice that the button pattern contains two characteristics – button size and the number of button holes. The button size alternates back and forth between small and large. The number of button holes alternates back and forth between two holes and four holes. The next three buttons in the pattern should therefore be a large button with four holes, followed by a small button with two holes, followed by a large button with four holes. To score a 1 on this question, students could show an understanding of this pattern but start with the incorrect button. Another way students can score a 1 on this question is to have only the number of button holes correct or only the button size correct in their pattern.

Sample Question 20: For each number below, write the number that is 1 more, 10 more, and 100 more on the blank line. The first number is done for you as an example.

	1 more	10 more	100 more
5	6	15	105
109			
489			
2,699			
30,500			

Content Category: Math Communication

To solve this problem, each number in the left-hand column is to be added to 1, 10, and 100, respectively. The correct answers for each row are given below. To score a 1 on this question, a student must fill in 2 or 3 rows completely correctly.

	1 more	10 more	100 more
5	6	15	105
109	110	119	209
489	490	499	589
2,699	2,700	2,709	2,799
30,500	30,501	30,510	30,600

VERBAL REASONING

Sample Question 1: Which lettered pair of words goes together in the same way as the first pair of words?

SNIFF : SMELL ::

- (A) glance : look
- (B) seek : find
- (C) talk : gossip
- (D) buy : sell

Content Category: Analogical Reasoning

The correct answer to this reasoning problem is (A). The two terms in the original pair are related by degree: to sniff is to smell quickly. Only the pair of words in option (A) has an analogous relationship: to glance is to look quickly.

Sample Question 2: Jamal and Alison have made up their own language. In this language, *tiff lam* means “they are,” *bon lam* means “we are,” and *bon sen* means “we will.”

- (A) *Tiff sen*
- (B) *Tiff bon*
- (C) *Bon bon*
- (D) *Bon tiff*

Content Category: Logical Reasoning / Inductive Reasoning

To answer this question, the student must determine which words defined in the problem mean they and will. Since *tiff lam* means they are and *bon lam* means we are, *lam* must mean are and *tiff* must therefore mean they. Knowing only that *tiff lam* means they are would not provide enough information to determine which word means they, because it is not necessarily the case that word order in Jamal and Alison’s language follows the same rules as English. Using similar rules of induction, it can be determined that *sen* means will. The correct answer is (A).

AUDITORY COMPREHENSION

(Material read aloud to students is indicated in italics.)

Listen very carefully while I tell you a story from China that is very much like “Little Red Riding Hood.”

Once, long ago, there was a woman who lived alone in the country with her three children — Shang, Tao, and Paotze. On the day of their grandmother’s birthday, the good mother set off to see her, leaving the three children at home.

Before she left, she said, “Be good while I am away, my heart-loving children; I will not return tonight. Remember to close the door tight at sunset and latch it well.”

But an old wolf lived nearby and saw the good mother leave. At dusk, disguised as an old woman, he came up to the house of the children and knocked on the door twice: bang, bang.

Shang, who was the eldest, said through the latched door, “Who is it?” “My little jewels,” said the wolf, “this is your grandmother, your Po Po.” “Po Po!” Shang said. “Our mother has gone to visit you!”

Sample Question 3: What does the word latch mean in the story?

- | | | | |
|-------|------|------|-------|
| Close | Lock | Bang | Guard |
| (A) | (B) | (C) | (D) |

Content Category: Vocabulary in Context

This question asks students to determine the meaning of the word “latch” in the context of the story. “Latch” means to shut tightly so that a latch is engaged. Option (A) is appealing but not accurate, since closing a door does not mean fastening it with a latch. Only (B) involves fastening the door, so option (B) is the correct answer.

Sample Question 4: Where did the “good mother” go?

- | | | | |
|---------------|---------------------|--------------------------|-------------------|
| To the market | To the wolf’s house | To visit the grandmother | To latch the door |
| (A) | (B) | (C) | (D) |

Content Category: Explicit Information / Detail

The question asks the students to recall an important detail of the plot of the story. Only (C) is an accurate account of where the “good mother” went, so option (C) is the correct answer.

AUDITORY COMPREHENSION CONTINUED
(Material read aloud to students is indicated in italics.)

Sample Question 5: *Why did the wolf disguise himself as an old woman?*

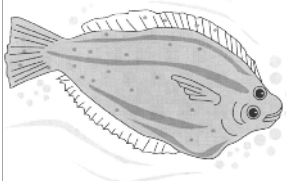
- | | | | |
|---|---|---------------------------------------|------------------------------|
| He wanted to
talk to the
grandmother. | He did not like
the way his fur
looked. | He wanted to
fool the
children. | The mother
might see him. |
| (A) | (B) | (C) | (D) |

Content Category: Inference / Motives and Behaviors

This reasoning question asks students to infer from the story the wolf’s reason for disguising himself as an old woman. The only option that offers a likely explanation for the wolf’s behavior is (C): the wolf disguised himself to fool the children. The other options don’t make logical sense and/or are not supported by the details in the story.

READING COMPREHENSION

Sample Questions 6 - 9 are based on the following passage.



Why Are Some Fish Flat?

Flatfish, such as flounder or sole, hatch from eggs like other fish. They hatch near the surface of the sea and start life with a normal fish shape. But when they are just a few weeks old, their shape begins to evolve.

First of all, one eye moves around to the other side of the fish’s head so that both eyes are on the same side. Then the fish swims down to lie on the seabed. It lies on its blind side with both its eyes staring upward.

Then gradually, the fish’s body flattens out. Instead of a right and a left side, a flatfish has a top and a bottom side. Flatfish spend most of their lives lying on the seabed. Their shape helps them hide from enemies and catch food more easily. Their top sides are often the same color as the seabed, so that they can take prey by surprise.

Sample Question 6: What is the main idea of the passage?

- (A) Flounder and sole are specific kinds of flatfish found in the ocean.
- (B) Flatfish have special features that make them different from other fish.
- (C) Flatfish have both eyes on the same side of their body.
- (D) The shape of flatfish helps them catch prey.

Content Category: Explicit Information / Main Idea

This question asks students to recognize the main idea of the passage, as opposed to a secondary or supporting idea. All of the options are points made in the passage, but only (B) states the main idea of the passage: flatfish have unique features that distinguish them from other fish.

READING COMPREHENSION CONTINUED

Sample Question 7: What enables flatfish to take their prey by surprise?

- (A) Their color is the same as the seabed.
- (B) Both eyes are on the same side of the fish.
- (C) They can swim very fast.
- (D) Their body is flat.

Content Category: Explicit Information / Detail

This question asks students to determine which characteristic of flatfish enables them to take their prey by surprise. The student must recall information provided in the end of the passage: a fish can blend in with the seabed and therefore surprise its prey. Option (A), which specifically addresses this point, is the correct answer. Option (D) is appealing, but while the passage indicates that the fish's flat shape helps it "catch food more easily," it does not specifically state that the fish's shape helps it take prey by surprise. Therefore, (A) is the best answer.

Sample Question 8: The author probably wrote this passage to:

- (A) Convince people to eat flatfish.
- (B) Teach people how to catch flatfish.
- (C) Teach people about flatfish.
- (D) Warn people about flatfish.

Content Category: Inference / Motives and Behaviors

This question asks students to infer from the passage the author's purpose in writing the passage. Only (C) offers a likely purpose, given the content of the passage, which is a discussion about the distinctive features of flatfish. Therefore, (C) is the correct answer.

Sample Question 9: Flatfish are different from most other fish in all of the following ways EXCEPT:

- (A) Flatfish have both eyes on the same side of their body.
- (B) Flatfish have a top and bottom instead of a right and left side.
- (C) Flatfish lay eggs in the water.
- (D) Flatfish spend most of their lives lying on the seabed.

Content Category: Analysis / Draw Conclusions

The student must perform two different tasks to determine the answer to this question. First, the student must decide which option is a characteristic that is NOT unique to flatfish. Options (A), (B), and (D) all describe characteristics that ARE unique to flatfish. Second, the student must infer from the passage that flatfish lay eggs in the water, since the passage indicates that flatfish "hatch from eggs like other fish." The correct answer, then, is option (C).

READING COMPREHENSION

Optional Constructed-Response Questions (CTP 4 Only)

Sample Question 10 is based on the following passage.



Read Passage 1 to learn more about eagles.

The eagle is a beautiful bird. It is one of the largest birds in the world. The bald eagle is the national symbol of the United States. But it is not bald at all. It is called the bald eagle because the feathers on its head and neck are pure white.

Eagles have large, strong beaks. The beak is very sharp and pointed. The top half of the beak curves down over the bottom half. Eagles are good hunters. They have large, powerful claws. They can swoop down out of the sky to catch a small animal like a mouse or even a fish.

Many people think the eagle is a sign of strength and bravery. It is also a symbol of freedom.

The picture of the eagle is on the Great Seal of the United States and also on the President's seal. You can also find a picture of an eagle on some U.S. coins and paper money.

When people think of eagles, they think of power, courage, and skill. Because of this, many groups use the eagle as their symbol. Some sports teams use the eagle as their mascot. They call their team The Eagles. They want people to think their players are strong and brave.

Sample Question 10: According to Passage 1, where are three places where you might find pictures of eagles?

Content Category: Reading for Understanding

In order to receive a 2 (the highest score) on this question, the student must show clear and solid understanding of three places where one might find pictures of eagles; the student's response must include three of the following.

- Great Seal (of the United States)
- Presidential seal
- Paper money
- Coins
- Mascot (for sports team)

To receive a score of 1, the student must show basic (but in some way incomplete) understanding of places where one might find pictures of eagles; the student's response must include one or two of the above.

A score of 0 indicates that the student shows very little or no understanding of places where one might find pictures of eagles; a response in this category mentions none of the places listed above or gives only incorrect information.

READING COMPREHENSION CONTINUED
Optional Constructed-Response Questions (CTP 4 Only)

Sample Question 11 is based on the following passage.

Read Passage 2 to learn what the students at Eastside Elementary School voted for.

The students at Eastside Elementary School wanted to have a new school symbol. The principal told the students that many schools choose an animal as a school symbol. A school's symbol is also called a mascot. This is what the principal said the mascot should be.

- It should be something that is special to the students.
- It should be something that makes them feel proud.
- It should be fun.

The students talked about what they wanted their school mascot to be. Mallory said she thought the eagle would be a good symbol for their school. Here are some reasons that Mallory gave.

- We could be called the Eastside Eagles. The name has a nice sound to it.
- We can get an eagle costume and have someone wear it at our school events.
- We can put the symbol on our school flag.
- The eagle will make a nice design.

The Eastside students voted on their school mascot. They also had a contest to have someone draw the school symbol. This is the symbol they chose. It was drawn by Maria.



Sample Question 11: According to what you read in Passage 1 about why some people choose the eagle as a symbol or mascot, how do you think the Eastside students want people to think of their school? Give at least two examples.

Content Category: Reading for Understanding

In order to receive a 2 (the highest score) on this question, the student must show clear and solid understanding of what the choice of an eagle as school symbol indicates about how the Eastside students want people to think of their school; the student's response must include two of the following.

- Powerful/strong
- Courageous/brave
- Skillful
- Beautiful
- Free
- Representing the United States

In order to receive a score of 1, the student must show basic (but in some way incomplete) understanding of what the choice of an eagle as school symbol indicates about how the Eastside students want people to think of their school; the student's response must include one of the examples listed above.

A score of 0 indicates that the student shows very little or no understanding of what the choice of an eagle as school symbol indicates about how the Eastside students want people to think of their school; a response in this category mentions none of the examples listed above or gives only incorrect information.

WRITING MECHANICS

Sample Question 12: Find the capitalization error in the sentence, if there is one.

Many students at Rosewood Elementary School speak russian.
(A) (B) (C)

No error
(D)

Content Category: Capitalization / Proper Noun

This question asks students to identify a capitalization error. Since the names of groups of people and their languages should be capitalized, the lowercase “r” in “russian” is incorrect. Therefore, (C) is the correct answer.

Sample Question 13: Find the punctuation error in the sentence, if there is one.

Mr. Lee, the art teacher, is having the students create a mural.
(A) (B)
“I want to draw a dolphin,” remarked Sarah. “They’re the best!”
(C)

No error
(D)

Content Category: Punctuation

This question asks students to recognize the correct use of commas and end punctuation. Since all of the underlined punctuation marks are correct, the answer is (D), or No error.

WRITING CONCEPTS AND SKILLS

Sample Question 14: Choose the opening sentence that goes best with the details in the paragraph.

_____. When they arrive there, the females give birth in the warm lagoons. They journey back in summer to the cold waters of the Arctic.

- (A) Gray whales push water out of their mouths.
- (B) Gray whales feed by swimming on their sides.
- (C) Some whales live in the North Atlantic.
- (D) Gray whales travel in the winter to warm water.

Content Category: Organization / Topic Sentences

This question asks students to choose the topic sentence that is best supported by the details provided in the rest of the paragraph. The paragraph describes female whales traveling to warm lagoons to give birth and then returning to cold waters in the summer. Only option (D) refers to whales traveling in winter to warm water, so (D) is the correct answer.

Sample Question 15: Which topic would be best to use in a report about learning to swim?

- (A) What creatures cannot live in salt water.
- (B) Fun at a pool party.
- (C) How to hold your breath while swimming under water.
- (D) The need for fences around pools.

Content Category: Purpose, Audience, and Focus / Relevant

Information This question asks students to choose an appropriate topic for discussion in a report about learning to swim. Only (C), which describes a skill important in learning to swim, is relevant to this topic, so option (C) is the correct answer.

Sample Question 16: The sentence at the beginning of the question is the main idea of a paragraph. Decide which of the choices goes best with the main idea.

Snails prefer dark and moist areas.

- (A) Snails move slowly.
- (B) Snails spend time in shells.
- (C) Snails crawl on rainy nights.
- (D) Snails eat plants.

Content Category: Supporting Details / Relevant

This question asks students to select the option that supports the statement “Snails prefer dark and moist areas” with appropriate details. Since (C) is the only option that refers to places that are both dark and moist (“Snails crawl on rainy nights”), option (C) is the correct answer.

WRITING CONCEPTS AND SKILLS CONTINUED

Sample Question 17: Choose the best way of stating the idea.

- (A) Jean planted flowers that were hers and watered her flowers.
- (B) Jean planted and watered her flowers.
- (C) Jean watered her flowers and planted them.
- (D) Jean planted and Jean watered her flowers.

Content Category: Style and Craft / Sentence Construction

This question asks students to determine which statement is the most sensible and concise. Options (A), (C), and (D) are either illogical or unnecessarily wordy. (B) is the only option that makes a sensible and concise statement: Jean planted and watered her flowers.

QUANTITATIVE REASONING

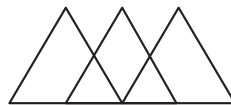


Figure A
The number of
triangles in
Figure A

A



Figure B
The number of
rectangles in
Figure B

B

Sample Question 18: Which statement is true?

- (A) A is greater than B.
- (B) B is greater than A.
- (C) A and B are equal.

Content Category: Comparison

This is a quantitative comparison question in which students are asked to compare the number of shapes contained in two figures. Figure A contains 5 triangles. There are 3 large triangles that overlap. There are also 2 smaller triangles formed by the large overlapping triangles. Figure B contains 5 rectangles. There are 3 different-sized rectangles shown. There are also 2 larger rectangles that consist of 2 of the smaller rectangles. So, the number in column A is the same as the number in column B. The correct answer is choice (C).

Sample Question 19: Which number would NOT appear in the pattern 4, 8, 12, 16, ... ?

- (A) 20
- (B) 32
- (C) 50
- (D) 100

Content Category: Extensions / Generalizations

The pattern formed by the numbers shown must be recognized. Each number in the pattern is a multiple of 4. Of the answer choices only one is NOT a multiple of 4. The only choice that is not a multiple of 4 is 50. The correct answer is choice (C).

MATHEMATICS

Sample Question 20: How many of the numbers from 1 to 20 are odd?

- (A) 7
- (B) 8
- (C) 10
- (D) 11

Content Category: Number Sense and Operations with Whole Numbers / Conceptual Understanding

There are 20 numbers from 1 through 20. Half of the numbers are even and half of them are odd. Therefore, there are 10 odd numbers from 1 to 20. The correct answer is choice (C).

Sample Questions 21 and 22 refer to the following information.



Watermelon 83¢ per pound



Oranges \$4.00 per box

Sample Question 21: How much does a 7-pound watermelon cost?

- (A) \$5.61
- (B) \$5.71
- (C) \$5.74
- (D) \$5.81

Content Category: Number Sense and Operations with Fractions and Decimals / Problem Solving

The price of watermelon is 83 cents per pound. To find the cost of a 7-pound watermelon you need to multiply 7 times 83 cents, which is 581 cents. This is the same as \$5.81. The correct answer, therefore, is choice (D).

Sample Question 22: How many boxes of oranges can be bought with \$35.00 ?

- (A) Six
- (B) Seven
- (C) Eight
- (D) Nine

Content Category: Number Sense and Operations with Fractions and Decimals / Problem Solving

Each box of oranges costs \$4.00. To find out the number of boxes of oranges that can be bought with \$35.00, divide 35 by 4.

$$\begin{array}{r} 8R3 \\ 4\overline{)35} \end{array}$$

Since the answer is 8R3, 8 boxes can be bought with \$35.00. Eight boxes of oranges cost 8 times \$4.00 or \$32. Nine boxes cost 9 times \$4.00 or \$36, which is over the \$35.00. Therefore, 8 boxes can be bought with \$35.00. The correct answer is choice (C).

Sample Question 23: Which of these could be the height of a stop sign?

- (A) 2 meters
- (B) 6 meters
- (C) 800 centimeters
- (D) 1,000 centimeters

Content Category: Measurement / Conceptual

Understanding The height of a stop sign must be estimated. Most stop signs are a little taller than an average adult. So you can estimate that a stop sign is between 6 and 8 feet tall. Of the answer choices, only one is close to this height. The first two choices are in meters. One meter is a little longer than a yard, which is 3 feet. Therefore, 2 meters is a little more than 6 feet. This is close to the height of a stop sign, so the correct answer is (A). Choice (B) is more than 18 feet, which is too high. There are 100 centimeters in a meter. Therefore, 800 centimeters is the same as 8 meters and 1,000 centimeters is the same as 10 meters. These are also too high.

MATHEMATICS

Optional Constructed-Response Questions (CTP 4 Only)

Sample Question 24: Petra is 4 feet 9 inches tall. Her father is 6 feet 3 inches tall. Petra wanted to find out how much taller her father is than she is.

Here is her work.

$$\begin{array}{r} 5 \quad 13 \\ \cancel{6} \text{ ft} \quad \cancel{3} \text{ in} \\ - \quad 4 \text{ ft} \quad 9 \text{ in} \\ \hline 1 \text{ ft} \quad 4 \text{ in} \end{array}$$

Petra's work is not correct. Explain what she did wrong and give the correct answer.

Content Category: Math Communication

This question asks students to explain the mistake that Petra made in her work. She wanted to figure out how much taller her father is than she is.

The first step is to figure out what mistake Petra made. Petra converts 6 feet 3 inches to 5 feet 13 inches. Since there are 12 inches in a foot, 6 feet is equal to 5 feet 12 inches. Therefore, 6 feet 3 inches equals 5 feet 15 inches. Petra got 5 feet 13 inches. She added 10 inches for 1 foot instead of 12 inches.

Here is what she should have done:

$$\begin{array}{r} 5 \quad 15 \\ \cancel{6} \text{ ft} \\ - \quad 4 \text{ ft} \quad 9 \text{ in} \\ \hline 1 \text{ ft} \quad 6 \text{ in} \end{array}$$

Petra's dad is 1 foot 6 inches taller than Petra. Here's another way to figure this out.

From 4 feet 9 inches to 5 feet is a difference of 3 inches. From 5 feet to 6 feet is a difference of 1 foot. From 6 feet to 6 feet 3 inches is a difference of 3 inches. The total difference from 4 feet 9 inches to 6 feet 3 inches is 1 foot 6 inches.

If a student has the correct answer with no explanation (or an incomplete explanation), the student will receive a score of 1. The student will also receive a score of 1 if he or she has a correct explanation but does not give the correct answer.

Sample Question 25: In a cooking class, John is making omelets for 26 children. Each omelet needs 3 eggs. How many dozen eggs does John need?

Use drawings, words, or numbers to explain your answer. Show all your work.

Content Category: Math Communication

This question is asking you to figure out how many dozen eggs John needs and to explain how you found your answer. The first step is to figure out how many eggs John needs. If he is making 26 omelets and each omelet needs 3 eggs, he needs 78 eggs, since $26 \times 3 = 78$.

Next you need to find out how many dozen this is. There are 12 eggs in 1 dozen. To find out how many dozen is equal to 78 eggs, you divide 78 by 12.

$$\begin{array}{r} 6R6 \\ 12 \overline{) 78} \\ \underline{72} \\ 6 \end{array}$$

John needs 6 dozen plus 6 more eggs. So he needs 6 1/2 dozen or 7 full dozen cartons of eggs.

Students need to show all of the steps in finding the correct answer in order to receive a score of 2. They must show work for finding the 78 eggs. Then they must show how to find how many dozen eggs this is. They then need to explain what 6R6 means – it is 6 dozen plus another 6 eggs, which is 6 1/2 dozen. If John can only buy eggs in 1 dozen cartons, he'll have to buy 7 cartons.

If students find that John needs 78 eggs but they do not find the correct number of dozens needed, they will receive a score of 1. If students answer 6 dozen and work indicates they did not know how to handle the remainder, they will also get a score of 1.

VERBAL REASONING

Sample Question 1: Which lettered pair of words goes together in the same way as the first pair of words?

HOARD : DISPERSE ::

- (A) obtain : acquire
- (B) oppose : disapprove
- (C) save : spend
- (D) donate : support

Content Category: Analogical Reasoning

The correct answer to this question is (C). The two terms in the original pair have an oppositional relationship: to hoard (to accumulate or stockpile) is the opposite of to disperse (to scatter or disseminate). Only the words in option (C) are also opposites.

Sample Question 2: Which of the following words does NOT belong with the others?

- (A) Planet
- (B) Spaceship
- (C) Meteor
- (D) Asteroid

Content Category: Categorical Reasoning /Fit

The correct answer to this categorical reasoning problem is (B). All of the objects on the list can be found in outer space; however, planets, meteors, and asteroids are all naturally occurring, while spaceships are made by humans.

Sample Question 3: If most mountains have jagged peaks, and if Stowe is a mountain in Vermont, then

- (A) Stowe is the only mountain in Vermont with a jagged peak.
- (B) All things with peaks are mountains.
- (C) Stowe is probably over 15,000 feet high.
- (D) Stowe probably has a jagged peak.

Content Category: Logical Reasoning /Deductive Reasoning

In this deductive reasoning problem, the premises are that Stowe is a mountain and that most mountains have jagged peaks. The conclusion to be drawn, therefore, is that Stowe probably has a jagged peak. The correct answer, then, is (D).

VOCABULARY

Sample Question 4: Choose the word that best fits in the context of the sentence.

Dr. Martin Luther King, Jr., an advocate of nonviolent protest, never _____ his belief in this form of resistance.

- (A) conquered
- (B) acknowledged
- (C) abandoned
- (D) maintained

Content Category: Precision

Option (C) is the correct answer because the sentence makes the most logical sense when “abandoned” is inserted in the blank. To answer the question, students must recognize that “this form of resistance” in the sentence is a reference to “nonviolent protest,” of which Dr. King was an advocate. Therefore, options (B) and (D) do not make sense in the context of the sentence; Dr. King would clearly have acknowledged and maintained a belief in something he advocated. The word “conquered” in option (A), while closer in meaning to “abandoned,” does not fit logically or idiomatically.

Sample Question 5: Choose the pair of words that best fits in the context of the sentence.

Walking into the museum with a feeling of _____ and expectation, Magda was so _____ to get started that she overlooked the map posted at the entrance.

- (A) boredom . . eager
- (B) dread . . happy
- (C) excitement . . anxious
- (D) anticipation . . unwilling

Content Category: Precision

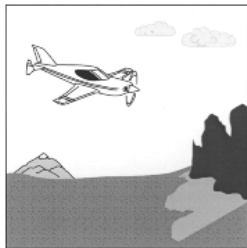
In this question, the students are looking for precise words that make the most logical sense in the sentence. The first blank reveals that Magda’s feelings are linked to ones of “expectation.” The sentence also indicates that she “overlooked” information. In what circumstances would “expectation” about something cause one to “overlook” crucial information? (C) is the correct answer. One who shows “excitement and expectation” could become so “anxious” as to not take notice of things.

READING COMPREHENSION

Questions 6-10 are based on the following passage.

Locating Buried Tombs and Towns

Most of the first places investigated by the treasure hunters and early archaeologists were clearly visible: big mounds, ruins of cities, and stone monuments.



Today, there are ways of finding ancient things that may not be visible at all. Photographs of the ground taken from an aircraft directly overhead can reveal the presence of buried ruins, ancient roads and ditches, or burial mounds that have eroded away to almost nothing. Deep soil is usually thickly covered with vegetation, but soil that is shallow because there is something under it, such as an ancient stone wall, can support only a few plants, and shows up on an aerial photo as a streak that looks very different from everything around it. A slight swelling of a worn-down burial mound may not even be noticeable to a person standing right in front of it, but at sunrise and sunset it will cast a longish shadow that reveals its presence perfectly on a photo taken from above.

The first aerial photographs that produced a major archaeological find were taken over the Sinai Desert in 1920. They showed that several ancient cities were lying beneath the sand! Today, in addition to standard aerial photography, archaeologists make use of special methods. Infrared photography can reveal buried objects. Photography from space can reveal details on the Earth's surface that are not visible at closer distances. It can pick up the course of ancient roads and track them to the sites of buried cities.

There are also tools of modern technology that are helpful in searching for buried tombs and towns from the surface of the ground rather than the air. One of these is ground-penetrating radar, which sends radio waves into the ground. If the waves strike a buried object, they bounce back and form an image on a kind of television screen. Ground-penetrating radar is capable of such things as locating ancient communities that are buried under tons of volcanic ash. Another tool is a device known as a magnetometer. The Earth has a magnetic field all around it, and a magnetometer can measure tiny differences in the field that are caused by such things as buried stone walls and buildings. A magnetometer can detect objects buried as deep as 15 feet (4.5 meters) underground.

Sample Question 6: What did early archaeologists rely on?

- (A) Touch
- (B) Sound
- (C) Sight
- (D) Smell

Content Category: Explicit Information / Detail

This question asks students to recall explicit information from the beginning of the passage. This information is important because it helps establish the importance of the use of technology by modern archaeologists. While early archaeologists had to rely on their sense of sight to discover artifacts, modern archaeologists have the benefit of technology to help them locate buried ruins and objects. The correct answer, therefore, is (C).

Sample Question 7: The passage mentions all of the following technological tools EXCEPT

- (A) infrared photography
- (B) convection heat
- (C) ground-penetrating radar
- (D) magnetometer

Content Category: Explicit Information / Detail

This question asks students to recall which tools are discussed in the passage and to recognize which tool is not discussed. Convection heat is the one tool that is not mentioned in the passage, so the correct answer to this question is (B).

Sample Question 8: Aerial photographs of the Sinai Desert taken in 1920 revealed for the first time the

- (A) beautiful shadows in the desert
- (B) plants that grow in the desert
- (C) magnetic field around the desert
- (D) ruins of cities buried in the desert

Content Category: Explicit Information / Detail

This question asks students to recall information provided in the beginning of the second paragraph. This information is important to the main idea of the passage. The photographs "showed that several ancient cities were lying beneath the sand" (lines 26-27), the first example of technology enabling archaeologists to find ruins not directly visible to the eye. The correct answer, then, is (D).

READING COMPREHENSION CONTINUED

Sample Question 9: Which of the following statements is an opinion?

- (A) Technology has been helpful in searching for burial sites.
- (B) A magnetometer can detect objects buried as deep as 15 feet.
- (C) The most valuable finds in the desert are burial mounds.
- (D) Photography from space can reveal details on the Earth's surface.

Content Category: Inference / Fact or Opinion

This question asks students to distinguish between factual statements and opinions. Options (B) and (D) are statements of fact taken directly from the passage: (B) from lines 48-50 and (D) from lines 30-32. Option (A), because it does express a judgment, may look like an opinion, but the content of the passage clearly presents as fact the notion that technology has been helpful to archaeologists. Only option (C) offers an opinion that cannot be supported by the passage. Therefore, the correct answer is (C).

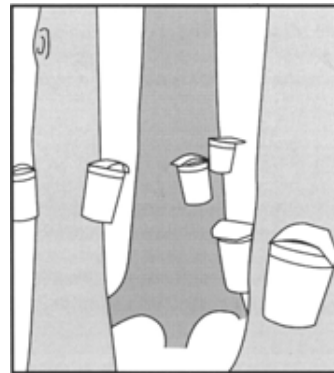
Sample Question 10: The passage suggests which of the following about technology?

- (A) It has proven to be very useful to archaeologists.
- (B) It will eventually replace archaeologists.
- (C) It can lead archaeologists to wrong conclusions about ancient peoples.
- (D) It cannot replace human instinct.

Content Category: Analysis / Draw Conclusions

This question asks students to infer the role of technology in the field of archaeology today. Although (C) and (D) are both plausible options, since they express reasonable concerns people might have about technology, the passage only addresses technology's positive contributions to archaeology. Therefore, (A) is the correct answer.

Questions 11-14 are based on the following passage.



Maple Syrup Buckets

At the edge of Mr. Wells' woods
I count eighteen rusty buckets
hanging from maple trees.

Line In these parts it's a known fact
5 that Mr. Wells has never smiled
in fact hardly speaks at all

though he once explained to me
why it takes forty gallons of sap
to make a single gallon of syrup

10 which made me wonder if maybe
he requires forty hours of silence
to make a single hour of talk.

He keeps bees, too: succulent honey.

15 Strange that such a sour man should
produce all that sweetness.

Sample Question 11: What does Mr. Wells do?

- (A) He plants trees.
- (B) He makes syrup.
- (C) He repairs buckets.
- (D) He talks about his bees.

Content Category: Explicit Information / Detail

This question asks students to recognize a detail from the poem, namely what Mr. Wells does. According to the poem, Mr. Wells explains to the speaker that "it takes forty gallons of sap to make a single gallon of syrup" (lines 8-9), and the poem ends with the speaker marveling that "such a sour man should produce all that sweetness" (lines 14-15). These details indicate that Mr. Wells makes maple syrup; the correct answer, therefore, is (B).

READING COMPREHENSION CONTINUED

Sample Question 12: According to the poem, which of the following statements about making syrup is true?

- (A) It takes forty hours to collect a gallon of sap.
- (B) Large amounts of sap are needed to produce a gallon of syrup.
- (C) Bees produce a gallon of honey faster than a person can make a gallon of syrup.
- (D) Mr. Wells is well known for his unusual methods for making syrup.

Content Category: Explicit Information / Detail

In this question, students are to recall basic information contained in the poem. Option (A) might seem correct because of its reference to “forty” and “a gallon of sap”; however, this choice is incorrect because the poem indicates “forty gallons of sap [are needed] to make a single gallon of syrup” (lines 8-9). Option (B) best conveys the notion that a lot of sap is needed to make a small amount of syrup, and therefore (B) is the correct answer.

Sample Question 13: Which of the following statements most accurately describes Mr. Wells?

- (A) Mr. Wells enjoys visitors.
- (B) Mr. Wells is talkative.
- (C) Mr. Wells works slowly.
- (D) Mr. Wells is unpleasant.

Content Category: Inference / Motives and Behaviors

The correct answer is (D). This question requires students to infer what type of person Mr. Wells is. The poem indicates that Mr. Wells “has never smiled [and] in fact hardly speaks at all.” He is also described as being a “sour man.” These descriptions are most indicative of someone who is “unpleasant.”

Sample Question 14: According to the poem, what makes the poet certain that Mr. Wells has never smiled?

- (A) Mr. Wells told him that he doesn’t smile.
- (B) Mr. Wells’ family volunteered this information.
- (C) Other people smile more than Mr. Wells does.
- (D) No one living nearby has seen Mr. Wells smile.

Content Category: Analysis / Draw Conclusions

To answer this question correctly, students need to draw a conclusion about information mentioned in the poem. Nothing about Mr. Wells’ family is mentioned, so option (B) can be eliminated. Option (C) might be true but is also not mentioned or suggested in the poem, and (A) is highly unlikely, since the poem indicates he “hardly speaks at all.” Only option (D) most closely reflects the sentiments expressed in the poem.

READING COMPREHENSION

Optional Constructed-Response Questions (CTP 4 Only)

Read Passage 1 to learn more about volcanoes.

A volcano is a vent, or opening, on Earth's surface where melted rock, called magma, can escape from inside Earth. Magma, a slushy mixture of gases, liquid rock, and minerals, is formed in Earth's interior. Once magma leaves the vent, it is called lava. With its bright colors of yellow, orange, and red, flowing lava often resembles a river of fiery water. Sometimes lava erupts quietly, spilling out of the vent and down the volcano's slope. Other times, pressure from gases forces a glowing spray of lava to shoot out of the vent, creating a lava fountain. Lava fountains usually spout anywhere from a few inches to about 30 feet (9 m) into the air. The highest lava fountain ever recorded on Earth came from Hawaii's Kilauea Volcano in 1959. This amazing fountain soared about 1,900 feet (570 m) into the air. That's several hundred feet higher than the world's tallest building!

Despite our fear of volcanoes' power, some effects of an eruption are beneficial. Air and rain react chemically with lava, producing very rich soil. This can happen in as little time as one year. In Hawaii, Central America, and South America, pineapples and coffee beans — two economically important crops — thrive in the rich volcanic soil.

Also, the heat generated by magma turns groundwater into water vapor. This steam can be used to produce geothermal energy. By drilling into the ground and piping steam or very hot groundwater into power plants, we can produce electricity to light and heat our homes and businesses. New Zealand, Mexico, and the United States are some of the countries that use geothermal power. In Iceland, groundwater is not hot enough to turn into steam, but it is hot enough to pipe directly into homes to heat them.

It's clear that volcanoes not only shape Earth's surface, but they also affect our lives!

Sample Question 15: How does lava look when it erupts? Discuss two examples from the passage.

Content Category: Reading for Understanding

In order to receive a 2 (the highest score) on this question, the student must show clear and solid understanding of how lava looks when it erupts from a volcano; the response must include at least two of the following descriptions from the passage.

- a river of fiery water
- bright colors of yellow, orange, and red
- spilling out of the vent and down the volcano's slope
- glowing spray of lava or a lava fountain

In order to receive a score of 1, the student must show basic (but in some way incomplete) understanding of how lava looks when it erupts from a volcano; the response must include one of the descriptions listed above.

A score of 0 indicates that the student shows very little or no understanding of how lava looks when it erupts from a volcano; a response in this category includes none of the descriptions listed above or gives only incorrect information.

READING COMPREHENSION CONTINUED Optional Constructed-Response Questions (CTP 4 Only)

Passage 2 is a fictional account of the eruption of Mount Vesuvius.

In the seaside town of Herculaneum, this summer morning in the year A.D. 79 seemed like any other. On the beachfront, the fishermen pulled up their boats in front of the seawall. Breezes from the bay cooled the wealthy Romans relaxing in the gardens of their elegant summer villas. No one suspected that within hours the top of nearby Mount Vesuvius would blow off, burying the town and many of its people under an enormous avalanche of mud and ash.

Petronia, a servant girl, was busy helping the household prepare for a big party. She had spent the past week shopping, cooking, and cleaning for the special event. By that afternoon, life, as she knew it, was over. Outside, the sky grew very dark, and the air was thick with hot dust that stuck in her throat and made her eyes water. Screaming, pushing crowds on donkeys, horses, even oxen and cows filled the streets.

As Petronia looked back at Mount Vesuvius, her heart almost stopped with fear. The peak of Mount Vesuvius seemed disfigured, as if a giant axe had ripped open the mountain. The mouth of the mountain was outlined in a blaze of red flame, and glowing rocks bubbled out below a gigantic plume of smoke and ash. Petronia turned away from the crowds and escaped to the sea.

The ash and hot gas poured over the town, followed by waves of hot mud. In a few hours, Herculaneum was completely buried under 65 feet of volcanic matter, which, when it cooled, covered the town like a cement shield.

And so the town lay tightly sealed for about 1,500 years.

Sample Question 16: Both the passage about volcanoes and the passage about Mount Vesuvius describe volcanic eruptions. How do these passages differ in their descriptions of the eruptions? Use examples from both passages to support your points.

Content Category: Reading for Understanding

In order to receive a 2 (the highest score) on this question, the student must show clear and solid understanding of how the two passages differ in their descriptions of volcanic eruptions. The response must indicate that the first passage emphasizes the positive aspects of volcanic eruptions (e.g., color, beauty, dramatic effects, environmental benefits), while the second passage emphasizes the negative aspects of volcanic eruptions (e.g., violence, destruction, frightening appearance). The student must provide specific details from both passages to support claims.

In order to receive a score of 1, the student must show basic (but in some way incomplete) understanding of how the two passages differ; the response might lack specific details or might refer only to the descriptions from one passage or might describe differences inaccurately or inadequately.

A score of 0 indicates that the student shows very little or no understanding of how the two passages differ; a response in this category includes no correct descriptions or details from either passage.

WRITING MECHANICS

Sample Question 17: Find the misspelled word, if there is one.

- (A) soldier
- (B) separate
- (C) exaggerate
- (D) no error

Content Category: Spelling / Commonly Used Words

This question asks students to identify an incorrectly spelled word. Since the word exaggerate is misspelled, the correct answer is option (C).

Sample Question 18: Find the punctuation error in the sentence, if there is one.

In cities____across the United States, childrens' museums have
(A) (B)
attracted young people interested in scientific exploration____and
(C)
artistic experiences. No error
(D)

Content Category: Punctuation / Apostrophe

This question asks students to recognize an error in punctuation. The word childrens' should have an apostrophe before the "s" instead of after the "s" to express the possessive case of a collective noun. Therefore, option (B) is the correct answer.

Sample Question 19: Choose the word that best completes the sentence.

The children were eating lunch in their backyard _____ it began to rain.

- (A) so
- (B) because
- (C) soon
- (D) when

Content Category: Usage / Diction

This question asks students to choose the word that correctly and grammatically establishes the most likely relationship between the two clauses, "The children were eating lunch in their backyard" and "it began to rain." Options (A) and (B) present relationships that don't make sense, while option (C) creates a run-on sentence. Only (D) presents a relationship that both makes sense and creates a grammatically correct expression: The children were eating lunch in the yard when it began to rain.

Sample Question 20: Which of the following should be two sentences?

- (A) The emperor glanced in all directions while the flying man soared in the morning wind.
- (B) He saw a farmer watching the sky and noted where the farmer stood.
- (C) The emperor reached out a thin hand to touch the birdlike apparatus.
- (D) I rose in the night and walked to the cliffs far away when the morning breezes blew I gathered my courage.

Content Category: Usage / Sentence Boundaries

This question asks students to identify a run-on sentence that should be made into two separate sentences. Options (A) and (B) may appeal to students, since (A) is a complex sentence and (B) has a compound verb. Both (A) and (B) are grammatically correct, however. The only run-on sentence is (D), so (D) is the correct answer.

WRITING CONCEPTS AND SKILLS

Sample Question 21: Decide which is the best order for the sentences listed.

1. The Romans found a way to build the supporting piers of bridges without having to work under water.
 2. Once the water inside the poles was pumped out, the workers would climb down and construct a pier of stone using the space inside the poles.
 3. First, a circle of long wooden poles with pointed ends was driven into the riverbed.
 4. Then the poles were chained together and any gaps were filled with clay.
- (A) 3, 4, 2, 1
 - (B) 1, 2, 3, 4
 - (C) 1, 3, 4, 2
 - (D) 1, 3, 2, 4

Content Category: Organization / Logical Sequence

This question asks students to put four sentences in order to form a coherent paragraph. Students must be able to recognize the topic sentence and then determine the logical sequence of the remaining sentences. Sentence 1 is the only one broad enough to serve as a topic sentence, and while the topic sentence need not always come first in a paragraph, in this case it is the only one that could logically begin the paragraph. The sequence of the remaining sentences is determined by the adverbs that begin each sentence and the logical order of the actions described. (The poles must be driven into the riverbed and chained together before they can serve as a foundation for a pier.) The correct answer to this question, then, is option (C).

WRITING CONCEPTS AND SKILLS

CONTINUED

Sample Question 22: This is a list of major topics in a report on the life of Harriet Tubman. They are not in the correct order.

1. Growing up on a plantation in the South.
2. Working for the Underground Railroad before the Civil War.
3. Escaping to the North before the Underground Railroad was established.
4. Serving as a nurse, cook, scout, and spy during the Civil War.

Which of these shows the topics arranged in the correct order?

- (A) 1, 3, 2, 4
- (B) 2, 1, 4, 3
- (C) 3, 1, 2, 4
- (D) 4, 3, 2, 1

Content Category: Organization / Logical Sequence

This question asks students to arrange a list of topics for a biographical report in the correct order. Since a biographical report often follows the subject's life chronologically, and since these topics emphasize the time periods during which each activity took place, chronological order seems the most logical choice. Therefore, the student must arrange the topics so that the list begins with Tubman's childhood, continues through the years preceding the Civil War, and concludes with the Civil War period. (A) is the only option that begins with Tubman's childhood and then proceeds chronologically. Thus, (A) is the correct answer.

Sample Question 23: Which of these would be the best to use in an essay about a famous scientist's research on marine life?

- (A) Rachel Carson was a famous scientist. Her grandmother, a teacher, taught her mathematics.
- (B) I am writing a biography of Rachel Carson. She was a scientist who studied nature.
- (C) Silent Spring is Rachel Carson's best known book. It was one of the first books to expose the dangerous effects of pesticides on the environment.
- (D) Rachel Carson began work on *The Sea Around Us* in 1948. She gathered information for the book while on a ten-day voyage on a research boat owned by the Fish and Wildlife Service.

Content Category: Purpose, Audience, and Focus / Relevant

Information This question asks students to determine which option contains the most appropriate information to include in an essay on Rachel Carson's research on marine life. All of the

options discuss Rachel Carson as a scientist; therefore, students must distinguish between interesting statements about Carson and statements that discuss her research on marine life. Only option (D) discusses Carson's marine research, so (D) is the correct answer.

Sample Question 24: The sentence at the beginning of the question is the main idea of a paragraph. Decide which of the choices goes best with the main idea.

Some jobs in a city are performed by people for no pay.

- (A) Citizens volunteer to work in schools and help in nursing homes and hospitals.
- (B) Unemployment and homelessness are some of the problems people face in a city.
- (C) People often enjoy cultural performances such as symphonies, ballet, and theater.
- (D) Trash collection, snow removal, and road maintenance are some of the jobs performed by workers employed by the city.

Content Category: Supporting Details / Relevant

Information This question asks students to choose the sentence that provides the appropriate supporting details for the preceding statement. Since the preceding statement refers to jobs in a city that are performed by people for no pay, the correct answer should give examples of these jobs. (A) is the only option that describes volunteer work; therefore, the correct answer is (A).

Sample Question 25: Choose the opening sentence that goes best with the details in the paragraph.

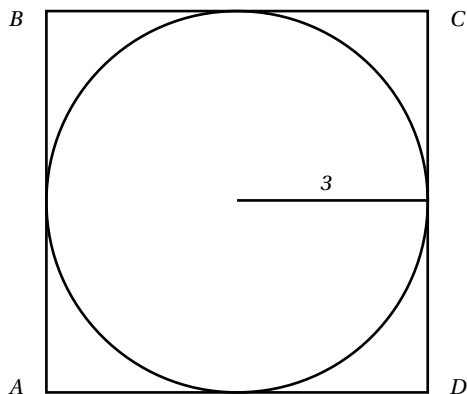
_____. Glassmakers in Venice, Italy, learned hundreds of years ago to swirl colors through their glass. No two pieces of this glass have exactly the same pattern of colors. Today, Venetian glass is still very popular.

- (A) Venice, a city in Italy, is popular for its many canals.
- (B) Silica and sand are important materials used in glassmaking.
- (C) Glass is used to make eyeglasses, telescopes, and microscopes.
- (D) In addition to being useful, Venetian glass is also unique.

Content Category: Supporting Details / Topic Sentences

This question asks students to choose the best topic sentence for a paragraph on Venetian glass. The best topic sentence will introduce the subject matter that is developed in the paragraph. Although each of the options discusses glass or glass-making, only (D) introduces the idea of the uniqueness of Venetian glass, a key point in the paragraph. Therefore, option (D) is the correct answer.

QUANTITATIVE REASONING



The circumference of the circle

A

The perimeter of square ABCD

B

Sample Question 26: Which statement is true?

- (A) A is greater than B.
- (B) B is greater than A.
- (C) A and B are equal.
- (D) There is not enough information to tell which is greater.

Content Category: Comparison

The square “sticks out” more than the circle. If you needed to travel from point A around the square and back to A again, you could shorten your trip by traveling part of it on the circle. Therefore, the perimeter of the square is greater than the circumference of the circle. This question can also be approached by using the fact that the radius of the circle is 3 and the length of each side of the square is 6. The circumference of the circle is $2\pi r = 6\pi$ (which is between 18 and 19). The perimeter of the square is $4 \times 6 = 24$. Since $24 > 6\pi$, the perimeter is greater than the circumference. Therefore, the amount in B is greater than the amount in A. The correct answer is (B).

The remainder when 111,111,111 is divided by 3

A

The remainder when 111,111,111 is divided by 9

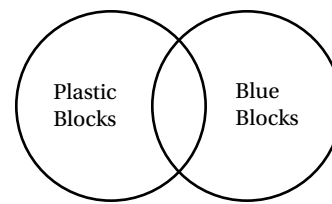
B

Sample Question 27: Which statement is true?

- (A) A is greater than B.
- (B) B is greater than A.
- (C) A and B are equal.
- (D) There is not enough information to tell which is greater.

Content Category: Extensions and Generalizations

The sum of the digits of 111,111,111 is 9. This means that it is divisible by 9 and also by 3. The remainder when 111,111,111 is divided by 3 is 0, and the remainder when 111,111,111 is divided by 9 is 0. Therefore, the remainders in A and B are equal, and the correct answer is choice (C).



The number of plastic blocks

A

The number of blue blocks

B

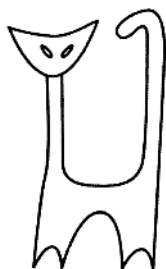
Sample Question 28: Which statement is true?

- (A) A is greater than B.
- (B) B is greater than A.
- (C) A and B are equal.
- (D) There is not enough information to tell which is greater.

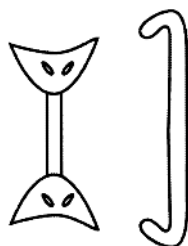
Content Category: Analysis

The Venn diagram allows for the possibility that some blocks are plastic and not blue, some are plastic and also are blue, some are not plastic but are blue, and some are neither plastic nor blue. No numbers are given for any of these categories, so there is no way to compare the number of plastic blocks with the number of blue blocks. Therefore, there is not enough information to tell which amount is greater. The correct answer is choice (D).

QUANTITATIVE REASONING CONTINUED



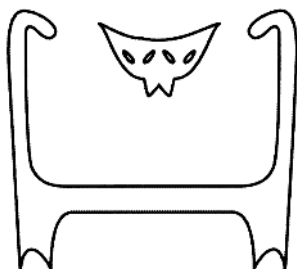
Sample Question 29: Scott is using a mirror with the drawing above to form images. Which of the following images can he form?



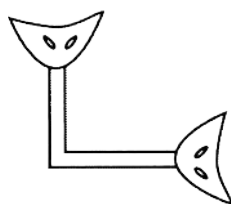
(A)



(B)



(C)



(D)

Content Category: Analysis

Among the answer choices, (A) and (D) can be ruled out because they lack symmetry. Choice (A) lacks symmetry because the eyes in the lower part of the image are not a reflection of the eyes in the upper part. Choice (D) lacks symmetry because the two necks are unequal in length. Choice (C) has a vertical line of symmetry, but it is incorrect because a notch appears instead of part of a neck. Choice (B) can be formed by placing an edge of the mirror on a vertical line just to the left of the center of the original drawing. The right-hand side of the image is in the original drawing, and the left-hand side of the image is the reflection in the mirror. The correct answer, therefore, is choice (B).

MATHEMATICS

Sample Question 30: Which of the following is less than $\frac{7}{8}$?

- (A) $\frac{9}{10}$
- (B) $\frac{8}{9}$
- (C) $\frac{3}{4}$
- (D) $\frac{15}{16}$

Content Category: Numbers and Number Relationships /

Conceptual Understanding The fraction $\frac{7}{8}$ is $\frac{1}{8}$ less than 1. The fraction $\frac{9}{10}$ is $\frac{1}{10}$ less than 1. Since $\frac{1}{10}$ is less than $\frac{1}{8}$, it follows that $\frac{9}{10}$ is closer to 1 than $\frac{7}{8}$ is. Therefore, $\frac{7}{8} < \frac{9}{10}$. Similar thinking will show that $\frac{7}{8} < \frac{8}{9}$ and $\frac{7}{8} < \frac{15}{16}$. Alternatively, to compare $\frac{7}{8}$ with $\frac{3}{4}$, rewrite $\frac{3}{4}$ as $\frac{6}{8}$. It is clear that $\frac{6}{8} < \frac{7}{8}$. Therefore, $\frac{3}{4} < \frac{7}{8}$. The correct answer is choice (C).

Sample Question 31: Five consecutive whole numbers sum to 125. What are the numbers?

- (A) 18, 19, 20, 21, and 22
- (B) 21, 22, 23, 24, and 25
- (C) 23, 24, 25, 26, and 27
- (D) 25, 26, 27, 28, and 29

Content Category: Number Systems and Number Theory /

Problem Solving The middle number of the five consecutive whole numbers is also the average of the five consecutive whole numbers. That middle number is $125 \div 5$, which is 25. To make 25 the middle number, you would start with 23. The five numbers are 23, 24, 25, 26, and 27. An alternate approach is to add up the five numbers in any option and see if the sum is 125. The only option containing 5 numbers with a sum of 125 is option (C). The correct answer is choice (C).

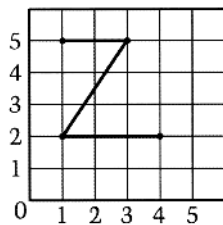
Sample Question 32: Which of the following could not be a rectangle?

- (A) A parallelogram
- (B) A polygon
- (C) A trapezoid
- (D) A quadrilateral

Content Category: Geometry / Conceptual Understanding

A parallelogram could be a rectangle (if it happened to have right angles). A polygon could be a rectangle (if it happened to have four sides and four right angles). A quadrilateral could be a rectangle (if it happened to have four right angles). The reason a trapezoid can never be a rectangle is that a trapezoid must have one pair of opposite parallel sides and one pair of opposite nonparallel sides. In a rectangle, both pairs of opposite sides are parallel. The correct answer is choice (C).

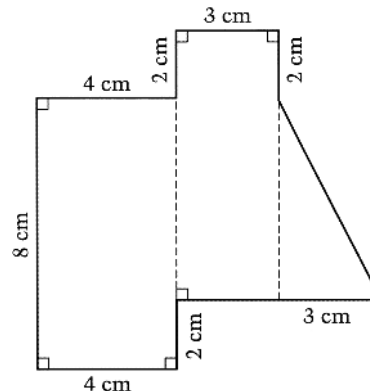
MATHEMATICS CONTINUED



Sample Question 33: The four points with coordinates (1, 2), (1, 5), (3, 5), and (4, 2) are to be connected to make a Z as shown. In what order can they be connected?

- (A) (1, 2) (1, 5) (3, 5) (4, 2)
- (B) (1, 5) (3, 5) (1, 2) (4, 2)
- (C) (3, 5) (1, 5) (1, 2) (4, 2)
- (D) (4, 2) (3, 5) (1, 5) (1, 2)

Content Category: Geometry and Spatial Sense / Conceptual Understanding To connect the four points, you would begin either at (1, 5), the point at the upper left of the Z, or at (4, 2), the point at the lower right of the Z. If you begin at (1, 5), the next point should be the one to the right of (1, 5), namely (3, 5). The point after that should be the one on the lower left, (1, 2), and the last point should be to the right of (1, 2), namely (4, 2). This is the sequence shown in answer choice (B), which is the correct answer. Answer choice (D) begins with (4, 2). If you started at (4, 2), the next point should have been (1, 2). In option (D) the first point listed is (4, 2), and the second is (3, 5). So option (D) is not correct.



Sample Question 35: What is the area of the figure above?

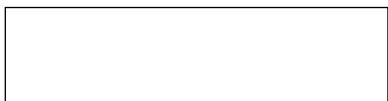
- (A) 74 square centimeters
- (B) 68 square centimeters
- (C) 65 square centimeters
- (D) 49 square centimeters

Content Category: Measurement / Problem Solving

The figure consists of two rectangles and a triangle. One rectangle has dimensions 4 cm by 8 cm. Therefore, its area is 32 square centimeters. The other rectangle has dimensions 3 cm by 8 cm. The length of 8 cm is found by comparison with the length of the first rectangle. The second rectangle extends 2 cm further on the upper end, but starts 2 cm higher on the lower end, $8 + 2 - 2 = 8$. Therefore, the area of the second rectangle is 24 square centimeters.

The triangle has base 3 cm and height 6 cm ($8 - 2 = 6$). The area of the triangle is $\frac{1}{2} \times 3 \times 6$, which is 9 square centimeters. Therefore, the total area is $32 + 24 + 9$, or 65 square centimeters. The correct answer is choice (C).

Length = $4x$



Width = x

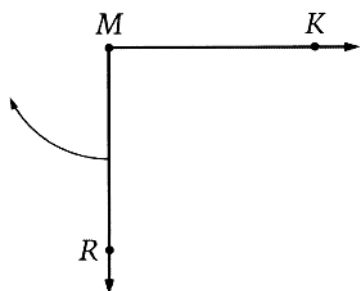
Sample Question 34: The length of a rectangular garden is four times its width. The perimeter of the garden is 240 meters. What is the length of the garden?

- (A) 24 meters
- (B) 48 meters
- (C) 96 meters
- (D) 192 meters

Content Category: Measurement / Problem Solving

Using the information about the rectangle's dimensions and perimeter, you can write the equation $4x + x + 4x + x = 240$. Since $10x = 240$, it follows that $x = 24$. The question asks for the length of the garden, $4x$, which is 4×24 or 96. The correct answer is choice (C).

MATHEMATICS CONTINUED



Sample Question 36: Ray MR above moves around point M in a clockwise direction until it is on top of ray MK .

How many degrees does ray MR move?

- (A) 90°
- (B) 180°
- (C) 270°
- (D) 360°

Content Category: Measurement / Conceptual

Understanding Ray MR will move through three quarter circles. The first quarter circle will result in the ray opposite ray MK . The second quarter circle will result in the ray opposite the initial position of ray MR . The third quarter circle will result in a ray on top of ray MK . Each quarter circle measures 90° , and $3 \times 90 = 270^\circ$. The correct answer is choice (C).

Questions 37 and 38 refer to the table below.

TOP TEN GRAMMY AWARD WINNERS, 1999

Winner	Number of Grammy Awards
Qunicy Jones	26
Henry Mancini	20
Stevie Wonder	19
Paul Simon	16
John Williams	16
Aretha Franklin	15
Chet Atkins	14
David Foster	14
Ella Fitzgerald	13
Michael Jackson	13

Sample Question 37: How many of the Grammy award winners shown in the table have won more Grammys than the median number of Grammys won by all 10 winners?

- (A) Three
- (B) Four
- (C) Five
- (D) Six

Content Category: Statistics / Problem Solving

The table lists the Grammy award winners in order from the one with the greatest number of awards to the one with the least number of awards. The median number of Grammys won by all 10 winners is the average of the two middle numbers, 15 and 16; thus, the median is $15\frac{1}{2}$. There are five winners listed who have won more than $15\frac{1}{2}$ awards. The correct answer is choice (C).

Sample Question 38: According to the table, what is the range in the number of Grammys awarded?

- (A) 7
- (B) 9
- (C) 11
- (D) 13

Content Category: Statistics / Problem Solving

The range refers to the difference between the highest value and the lowest value. For the data in the table, the highest number of Grammys awarded is 26 and the lowest number of Grammys awarded is 13. Therefore, the range is $26 - 13$, which is 13. The correct answer is choice (D).

Sample Question 39: A number cube has a different number from 1 to 6 on each face. If the number cube will be rolled twice, what is the probability that the sum of the numbers on the top face of the cube will be 10?

- (A) $\frac{1}{12}$
- (B) $\frac{1}{10}$
- (C) $\frac{1}{6}$
- (D) $\frac{2}{3}$

Content Category: Probability / Problem Solving

There are 36 combinations that result from rolling the cube twice. You need to count the number of combinations for which the sum of the numbers on the top face is 10.

1st roll	2nd roll
4	6
5	5
6	4

There are 3 combinations giving a sum of 10. Therefore, the probability that the sum will be 10 is 3 out of 36, or $\frac{1}{12}$. The correct answer is choice (A).

MATHEMATICS

Optional Constructed-Response Questions (CTP 4 Only)

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Sample Question 40: Here are some clues about a certain whole number.

- It is a multiple of 3.
- Its square is an even number less than 100.

What is the number? Explain your reasoning.

Content Category: Math Communication

It is given that the number is a multiple of 3, and its square is an even number less than 100. The even squares less than 100 are 4, 16, 36, and 64. The square roots of these squares are 2, 4, 6, and 8. Of these square roots, only 6 is a multiple of 3, so 6 is the only positive integer that satisfies both conditions.

Alternative solutions are possible. Students receive full credit (a score of 2) if they answer 6 and have a mathematically correct explanation. Students receive partial credit (a score of 1) by: 1) Answering 6 with an incomplete explanation or no explanation. Or 2) Answering 36 with an explanation that includes $6 = 36$ and $36 < 100$.

.....

Sample Question 41: Each day Mrs. Kistler drives 48 miles to work and 48 miles back home again.

- Her car uses 1 gallon of gas for every 30 miles she travels.
- Last week she worked 5 days.

How many gallons of gas did she use last week going to work and back? Show your work or explain how you got your answer.

Content Category: Math Communication

Mrs. Kistler drives 96 miles each day. In the 5 days she worked last week her total mileage is 5×96 or 480 miles. Her car uses 1 gallon of gas for every 30 miles. $480 \div 30 = 16$. The correct answer is 16 gallons.

Alternative approaches are possible. For example, Mrs. Kistler drives 96 miles each day. Since $96 \div 30 = 3.2$, she uses 3.2 gallons of gas each day. Over the course of 5 days she uses 3.2×5 or 16 gallons of gas.

Students receive full credit (a score of 2) if they answer 16 gallons and show mathematically correct work or explanation. Students receive partial credit (a score of 1) if they: 1) give the correct answer with no work or incomplete/unclear work, 2) have the correct process, but do not get the correct answer, or 3) answer 8 gallons and show work for only the one-way journey instead of the round-trip journey.

VERBAL REASONING

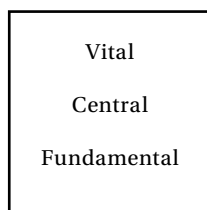
Sample Question 1: Which lettered pair of words goes together in the same way as the first pair of words?

MELODIOUS : SOUND ::

- (A) peaceful : noise
- (B) evident : view
- (C) tasty : flavor
- (D) malodorous : smell

Content Category: Analogical Reasoning

The correct answer to this reasoning problem is (C). There is a positive, associational relationship between the two terms in the pair: a sound that is melodious is by definition pleasing. Only the pair of words in option (C) has this same relationship.



Sample Question 2: Which of the following words best fits in the list above?

- (A) Bothersome
- (B) Basic
- (C) Stray
- (D) Initial

Content Category: Categorical Reasoning / Fit

The correct answer to this question is (B). Each of the three words in the list defines something that is “essential or of primary concern.” Only option (B) conveys this same meaning.

Sample Question 3: Complete the statement below by selecting the most logical conclusion.

If all mammals are warm-blooded creatures and if all bears are mammals, then

- (A) bears hibernate because they are warm- blooded creatures
- (B) every warm-blooded mammal is a bear
- (C) grizzly bears are warm-blooded creatures
- (D) full-grown grizzly bears are the largest warm- blooded creatures

Content Category: Logical Reasoning / Deductive

The correct answer to this question is (C). The suppositional statement establishes two points: 1) all mammals are warm-blooded creatures; and 2) all bears are mammals. Given this information, only option (C) can be deduced from the information provided.

VOCABULARY

Sample Question 4: Choose the word that best fits in the context of the sentences.

The talk show host’s popularity was based on her ability to generate _____ dialogue with her guests. The witty conversation ensured high ratings with a large audience.

- (A) onerous
- (B) listless
- (C) scintillating
- (D) mundane

Content Category: Precision

This question asks students to choose the word that best fits in the context of these sentences. Since the sentences discuss the host’s popularity and witty conversation with her guests, the missing word should emphasize the lively quality of the dialogue. The word “scintillating,” meaning animated and vivacious, is the only one of the choices that emphasizes this quality, so option (C) is the correct answer.

Sample Question 5: Choose the pair of words that best fits in the context of the sentence.

Although Ron disagreed with his friend, instead of _____ him directly, Ron tried to express his own idea more _____.

- (A) supporting . . secretly
- (B) contradicting . . diplomatically
- (C) attacking . . meekly
- (D) affirming . . reliably

Content Category: Precision

The pair of words that makes the most sense in this sentence is the pair in option (B): contradicting . . diplomatically. Options (A) and (D) can be eliminated based on the first word in each pair; the first blank can be filled logically only by something that reinforces the idea that Ron is in disagreement with his friend. Option (C) is plausible at first glance, but “attacking” is too strong — disagreement does not necessarily imply antagonism — and the opposition between “attacking” and expressing an idea “meekly” is not as precise as the more logical opposition between “contradicting” and expressing an idea “diplomatically.”

VOCABULARY CONTINUED

Sample Question 6: The sales representative had traveled the same circuit throughout the southeastern United States for twenty years before retiring.

Which of the following definitions of the word “circuit” is used in the sentence above?

- (A) Periphery
- (B) Route
- (C) Assemblage
- (D) League

Content Category: Application

This question asks students to choose the correct definition of the word “circuit” in the context of a sentence. One meaning of “circuit” is the line going around or bounding any area or object, making option (A) attractive, but “periphery” does not make sense within the context of the sentence. The only option that makes sense in this context is (B), “route,” which matches the definition of a circuit as the route followed on a periodical journey made to perform certain duties. Therefore, option (B) is the correct answer.

Sample Questions 7-10 are based on the passage below.

Deep and shaded by alders, this perennial creek has carved a canyon that offers scores of places to spend an afternoon. The canyon’s beauty begins at road’s edge. Alders thickly covered with green leaves flutter in the breeze, and twenty yards upstream are the first pools. With the canyon walls and alder boughs for privacy, sandstone boulders for resting spots, and the creek’s

Line 9 never-ending babble for companionship, you’ll fall in love with it in 5 no time.

Sample Question 7: Which of the following phrases most nearly means the same as the word perennial in line 1?

- (A) specific to one place
- (B) winding around
- (C) constant throughout the seasons
- (D) pretty and delightful

Content Category: Application / Synonym

The word *perennial* in this context means lasting or enduring for an indefinitely long time, especially in terms of remaining unchanged throughout the seasons of the year. Therefore, option (C) is the best answer.

Sample Question 8: Which of the following phrases most nearly means the same as the word scores as it is used in line 2?

- (A) musical compositions
- (B) large numbers
- (C) privacy and shelter
- (D) indefinitely repeating patterns

Content Category: Application / Synonym

The correct answer to this question is (B). In the phrase “scores of places to spend an afternoon,” only “large numbers” makes sense in place of “scores,” which is defined in this context as “a great many.”

Sample Question 9: Which of the following words is more precise than the word never-ending in line 9?

- (A) incessant
- (B) raucous
- (C) interrupted
- (D) occasional

Content Category: Application / Synonym

In this question, the students are looking for a word that is more precise in meaning than “never-ending.” Option (A) is the correct answer because that which is “incessant” is by definition continual and “never-ending.”

Sample Question 10: Which of the following phrases most nearly means the same as the word babble in line 9?

- (A) jovial conversations
- (B) private conversations
- (C) friendly movements
- (D) sounds with no specific meaning

Content Category: Application / Synonym

This question asks the students to recognize that “babble” means “meaningless or unintelligible sounds”; therefore, the correct answer is (D).

READING COMPREHENSION

Questions 11-16 are based on the following passage.

The World of the Amazon Jungle

- When you are inside the jungle of the Amazon, away from the river, the trees vault out of sight. It is hard to remember to look up the long trunks and see the fans, strips, fronds, and sprays of glossy leaves.
- 5 Inside the jungle you are more likely to notice the snarl of climbers and creepers around the trees' trunks, the flowering bromeliads and epiphytes in every bough's crook, and the fantastic silk-cotton tree trunks 30 or 40 feet across, trunks buttressed in
- 10 flanges of wood whose curves can make three high walls of a room — a shady, loamy-aired room where you would gladly live. Butterflies, iridescent blue, striped, or clear-winged, thread the jungle paths at eye level. And at your feet is a path of ants bearing
- 15 triangular bits of green leaf. The ants with their leaves look like a wide fleet of sailing boats — but they don't quit. In either direction they wobble over the jungle floor as far as the eye can see.
- Unseen in the jungle, but present, are tapirs, jaguars,
- 20 many species of snake and lizard, ocelots, armadillos, marmosets, howler monkeys, toucans and macaws, and a hundred other birds, deer, and bats. Also present in this jungle, but variously distant, are oil derricks and pipelines, and some of
- 25 the fiercest fighters in the world.

Sample Question 11: The main idea of the passage is that

- (A) the jungle teems with more life than meets the eye
- (B) danger lurks in unseen places
- (C) the beauty of the jungle is best appreciated from the river
- (D) one must remember to look up when inside the jungle

Content Category: Explicit Information / Main Idea

This question asks the students to recognize the main idea of the passage. The passage's detailed description of the various plants, animals, and activities in the Amazon jungle clearly supports (A) as the correct answer.

Sample Question 12: The phrase "they don't quit" (line 17) suggests all of the following about the ants EXCEPT:

- (A) They seem almost infinite in number.
- (B) They are extremely flexible.
- (C) They do not stop moving.
- (D) They travel great distances.

Content Category: Inference / Draw Conclusions

This question requires students to understand the phrase "they don't quit" (line 17) in the context of the passage and to recognize what is not discussed, either explicitly or implicitly, about the ants. Options (A), (C), and (D) are all mentioned or implied. Nothing in the passage, however, suggests that the ants are "flexible"; therefore, the correct answer is (B).

Sample Question 13: The description of the trees mainly emphasizes that they are

- (A) endangered
- (B) useful to humans
- (C) very large
- (D) covered with animal life

Content Category: Analysis / Purpose and Intent

This question requires students to use their skills of analysis. Based on the description of the trees in the passage, students are to determine which aspect of the trees the author emphasizes. Options (A) and (B) are the easiest to eliminate, for although the trees may well be both endangered and useful to humans, these aspects are not mentioned in the passage. Option (D) is appealing, but the only life mentioned in the passage that is directly supported by the trees is plant life: the "climbers and creepers" around the trees' trunks and the "bromeliads and epiphytes" in their boughs (lines 6-8). The emphasis in the passage is clearly on the size of the trees. The trees are described as "vault[ing] out of sight" (line 2), with "long trunks" (line 3) that are "30 or 40 feet across" (line 9). Option (C) is therefore the correct answer.

Sample Question 14: The descriptions in the passage rely primarily on the sense of

- (A) smell
- (B) sound
- (C) sight
- (D) touch

Content Category: Analysis / Purpose and Intent

This question asks students to recognize which sense the author appeals to most in describing the Amazon jungle. The detailed descriptions of the trees' height and size, the various flowering plants, and the colorful insects appeal most to the reader's sense of sight. Option (C), therefore, is the correct answer.

READING COMPREHENSION CONTINUED

Sample Question 15: The second paragraph of the passage primarily serves to

- (A) describe the dominance of machinery over nature
- (B) reemphasize the need for conservation
- (C) provide a contrast between plant and insect life and human life
- (D) introduce the presence of larger creatures and human beings

Content Category: Analysis / Purpose and Intent

In this question, the students are to examine the second paragraph only and determine its purpose. Why has the author included this information? In this paragraph, the author mentions other species of animals that are much larger than the butterflies and ants mentioned earlier. Also, the paragraph includes references to the “oil derricks and pipelines, and some of the fiercest fighters in the world” (lines 24-25), which are clearly allusions to the presence of humans. Therefore, (D) is the correct answer.

Sample Question 16: The author’s attitude toward being in the jungle is primarily one of

- (A) mild discomfort
- (B) scholarly interest
- (C) anxiety
- (D) awe

Content Category: Analysis / Style and Tone

From information stated in the passage, the students are to determine the author’s overall attitude toward the jungle. Nothing in the passage suggests that the author is uncomfortable or anxious about being in the jungle; therefore, (A) and (C) can be easily eliminated. (B) might hold some appeal, but the author does not discuss the jungle in a scholarly manner. Instead, the author conveys the wonder of being in the presence of jungle with its teeming life; therefore, (D) is the correct answer.

Sample Questions 17-21 are based on the following passage.

Although we all use postage stamps, few of us think about their origin. Read this account to learn about their early development.

Before the postage stamp, there was the postmark. In England, it took the form of a triangular impression in red ink bearing the words “Penny post paid.” From 1834 to 1838 an Englishman by the name of
 5 Chalmers, a printer and bookseller in Dundee, printed a kind of postage label that he had invented. But the real father of the postage stamp was Roland Hill. In 1837 he published a pamphlet entitled Post Office Reform in which he proposed that letters be
 10 carried any distance within Great Britain and Ireland for a fixed rate and that all postage be prepaid. (At the time, most letters went through the mail unpaid, with postage collected on delivery.) Wrappers and envelopes with the postmark
 15 indicating prepayment were to be sold at all post offices; and for people who wanted to use their own stationery, Hill proposed a bit of paper just large enough to bear the post office’s imprint and “covered at the back with a glutinous wash, which might, by
 20 applying a little moisture, attach to the back of the letter.”

Hill’s proposal was submitted to the Houses of Parliament, where at first it met great resistance. Thanks to publicity generated by the press, however, Hill was able to work out the details of his proposal to
 25 everyone’s satisfaction. On August 17, 1839, a law was passed authorizing the use of the adhesive postage stamp, and a competition was held. The subject chosen for the stamp was Queen Victoria. Henry Courbould made a drawing from a portrait that had
 30 been used by the royal mint for the medal that had been struck commemorating the queen’s first visit to London in 1837. Above the head of the queen was the word “Postage,” and below, a panel with “One Penny” or “Two Penny.” On May 6, 1840, both stamps were
 35 ready: the one-penny was black, the two-penny blue.

The following year, these stamps were sold in every post office in Great Britain. The postage stamp was enthusiastically adopted by the British public: in 1839, 50 million letters were sent within the country;
 40 in 1840, 170 million; and ten years later, more than double that number!

The celebrated one-penny black and its companion, the two-penny blue, are now among the rarest stamps in the world and the prize of any collection.

READING COMPREHENSION CONTINUED

Sample Question 17: According to the passage, the triangle of red ink was known as the

- (A) postage stamp
- (B) postmark
- (C) postal label
- (D) postal wrapper

Content Category: Explicit Information / Detail

This question asks students to recall explicit information from the first sentence of the passage. The first sentence indicates that the postage stamp was preceded by the postmark, which was “a triangular impression in red ink” (lines 2-3). Therefore, the correct answer is option (B).

Sample Question 18: The term “glutinous wash” (line 19) refers to the

- (A) ink used to print the stamps
- (B) paper the stamps were made of
- (C) coating on the back of the stamps
- (D) liquid used in paper manufacture

Content Category: Inference / Implicit Information

This question asks students to infer what the term “glutinous wash” refers to in this passage. The passage describes a small bit of paper covered with a glutinous wash on the back (lines 17-19). The paper is then attached to a letter after a little moisture is added to the glutinous wash. The student must infer that the bit of paper is a stamp and that the “wash” is the glue that coats the back of a stamp. The correct answer to this question, then, is (C).

Sample Question 19: The passage suggests that which of the following helped Hill’s proposal gain acceptance in Parliament?

- (A) The press
- (B) The enthusiasm of the queen
- (C) Henry Courbould
- (D) Intense pressure from the post office

Content Category: Inference / Implicit Information

This question asks students to determine which factor helped Hill’s proposal gain acceptance in Parliament. The passage states that “Thanks to publicity generated by the press . . . Hill was able to work out the details of his proposal to everyone’s satisfaction” (lines 23-25). Nothing else is cited as a factor in helping Hill’s proposal gain Parliament’s approval. Option (A), therefore, is the correct answer.

Sample Question 20: The passage implies that which of the following happened in 1840?

- (A) Parliament was still debating Hill’s proposal.
- (B) The queen’s portrait for the first stamp was painted.
- (C) Stamps were phased into circulation.
- (D) Collectors rushed to buy the rare stamps.

Content Category: Inference / Draw Conclusions

This question asks students to infer what happened in 1840. The student needs to recognize a logical sequence of events in order to answer this question correctly. Options (A) and (B) refer to events that took place before 1840. Option (D) refers to an event that would not yet have happened in 1840. Only option (C) describes an event that would logically have taken place in 1840: if the stamps were ready on May 6, 1840, then it is likely that they were phased into circulation shortly thereafter. Moreover, the passage states that by “the following year [1841], these stamps were sold in every post office in Great Britain.” The stamps must therefore have been phased into circulation in 1840. Option (C) is the correct answer.

Sample Question 21: The passage mentions the numbers of letters sent within Great Britain in order to indicate that

- (A) people enthusiastically accepted the postage stamps
- (B) stamps were cheaper than postmarks
- (C) people corresponded more than they do today
- (D) mail delivery was much faster after stamps were introduced

Content Category: Analysis / Purpose and Intent

This question asks students to infer the reason for the references in the passage to the numbers of letters sent within Great Britain after stamps were introduced. In answering this question, the student should take note of where these references occur in the passage. Options (B), (C), and (D) are plausible reasons for an increase in the number of letters sent, but the information needed to support these statements is not in the passage. Option (A) makes the most sense in the context of the passage, especially since the references to the numbers of letters immediately follow the statement “the postage stamp was enthusiastically adopted by the British public.” Clearly, the passage cites the numbers of letters sent in order to show the British public’s enthusiasm for the stamp. Option (A), then, is the correct answer.

READING COMPREHENSION

Optional Constructed-Response Questions (CTP 4 Only)

Passage 1 is a story drawn from legends of King Arthur and his knights.

When the knights of the Round Table met at Camelot, there rode into the hall a fair lady who went straight to King Arthur and greeted him, saying, "Where is Sir Lancelot?" And the king showed her. Then went she to him and said, "Sir, come with me into the forest." Lancelot and the lady rode forth, and she led him to a youth so fair and well-made that in all the world none could find his match. His name was Galahad, and Lancelot thought that he had never beheld a better man.

"Sir," said the lady, "make this youth a knight, for from no worthier hand than Lancelot's can he receive that honor." Galahad expressed the same desire. So Lancelot knighted him.

Then Lancelot returned to Camelot. When the knights next gathered in the banquet hall, each found his name written at a seat in letters of gold. And in "the Perilous Seat," the place of honor at the table, a name was also written, and they marveled greatly, for there had never been a name there and no knight had ever yet dared to sit upon that seat. Lancelot covered the name with a silken veil.

When the high feast began, the hall was filled with laughter and talk. But suddenly the doors and windows shut violently all by themselves, making thick darkness, and a fair, gentle light came from the Perilous Seat. Then Arthur rose and said, "Fair knights, rejoice, for I know we shall today see him who may sit in the Perilous Seat."

Then an old man entered, leading young Galahad. The old man took him to the Perilous Seat, and lifting up the silken cloth that had covered the name, read these words: "This is the seat of Sir Galahad, the good knight."

Galahad was taken to a mighty stone that floated in the river and was pierced by a sword inscribed thus: "No man shall take me but the best knight in the world."

"Here," said the king, "is as great a marvel as ever I saw, and many good knights have tried and failed to gain that sword."

"I do not wonder," said Galahad, "for this adventure is mine, since I brought no sword with me." And he laid his hand upon the sword and lightly drew it from the floating stone.

Sample Question 22: In Passage 1, what elements seem to indicate that Galahad was destined to sit in the Perilous Seat, the seat of honor? Discuss at least two of these elements.

Content Category: Reading for Understanding

To receive a 2 (the highest score) on this question, the student must show clear and solid understanding of two or more elements that indicate that Galahad was destined to sit in the seat of honor; the student must name two or more of the following.

- fair
- noble
- well-made
- no better man beheld by Lancelot
- no match in the world
- knighted by Lancelot
- lady wanted him knighted
- name written on the Perilous Seat
- place of honor
- light comes from seat
- doors and windows close
- can draw sword from stone

To receive a score of 1, the student must show basic (but in some way incomplete) understanding of elements; the student must name one the elements listed above.

A score of 0 indicates that the student shows very little or no understanding of the elements that indicate that Galahad was destined to sit in the seat of honor; the student is unable to name any of the elements listed above or lists elements but they are incorrect.

READING COMPREHENSION CONTINUED Optional Constructed-Response Questions (CTP 4 Only)

Passage 2 considers the legend of King Arthur from a historian's point of view.

In England archaeologists wonder: did the legendary King Arthur really exist, or were he and his knights just a storybook tale? A twelfth-century English monk, Geoffrey of Monmouth, wrote a History of the Kings of Britain that claims that the Arthurian stories came from old books and legends, but the tales he recorded were true and set in Arthur's time. Many people, however, scoffed, saying that Geoffrey made up the entire legend.

The tales about Arthur, featuring castles, dragons, sorcerers, and knights in armor, have constituted the principal myth of Britain for nearly a thousand years. Some archaeologists think that the stories are based on the real deeds of a great warrior (not King Arthur) who lived at the end of the fifth century A.D. when the Roman Empire had collapsed and Anglo-Saxons from Europe invaded England. All the kings in Britain joined forces to defeat the invaders, and the battles became the subject of stories passed down through time. Arthur's legends became linked with those of the unknown leader of these battles, and Arthur's fame grew. Geoffrey of Monmouth tells that Arthur was born at Tintagel in Cornwall, England, and archaeological digs at Tintagel have unearthed luxurious objects, suggesting that the site was someone's royal stronghold. But whose?

The stories also tell how Arthur was wounded in his last battle and taken to the enchanted Isle of Avalon, where he died and was buried. No one really knows Avalon's location, but in the twelfth century, monks at Glastonbury in England announced that they had unearthed a burial place with the Latin words: "Here lies the renowned King Arthur in the Isle of Avalon." Beneath the inscription was an oak coffin containing bones and a skull. The medieval description suggests that the tomb could have been a royal grave. Was the tomb Arthur's?

Archaeologists may never find complete evidence that Arthur really existed. But as long as people can read the wonderful Arthurian legends, he and his brave knights seem very real.

Sample Question 23: What does the last paragraph of Passage 2 make you think about the relationship between Passage 1 and Passage 2?

Content Category: Reading for Understanding

To receive a 2 (the highest score) on this question, the student must show clear and solid understanding that, although there is no definitive proof that Arthur ever existed, the story and the people are realistic, or the story is valuable, or the story is enjoyable. The student must counterpose the lack of definitive proof to the value or interest or realism of the story; he or she may say, for instance, "Although there is no proof or there may never be proof, the story or the people in the story are realistic (or there is value in the story, or enjoyment in the story, or the story is exciting or fun)."

To receive a score of 1, the student must show basic (but in some way incomplete) understanding of the relationship between Passages 1 and 2; the student may give either half of the response described above, but not both halves.

A score of 0 indicates that the student shows very little or no understanding of the relationship between Passages 1 and 2; a response in this category gives none of the response described above or give an incorrect response.

WRITING MECHANICS

Sample Question 24: Find the error in the sentence, if there is one.

"All atheletes need to turn in their uniforms by
(A) (B)
Friday," announced the coach. No error
(C) (D)

Content Category: Spelling / Commonly Used Words

The correct answer to this question is (A). Students are to recognize that "athletes" is misspelled.

Sample Question 25: Find the error in the sentence, if there is one.

Even though Simon was tired, he found the energy
(A) (B)
to take a long bike ride after school. No error.
(C) (D)

Content Category: Punctuation / Comma versus Semicolon

The correct answer to this question is (B). Students must identify the punctuation error in the sentence by recognizing that the semicolon should be replaced with a comma, since "Even though Simon was tired" is a subordinate clause, not an independent one.

Sample Question 26: Find the error in the sentence, if there is one.

The lyrics of one of the most-known spirituals, "Swing Low,
(A)
Sweet Chariot," are repeated several times in order to produce a
(B) (C)
melancholy theme. No error
(D)

Content Category: Usage / Diction

The correct answer to this question is (A). This usage question tests appropriate diction. Students are to recognize that the correct word choice for (A) should be either "best-known" or "most widely known."

WRITING CONCEPTS AND SKILLS

Sample Question 27: This is a list of the major topics in an article about how to redecorate a room.

1. Buy paint and other materials.
2. Decide on a color scheme.
3. List what you will need to buy.
4. Comparison shop for the lowest prices.

Which of the following shows the parts of this outline arranged in the correct order?

- (A) 2, 1, 3, 4
- (B) 2, 3, 4, 1
- (C) 3, 4, 2, 1
- (D) 4, 3, 1, 2

Content Category: Organization / Logical Sequence

This question asks students to arrange a list of topics for an article about redecorating a room. The topics should be arranged in a logical sequence of actions, beginning with planning the redecoration and ending with purchasing the necessary materials. Although both options (A) and (B) begin with the initial planning, only (B) proceeds logically from that point. Therefore, (B) is the correct answer.

Sample Question 28: Decide which is the best order for the sentences listed.

1. The pilot and a picked crew go out in a smaller "sounding-boat" and hunt for the best water.
2. The pilot sounds the depth of the river with a pole that is ten or twelve feet long.
3. The moment the shallowest point is reached, the pilot delivers the order, "Let go the buoy!" and over it goes.
4. This is the way that a river "sounding" is done.

- (A) 1, 3, 2, 4
- (B) 2, 3, 4, 1
- (C) 3, 2, 1, 4
- (D) 4, 1, 2, 3

Content Category: Organization / Logical Sequence

This question asks students to put four sentences in order to form a coherent paragraph. Students must be able to recognize the topic sentence and then determine the logical order of the remaining sentences. The fourth sentence is the only sentence broad enough to serve as a topic sentence, and while the topic sentence need not always come first in a paragraph, in this case it is the only one that could logically begin the paragraph. The order of the remaining sentences is determined by the logical sequence of the actions described. (The pilot and crew must first go out in a boat, then use a pole to sound the depths, and finally, drop the buoy when the shallowest point is found.) The correct answer to this question, then, is option (D).

WRITING CONCEPTS AND SKILLS

CONTINUED

Sample Question 29: Which of the following sentences would be most appropriate to include in a report on proper nutrition?

- (A) Fruits and vegetables grow better in warmer areas of the country.
- (B) Fruits and vegetables provide important vitamins and minerals needed for optimal body function.
- (C) The federal government regulates meat, poultry, and dairy products.
- (D) Fast-food restaurants sell more meat products than fruits and vegetables.

Content Category: Purpose, Audience, and Focus / Relevant

Information This question asks students to determine which sentence provides the appropriate information for a report on proper nutrition. All of the options make reference to foods that most people view as healthful, but only option (B) discusses the nutritional value of foods. Therefore, the correct answer is (B).

Sample Question 30: Choose the opening sentence that goes best with the details in the paragraph.

_____. New York surpassed Philadelphia not because of the superiority of its climate but because of the superiority of its harbor. It offered unimpeded access up the Hudson River. The city's natural setting was a blessing occasionally mentioned in a patriotic address, though there was little knowledge of the natural processes that had led to the formation of the solid material on which the city's streets were built.

- (A) Traces of the past in New York City are buried and hidden.
- (B) The geography of New York City was the city's supreme advantage.
- (C) The reasons that the Dutch first came to New York City were largely commercial.
- (D) Most of New York City was covered by the great Laurentide glacier about 20,000 years ago.

Content Category: Supporting Details / Topic Sentences

This question asks students to choose the best topic sentence for a paragraph on New York City's natural resources in its early years. The best topic sentence will introduce the subject matter that is developed in the paragraph. Although each of the options discusses an aspect of New York City's past, only option (B) discusses the advantageousness of New York City's geography, the main subject of the paragraph. The correct answer, then, is (B).

Sample Question 31: The sentence at the beginning of the question is the main idea of a paragraph. Decide which of the choices goes best with the main idea.

Past Presidents have led the country through wars, economics depressions, and periods of geographic expansion.

- (A) To be successful, Presidents need various leadership skills and the ability to deal with enormous national challenges.
- (B) Wars are devastating to a nation.
- (C) In order to be President, one must be a United States citizen.
- (D) Some Presidents were senators, representatives, or governors before taking office.

Content Category: Supporting Details / Relevant

Information This question asks students to choose the sentence that is supported by the details in the preceding statement. Since the preceding statement refers to some of the weighty responsibilities of past Presidents, the correct answer will most likely discuss the general skills that Presidents need to have. Options (C) and (D) are accurate statements, but they aren't sufficiently related to the preceding statement. Option (B) is a reasonable statement but has little to do with the preceding statement. Only option (A) discusses the skills that Presidents need to lead their nations through difficult periods. Therefore, (A) is the correct answer.

QUANTITATIVE REASONING

Sample Question 32: Choose:

- (A) if the quantity in Column A is greater,
- (B) if the quantity in Column B is greater,
- (C) if the two quantities are equal,
- (D) if not enough information is given for you to decide.

Column A	Column B
----------	----------

p is an integer and $7 \times p$ is even.

The remainder when p is divided by 2.	1
---	---

Content Category: Extensions and Generalizations

It is given that $7 \times p$ is even, which means that it has 2 as one of its factors. The factor 2 is not in the 7 (since 7 is odd), so it must be in the integer p . This means that p is even. Therefore, when p is divided by 2, the remainder is 0. Since 0 is less than 1, the amount in column B is greater than the amount in column A. The correct answer is choice (B).

Sample Question 33: Choose:

- (A) if the quantity in Column A is greater,
- (B) if the quantity in Column B is greater,
- (C) if the two quantities are equal,
- (D) if not enough information is given for you to decide.

Column A	Column B
----------	----------

A car traveled m miles. The average speed of the car, in miles per hour, was x ; and the average speed of the car, in miles per minute, was y .

x	y
-----	-----

Content Category: Analysis

The car's average speed is given as x miles per hour or y miles per minute. Since 1 hour = 60 minutes, a speed of x miles per hour is equivalent to

$$\frac{x \text{ miles}}{60 \text{ minutes}} \quad \text{or} \quad \frac{x}{60} \text{ miles per minute.}$$

Since the car's average speed is y miles per minute, $y = \frac{x}{60}$. Since $x > \frac{x}{60}$, x must also be greater than y . Thus, the correct answer is choice (A).

It is also possible to reason that the correct answer must be (A) because a car would go farther in 1 hour than it would go in 1 minute.

Sample Question 34: If $a \Delta b = a(a - b)$ and $a \odot b = b(b + a)$, what is the value of $(8 \Delta 5) + (8 \odot 5)$?

- (A) 21
- (B) 29
- (C) 89
- (D) 128

Content Category: Analysis

This question introduces two newly defined operations, Δ and \odot . Students are not expected to have seen these operations before, since the operations were made up for this question. Since $a \Delta b = a(a - b)$, $8 \Delta 5 = 8(8 - 5) = 8 \times 3 = 24$. Since $a \odot b = b(b + a)$, $8 \odot 5 = 5(5 + 8) = 5 \times 13 = 65$. The sum is $24 + 65$, which equals 89. The correct answer is choice (C).

MATHEMATICS

Sample Question 35: It takes light 0.000000001 second to travel 30 centimeters. What is this number of seconds written in scientific notation?

- (A) 1.0×10^9
- (B) 1.0×10^8
- (C) 1.0×10^{-8}
- (D) 1.0×10^{-9}

Content Categories: Numbers and Number Relationships / Procedural Knowledge The problem here is to transform the number 0.000000001 to a number in the form 1.0×10^n , where n is an integer. The number 1.0 is 1,000,000,000 (or 10^9) times 0.000000001. The 9 in 10^9 can be found by counting the number of decimal places to the right of the decimal point (the decimal point needs to move 9 places to the right to come to the spot just to the right of the digit 1). This means that 0.000000001 equals $1.0 \div 10^9$, which is 1.0×10^{-9} . The correct answer is choice (D).

Sample Question 36: In 1972, a loaf of bread cost \$0.89. In 2000, the same loaf of bread cost \$2.69. The price of bread increased by about what percent?

- (A) 33%
- (B) 67%
- (C) 200%
- (D) 300%

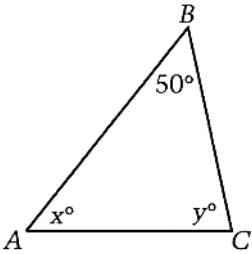
Content Categories: Numbers and Number Relationships / Procedural Knowledge The increase in price can be found by subtracting \$0.89 from \$2.69, which is \$1.80. The percent increase in price is equal to the amount of increase divided by the original price, or \$1.80 divided by \$0.89. Since \$1.80 is about twice \$0.89, the percent increase in the price of bread is about 200%. The correct answer is choice (C).

Sample Question 37: A flower bed contains 72 orange daylilies, 65 yellow roses, 55 yellow marigolds, and 120 green ferns.

What is the ratio of orange flowers to yellow flowers?

- (A) 3 to 5
- (B) 3 to 8
- (C) 3 to 10
- (D) 3 to 13

Content Categories: Numbers and Number Relationships / Procedural Knowledge There are 72 orange flowers and 65 + 55 or 120 yellow flowers. The ratio of orange flowers to yellow flowers is 72 to 120. This ratio can be simplified by dividing both terms by the greatest common factor, 24. The ratio in simplified form is 3 to 5. The correct answer is choice (A).



Sample Question 38: In triangle ABC, the ratio of x to y is 2 to 3. What is the value of x ?

- (A) 20
- (B) 26
- (C) 40
- (D) 52

Content Categories: Geometry / Problem Solving In triangle ABC, one angle measures 50°. Since the sum of the three angle measures is 180°, it follows that $x + y = 130$. In addition, the ratio of x to y is 2 to 3. This means that $\frac{x}{y} = \frac{2}{3}$ and therefore $y = \frac{3}{2}x$. Substituting $\frac{3}{2}x$ for y in the first equation gives $x + \frac{3}{2}x = 130$. From this you can see that $2x + 3x = 260$, so $5x = 260$, and therefore $x = \frac{260}{5} = 52$. The correct answer is choice (D).

Sample Question 39: A fair coin is tossed 4 times. What is the probability that it will land heads up all 4 times?

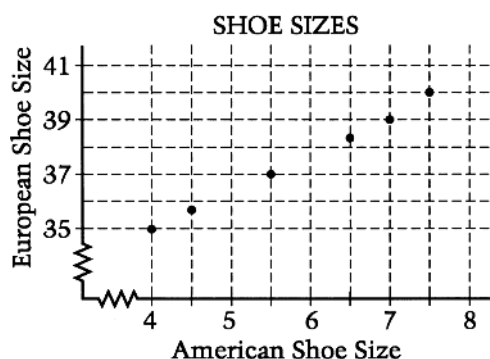
- (A) 2
- (B) $\frac{1}{2}$
- (C) $\frac{1}{8}$
- (D) $\frac{1}{16}$

Content Categories: Probability / Problem Solving One way to solve this problem is to list all the possible outcomes of the four coin tosses. It is a good idea to list them in a systematic way. Here is one way to do that.

HHHH	HTHH	THHH	TTHH
HHHT	HTHT	THHT	TTHT
HHTH	HTTH	THTH	TTTH
HHTT	HTTT	THTT	TTTT

There are 16 possible outcomes, all equally likely. Only 1 outcome has all heads; so the probability of all heads is $\frac{1}{16}$. It is also possible to use the concept of multiplying probabilities of independent events. The probability of a coin landing heads up in 1 toss is $\frac{1}{2}$. So, the probability of this event occurring 4 times is $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{16}$. The correct answer is choice (D).

MATHEMATICS CONTINUED



Sample Question 40: The graph above shows the relationship between some American and European shoe sizes. Based on the graph, which of the following is the range of European sizes that would include the American size 9?

- (A) 35 to 37
- (B) 38 to 40
- (C) 41 to 43
- (D) 44 to 46

Content Categories: Pre-Algebra / Problem Solving

On the graph, American shoe sizes are given on the horizontal axis and European shoe sizes are given on the vertical axis. The six points in the body of the graph give six correspondences between American and European sizes. For example, an American size of 4 corresponds to a European size of 35. The six points appear to lie approximately on a line. Noticing this pattern allows you to approximate other correspondences, by filling in or extending the line. The line can be extended up and to the right, to see that an American size 9 appears to correspond to a European size of about 42. This lies in the range 41 to 43. The correct answer is choice (C).

Sample Question 41: If $a = b$, what is the value of $3 + 5(a - b)$?

- (A) 0
- (B) 3
- (C) 5
- (D) 8

Content Categories: Pre-Algebra / Conceptual

Understanding If $a = b$, then $a - b = 0$, and the expression $3 + 5(a - b)$ equals $3 + 5(0)$. Since $5(0) = 0$, the expression equals $3 + 0$, or 3. The correct answer is choice (B).

Sample Question 42: If $m = 7(3 + 5)k$ and k is a positive integer, which of the following must be a factor of m ?

- (A) 5
- (B) 10
- (C) 14
- (D) 21

Content Categories: Pre-Algebra / Conceptual

Understanding The problem gives that $m = 7(3 + 5)k$, which equals $7 \times 8 \times k$. Since k is a positive integer, m is a multiple of both 7 and 8, and also a multiple of any combination of factors of 7 and 8. The answer choice that must be a factor of m is 14, since 14 is the product of 7 and 2 (and 2 is a factor of 8). Alternatively, the product of 7 and 8 is 56 and $m = 56k$. 14 is the only choice given that is a factor of 56. Therefore, 14 must be a factor of m . The correct answer is choice (C).

Sample Question 43: The formula for density is $d = \frac{m}{v}$, where m stands for mass in grams and v stands for volume in cubic centimeters. If steel has a density of 7.82 g/cm^3 , what is the mass of a rectangular steel beam measuring 30 centimeters wide, 20 centimeters high, and 6 meters long?

- (A) 460.36g
- (B) 28,152g
- (C) 46,035.81g
- (D) 2,815,200g

Content Categories: Pre-Algebra / Problem Solving

The question gives a formula and asks for a particular value of m . In the formula, the unit for m is grams (g), the unit for v is cubic centimeters (cm^3) and the unit for d is grams per cubic centimeter (g/cm^3). The density for steel is given as 7.82 g/cm^3 . You can figure out the volume in cubic centimeters, since the dimensions of the beam are 30 cm, 20 cm, and 6 meters. Converting meters to centimeters gives 6 meters = $6 \times 100 \text{ cm}$, which equals 600 cm. The volume is $30 \times 20 \times 600 \text{ cm}^3$, which is $360,000 \text{ cm}^3$. Substituting 7.82 for d and 360,000 for v in the formula gives

$$7.82 = \frac{m}{360,000}$$

Solve for m by multiplying 7.82 by 360,000. Students would not have calculators for this question, so some may choose to estimate the product as $8 \times 400,000$, or 3,200,000. In this estimate both rounding steps involved rounding up, so the actual answer is less than 3,200,000. The most reasonable answer choice is 2,815,200 g. The correct answer is choice (D).

MATHEMATICS

Optional Constructed-Response Questions (CTP 4 Only)

Sample Question 44: Each of the teachers in Town School ordered the same total number of candy bars, but some teachers ordered the candy bars in packs of 9, some ordered packs of 4, and some ordered packs of 15. What is the smallest total number of candy bars that each teacher could have ordered?

Show how you arrived at your answer.

Content Category: Math Communication

The number of candy bars ordered by each teacher must be a multiple of 9, a multiple of 4, and a multiple of 15. So the problem comes down to finding the least common multiple of 9, 4, and 15. One approach is to factor each number into its prime factors.

$$9 = 3 \times 3$$

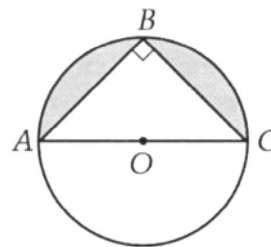
$$4 = 2 \times 2$$

$$15 = 3 \times 5$$

Common multiples of these three numbers must have 3, 3, 2, 2, and 5 as factors. The least common multiple is $3 \times 3 \times 2 \times 2 \times 5$, which is 180. It is also acceptable to list multiples of 9, 4, and 15 and pick 180 as the least number common to all three lists.

Students receive a score of 2 for the correct answer (180) with mathematically accurate work/explanations.

Students receive a score of 1 if: 1) they answer 180 with work missing or incomplete or work that has multiple arithmetic errors; 2) they have a correct process, but because of an arithmetic error the answer is incorrect; or 3) they found a common multiple of 9, 4, and 15 with work shown, but it is not the least common multiple.



Sample Question 45: In the figure above $\triangle ABC$ is inscribed in the circle, centered at O , and $AB = BC = \sqrt{2}$.

What is the area of the shaded region? Show your work or explain your reasoning.

Content Category: Math Communication

The shaded region given is inside the half of the circle above diameter AC and outside of isosceles right triangle ABC . Therefore, the area of the shaded region is the difference between the area of the semicircle and the area of triangle ABC .

The area of the semicircle is half the area of the circle. You need to find the radius of the circle to find its area. The radius of the circle is half of a diameter. \overline{AC} is a diameter of the circle and also the hypotenuse of the triangle ABC . Using the Pythagorean Theorem, you can find that the square of the length of \overline{AC} is $(\sqrt{2})^2 + (\sqrt{2})^2$ or 4. Therefore, $AC = 2$ and the radius of the circle is 1. This implies that the area of the circle is $\pi(1)^2$ or π . Therefore, the area of the semicircle is $\pi/2$.

$$\text{The area of triangle } ABC \text{ is } \frac{1}{2} (AB)(BC) = \frac{(\sqrt{2})(\sqrt{2})}{2} = 1$$

Therefore, the area of the shaded region is $\pi/2 - 1$.

Students receive full credit (a score of 2) for the correct answer with sufficient work/explanations. Student receives partial credit (a score of 1) if: 1) the correct answer is given with insufficient work/explanations; 2) the answer given is incorrect, but the correct process is followed or explained; or 3) the student applies the Pythagorean Theorem correctly and determines the correct areas of the semicircle and $\triangle ABC$ but does not find the difference between the areas.

ALGEBRA 1

Sample Question 46: The solution of which of the following inequalities is the set of all numbers that are more than 2 units from 6?

- (A) $|x| - 2 > 6$
- (B) $|x - 2| > 6$
- (C) $|x - 6| > 2$
- (D) $|x| - 6 > 2$

Content Category: Equations and Inequalities

Each inequality given involves absolute value, which can be defined relative to the real number line as follows. For any real numbers, a and b , $|a - b|$ is the distance between a and b on the real number line. Therefore, all numbers x that are more than 2 units from 6 or have a distance between x and 6 that is greater than 2 satisfy the inequality $|x - 6| > 2$. The correct answer is choice (C).

Sample Question 47: If a and b are both positive and $ax + c + bx - y = 0$, then $x =$

- (A) $\frac{y - c}{ab}$
- (B) $\frac{y + c}{a - b}$
- (C) $\frac{y - c}{a + b}$
- (D) $\frac{y + c}{ab}$

Content Category: Equations and Inequalities

Combine like terms and solve for x in the following manner.

$$\begin{aligned} ax + c + bx - y &= 0 \\ ax + bx + c - y &= 0 \\ (a + b)x + (c - y) &= 0 \\ (a + b)x &= -(c - y) \\ x &= \frac{-(c - y)}{a + b} = \frac{y - c}{a + b} \end{aligned}$$

The correct answer is choice (C).

Sample Question 48: If a and b are constants and $(ax + b)(2x - 3) = 2x^2 + 5x - 12$ for all values of x , what is the value of $a + b$?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

Content Category: Equations and Inequalities

$(ax + b)(2x - 3) = 2x^2 + 5x - 12$ for all values of x . The product of the factors $(ax + b)$ and $(2x - 3)$ is $2ax^2 + 2bx - 3ax - 3b$ or $2ax + (2b - 3a)x - 3b$. If this is equal to another quadratic in x for all values of x , then the coefficients of like terms must be equal. Therefore, $2a = 2$ and $-3b = -12$, which implies $a = 1$ and $b = 4$. Additionally, $2b - 3a = 2 \cdot 4 - 3 \cdot 1 = 8 - 3 = 5$. Thus, $a + b = 1 + 4 = 5$. The correct answer is choice (C).

Sample Question 49: The line containing points $(1, -4)$ and $(4, -7)$ must also contain point

- (A) $(10, -10)$
- (B) $(0, -1)$
- (C) $(-1, -2)$
- (D) $(-5, 3)$

Content Category: Equations and Inequalities

Any point on the line must satisfy its equation. The two given points on the line can be used to find the slope of the line.

$$\text{Slope} = m = \frac{-4 - (-7)}{1 - 4} = \frac{3}{-3} = -1$$

In the form $y = mx + b$, the equation of the line is $y = -x + b$. This implies $-4 = -(1) + b$ or $b = -3$. Thus, the equation of the line is $y = -x - 3$. Of the choices, only option (C) satisfies this equation, since $-2 = -(-1) - 3$. The correct answer is choice (C).

This problem can also be solved by focusing on the slope of the line. As we saw above, the slope of the line is equal to

$\frac{-4 - (-7)}{1 - 4} = -1$. The slope of a line remains constant, so you can determine which point is on the line by determining which produces a slope of -1 with one of the given points.

ALGEBRA 1 CONTINUED

Sample Question 50: Together Charlie and Patty have 45 books. Patty has twice as many books as Charlie. Let c represent the number of books Charlie has and p the number of books Patty has.

Which of the following systems of equations best expresses this information?

(A)
$$\begin{cases} c + p = 45 \\ p = 2c \end{cases}$$

(B)
$$\begin{cases} c + p = 45 \\ c = 2p \end{cases}$$

(C)
$$\begin{cases} c = 2p \\ p = c + 45 \end{cases}$$

(D)
$$\begin{cases} p = 2c \\ c = p + 45 \end{cases}$$

Content Category: Situations Involving Variable Quantities

Since Charlie and Patty have 45 books together, the sum of the number of books each has is 45. Charlie has c books and Patty has p books; thus, $c + p = 45$. Additionally, Patty has twice as many books as Charlie, which means if the number of books that Charlie has is multiplied by 2, then the result should be the number of books that Patty has. Therefore, $p = 2c$. Thus, the system of equations that represents the given information is

$$\begin{cases} c + p = 45 \\ p = 2c \end{cases}$$

The correct answer is choice (A).