



PRAXIS STUDY COMPANION

# Elementary Education Fundamentals: Mathematics

## 8003



## Table of Contents

Elementary Education Fundamentals: Mathematics (8003) .....	3
Test at a Glance .....	3
About The Test .....	4
Content Topics .....	6
Discussion Questions .....	6
Elementary Education Fundamentals: Mathematics (8003) Sample Questions .....	11
Answers .....	17
Understanding Question Types .....	23
Understanding Selected-Response and Numeric-Entry Questions .....	23
Understanding Constructed-Response Questions .....	24
General Assistance For The Test.....	26
Praxis Interactive Practice Test.....	26
Doing Your Best .....	26
Helpful Links .....	26

# Elementary Education Fundamentals: Mathematics (8003)

## Test at a Glance

<b>Test Name</b>	Elementary Education Fundamentals: Mathematics			
<b>Test Code</b>	8003			
<b>Time</b>	100 minutes *Categories are not timed separately when taking the full test.			
<b>Number of Questions</b>	68 selected-response questions and numeric entry questions			
<b>Format</b>	The test consists of a variety of selected-response and numeric entry questions. You can review the question types in Understanding Question Types.			
<b>Test Delivery</b>	Computer Delivered			
	Content Categories	*Category Time	Approximate Number of Questions	Approximate Percentage of Examination
	I. Numbers and Operations	40 minutes	28	42%
	II. Algebraic Thinking	30 minutes	20	29%
	III. Geometry, Measurement, and Data	30 minutes	20	29%
	Approximately 10-15% of the questions integrate Tasks of Teaching Mathematics			

## About The Test

The Elementary Education Fundamentals tests are designed to assess whether the entry-level elementary teacher has the content knowledge that is important, necessary, and needed at time of entry to the profession to teach reading, mathematics, social studies, and science at the elementary level. Each state may require one or more of the subject tests to support a generalist elementary school license.

The **Elementary Education Fundamentals: Mathematics** test measures the knowledge and skills in mathematics necessary for a beginning teacher of children in primary through upper elementary school grades. The 68 selected-response and numeric-entry questions are based on material commonly covered in a bachelor's degree program in elementary education.

The test is not designed to be aligned with any particular school mathematics curriculum but is intended to be consistent with the recommendations of national studies on mathematics education, such as the Council for the Accreditation of Educator Preparation (CAEP) K-6 Elementary Teacher Preparation Standards and the Association of Mathematics Teacher Educators (AMTE) Standards for Preparing Teachers of Mathematics.

Test takers will also find that approximately ten to fifteen percent of questions call for application of mathematics content and processes within a teaching scenario or an instructional task. Such questions—designed to measure applications of mathematics knowledge to the kinds of decisions and evaluations a teacher must make during work with students, curriculum, and instruction—situate mathematics content questions in tasks critical for teaching. Below, in Tasks of Teaching Mathematics, is a list of tasks that are a routine part of mathematics instruction. These tasks, identified based on research on mathematics instruction, have been confirmed by a national committee of teachers and teacher educators as important for effective teaching of elementary mathematics.

An on-screen scientific calculator is provided. To ensure familiarity with the calculator's functionality, it is recommended to practice before the test. For many questions, there may be multiple ways to arrive at the solution, so the calculator may not be necessary for all questions.

This test may contain some questions that will not count toward your score.

**Praxis Steps:** This test will be Praxis Steps enabled shortly after launch. States that have adopted Praxis Steps for Elementary Education Fundamentals will allow you to take or retake individual content categories or "steps" so you have greater flexibility. Check your [State Requirements](#) to see what your state allows.

## On-Screen Scientific Calculator

An on-screen scientific calculator is provided for the computer-delivered test. Please consult the [Praxis Calculator Use web page](#) for further information.

You are expected to become familiar with the functionality of the calculator before taking the test. To practice using the calculator, [request access to it](#).

## Using Your Calculator

Take time to [access the calculator and practice with it](#) so that you are comfortable using the calculator on the test.

For many questions, there is more than one way to solve the problem. Don't use the calculator if you don't need to; you may waste time.

## Content Topics

This list details the topics that may be included on the test. All test questions cover one or more of these topics.

**Note:** The use of “e.g.” to start a list of examples implies that only a few examples are offered and that the list is not exhaustive, whereas the use of “i.e.” to start a list of examples implies that the given list of examples is complete.

## Discussion Questions

In this section, discussion questions provide examples of content that may be included in the questions you receive on testing day. They are open-ended questions or statements intended to help test your knowledge of fundamental concepts and your ability to apply those concepts to classroom or real-world situations. Answers for the discussion questions are **not** provided; however, thinking about the answers will help improve your understanding of fundamental concepts and may help you answer a broad range of questions on the test. Most of the questions require you to combine several pieces of knowledge to formulate an integrated understanding and response. The questions are intended to help you gain increased understanding and facility with the test's subject matter. You may want to discuss these questions with a teacher or mentor.

## I. Numbers and Operations

### A. Understands the Place-Value System

1. Represents numbers using base-10 model, standard form (numerals), written form (number names), and expanded form
2. Composes and decomposes multidigit numbers
3. Identifies the place a digit is in and its value in that place
4. Uses whole-number exponents to denote powers of 10 and recognizes that a digit in one place represents ten times what it represents in the place to its right and one-tenth what it represents in the place to its left, and extends this recognition to several places to the right or left

### B. Understands Operations and Properties of Rational Numbers

1. Uses concepts of one-to-one correspondence, counting, skip counting, and cardinality to solve problems
2. Identifies different problem situations for the operations (e.g., addition as putting together, subtraction as a comparison, multiplication as equal groups, repeated addition, arrays, division as sharing, repeated subtraction)
3. Solves multistep mathematical and real-world problems using addition, subtraction, multiplication, and division of rational numbers; interprets the solutions of the problems (e.g., remainders)
4. Uses various strategies and algorithms to perform operations on rational numbers
5. Uses mental computation, estimation, and rounding strategies to solve problems and to determine reasonableness of the results



6. Solves problems using the order of operations, including problems involving whole-number exponents
7. Identifies properties of operations (e.g., commutative, associative, distributive) and uses them to solve problems
8. Solves problems involving odd and even numbers, prime and composite numbers, factors, and multiples of numbers
9. Applies concepts of fractions (e.g., fractions as numbers less than 1 and greater than 1, as part-whole relationships, as multiples of unit fractions, and as division; equipartitioning; equivalent fractions; the fact that the value of a unit fraction decreases as the value of the denominator increases; the fact that fraction comparisons are valid only when the fractions refer to the same whole) to solve problems
10. Represents rational numbers and operations on rational numbers in different ways (e.g., base-10 blocks, equations, number lines, rectangular arrays, area models)
11. Compares, classifies, and orders rational numbers
12. Converts between fractions and decimals

### **C. Understands Ratios, Proportional Relationships, and Percents**

1. Finds a percent of a quantity as a rate per 100
2. Uses the language of ratio and rate to describe relationships between two quantities
3. Identifies proportional relationships and uses them to solve problems (e.g., unit rates)

### **Discussion Questions: Numbers and Operations**

- Represent numbers in different forms (e.g., one hundred twenty-three thousand, 123,000,  $100,000 + 20,000 + 3,000$ ,  $1 \times 10^5 + 2 \times 10^4 + 3 \times 10^3$ , and  $1.23 \times 10^5$  are all different ways to express the same number).
- Identify how many times greater the value of one digit in a number is than another digit in the number (e.g., in 23.12, the value of the 2 in the tens place is 1,000 times greater than the value of the 2 in the hundredths place).
- Identify cases when the answer to a real-world division problem is found by ignoring the remainder, dividing the remainder into equal shares, or using the least whole number that is greater than the quotient.
- Identify and apply commutative, associative, and distributive properties.
- Use the order of operations to solve problems.
- Represent a fraction as a sum of unit fractions (e.g.,  $\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ ).
- Identify an area model that represents the product of two fractions.
- Put fractions and decimals in order from least to greatest.
- Divide two quantities to find an equivalent unit rate, then use the unit rate to solve problems. (e.g., If 5 pounds of apples cost \$8.50, then the unit rate is \$1.70 per pound, so 8 pounds of apples will cost \$13.60.)
- Find the prime factors of a whole number, and find the greatest common factor and the least common multiple of whole numbers.

## II. Algebraic Thinking

### A. Knows How to Create, Evaluate, and Manipulate Algebraic Expressions, Equations, Inequalities, and Formulas

1. Recognizes the meaning of the equal sign and what it means for algebraic expressions and equations to be considered equivalent
2. Differentiates among algebraic expressions, equations, and inequalities
3. Identifies equivalent linear algebraic expressions by adding and subtracting like terms and using the distributive property
4. Evaluates simple algebraic expressions (i.e., one variable with up to 2 terms) for given values of variables
5. Uses mathematical terms to identify parts of expressions and describe expressions (i.e., sum, difference, product, quotient, factor, term, coefficient, variable, constant term)
6. Translates between verbal statements and algebraic expressions, equations, or inequalities
7. Solves multistep one-variable linear equations and inequalities
8. Interprets solutions of multistep one-variable linear equations and inequalities (e.g., graphs the solution on a number line, interprets a solution in context)
9. Uses formulas to determine unknown quantities

### B. Knows How to Recognize and Represent Linear Relationships

1. Identifies, extends, describes, and generates number and shape patterns that increase or decrease linearly
2. Finds a rule or relationship between the corresponding terms of two linear numerical patterns
3. Uses linear relationships represented by equations, tables, and graphs to solve problems

### Discussion Questions: Algebraic Thinking

- Solve an equation or inequality that has variables on both sides, that involves combining like terms, or that involves the distributive property by isolating the variable on one side of the equation or inequality (e.g., solve  $8x - 17 = 3x + 13$  for  $x$ , solve  $2(5y + 8) - 6y < 36$  for  $y$ ).
- Represent a verbal statement as an algebraic expression, equation, or inequality (e.g., the statement “ $y$  is 5 more than 3 times  $x$ ” is represented by the equation  $y = 3x + 5$ ).
- Identify examples of mathematical vocabulary such as “terms in an expression,” “constant term,” “factor,” “coefficient,” and “leading coefficient.”
- Substitute numbers into a formula to find the corresponding value of a variable in the formula (e.g., given the formula for the area of a rectangle and the area and the length of the rectangle, find the width of the rectangle).
- Simplify expressions by applying distributive property and by adding and subtracting like terms.
- Represent the solution of a one-variable inequality on a number line.



- Find a rule for a pattern, and use the rule to predict future elements in the pattern.
- Identify an equation that represents the relationship between the  $x$ -values and the corresponding  $y$ -values in a table.

### III. Geometry, Measurement, and Data

#### A. Knows Concepts of Geometry

1. Uses definitions to identify lines, rays, line segments, parallel lines, and perpendicular lines
2. Classifies angles based on their measures
3. Composes and decomposes two- and three-dimensional shapes
4. Classifies polygons and solids using their properties
5. Identifies lines of symmetry and line-symmetric polygons
6. Solves problems by plotting points and drawing polygons in the  $xy$ -plane

#### B. Knows Concepts of Measurement

1. Finds the area and perimeter of polygons, including those with fractional side lengths
2. Finds the volume and surface area of right rectangular prisms, including those with fractional edge lengths
3. Represents three-dimensional figures with nets that are made of rectangles and triangles and uses nets to determine the surface area of three-dimensional figures
4. Calculates changes to perimeter, area, and volume as dimensions change

5. Solves measurement and conversion problems involving money, length, volume, mass, and elapsed time in standard measurement systems
6. Selects appropriate tools to measure the attributes of objects

#### C. Knows Basic Concepts of Data

1. Collects data using appropriate statistical questions to identify, construct, and complete graphs that correctly represent the data (e.g., circle graphs, bar graphs, line graphs, histograms, scatterplots, double bar graphs, double line graphs, box plots, line plots/dot plots)
2. Interprets various displays of data (e.g., box plots, histograms, scatterplots)
3. Describes a set of data using measures of center (e.g., mean, median), measures of spread (e.g., range, interquartile range), and shape
4. Determines how changes in data affect measures of center and measures of spread

#### Discussion Questions: Geometry, Measurement, and Data

- Identify parallel lines and perpendicular lines.
- Identify acute, right, obtuse, and straight angles.
- Classify shapes (e.g., isosceles triangle, parallelogram, octagon) based on descriptions of their sides and angles.
- Plot points in the  $xy$ -coordinate plane.
- Find the area of a polygon by decomposing it into rectangles and triangles.

- Identify how the perimeter and area of a rectangle change when the rectangle's length and width are doubled, and identify how the surface area and the volume of a right rectangular prism change when the length, width, and height of the right rectangular prism are doubled.
- Identify lines of symmetry for a given shape.
- Solve problems involving unit conversions.
- Find the measures of center (e.g., mean, median, mode) and measures of spread (e.g., range, interquartile range) for a data set.
- Determine how the mean, median, mode, and range of a data set change when numbers are added to or removed from the data set.

## Tasks of Teaching Mathematics

### A. Instruction

1. Evaluates mathematical language (e.g., explanations, justifications, definitions) to determine its validity, generalizability, coherence, precision, usefulness in a particular context, or how it can be improved
2. Identifies problems, tasks, examples, and questions that fit a particular structure, illustrate a concept, demonstrate desired characteristics, or are useful for introducing a concept
3. Identifies problems, tasks, examples, or questions that incorporate mathematical practices (e.g., constructing viable arguments, modeling with mathematics, attending to precision)

4. Identifies problems, tasks, examples, and questions that support a strategy or address a student question or misconception
5. Identifies counterexamples that highlight a mathematical distinction or demonstrate why a student conjecture is incorrect or partially incorrect
6. Evaluates representations (e.g., visual, physical, symbolic) in terms of validity, generalizability, usefulness for supporting students' understanding, or fit to the content being represented

### B. Student Reasoning

1. Evaluates and compares student work (e.g., solutions, conjectures, explanations, justifications, generalizations, representations) in terms of validity, generalizability, coherence, or precision
2. Evaluates student work to identify the use of a particular concept, idea, or strategy

## Elementary Education Fundamentals: Mathematics (8003) Sample Questions

The sample questions that follow represent a number of the types of questions and topics that appear on the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

**Directions:** The test consists of a variety of selected-response questions, where you select one or more answer choices, and questions where you enter a numeric answer in a box.

1. Which of the following is equivalent to 37,500,000 ?

(A)  $3.75 \times 10^5$   
(B)  $3.75 \times 10^7$   
(C)  $37.5 \times 10^5$   
(D)  $37.5 \times 10^7$

2. A teacher is reserving buses to carry students, teachers, and chaperones on a field trip. A total of 98 people will go on the field trip, and each bus can carry at most 22 passengers. What is the least number of buses the teacher must reserve for the trip?

buses

3. After a lesson on rounding and estimation, a teacher tells students that 157 rulers will be distributed to 4 teachers. The teacher asks the students to estimate the number of rulers each teacher will receive if the rulers are shared as equally as possible among the teachers.

Which of the following students produces the best estimate of the number of rulers each teacher will receive?

(A) Student A: about 30  
(B) Student B: about 35  
(C) Student C: about 40  
(D) Student D: about 45

4. What is the value of the expression  $6 + 3 \times 4 - 3 \times 5^2$ ?
- (A)  $-39$
  - (B)  $-57$
  - (C)  $-189$
  - (D)  $-207$
5. Which of the following equations best illustrates the associative property of multiplication?
- (A)  $3 \times (20 \times 8) = 3 \times (8 \times 20)$
  - (B)  $3 \times (20 \times 8) = (3 \times 20) \times 8$
  - (C)  $3 \times (20 + 8) = (20 + 8) \times 3$
  - (D)  $3 \times (20 + 8) = 3 \times 20 + 3 \times 8$
6. A school bus has the following riders: 20 students in ninth grade, 10 students in tenth grade, 9 students in eleventh grade, and 7 students in twelfth grade.
- Approximately what percent of the students on the bus are in ninth grade?
- (A) 23%
  - (B) 43%
  - (C) 46%
  - (D) 76%
7. To make fruit punch, Edie mixes two kinds of juices in the following ratio: 1 cup of pineapple juice to 3 cups of orange juice.
- How many cups of orange juice will Edie need in order to make 48 cups of fruit punch?
- (A) 12
  - (B) 16
  - (C) 24
  - (D) 36

8. Which of the following students correctly simplifies the expression  $5x - 3(2x - 4) + 8$ ?

- (A) Student 1:  $5x - 3(2x - 4) + 8 = 5x - 6x - 12 + 8 = -x - 4$
- (B) Student 2:  $5x - 3(2x - 4) + 8 = 5x - 6x + 12 + 8 = -x + 20$
- (C) Student 3:  $5x - 3(2x - 4) + 8 = 5x - 6x + 4 + 8 = -x + 12$
- (D) Student 4:  $5x - 3(2x - 4) + 8 = 5x - 6x - 4 + 8 = -x + 4$

$$-x^2 - x$$

9. What is the value of the given expression when  $x = -2$ ?

- (A)  $-6$
- (B)  $-2$
- (C)  $2$
- (D)  $6$

10. Jack had three babysitting jobs this week. He worked the same number of hours  $H$  on each job. He was paid at a rate of \$12 for every hour at his first job, \$4 for every half hour at his second job, and \$5 for every 20 minutes at his third job.

Which of the following expressions represents the total amount, in dollars, Jack was paid this week?

- (A)  $12 \times H + 4 \times H + 5 \times H$
- (B)  $12 \times H + 8 \times H + 15 \times H$
- (C)  $12 \times H + 8 \times H + 20 \times H$
- (D)  $12 \times H + 4 \times \frac{1}{2} \times H + 5 \times \frac{1}{3} \times H$

$$-2x + 3 \leq 4$$

11. What is the solution to the given inequality?

(A)  $x \geq -\frac{1}{2}$

(B)  $x \geq \frac{1}{2}$

(C)  $x \leq -\frac{1}{2}$

(D)  $x \leq \frac{1}{2}$

$x$	$y$
4	-20
7	-38
12	-68
15	-86

12. Which of the following equations could represent the relationship shown in the preceding table?

(A)  $y = -8x + 4$

(B)  $y = -7x + 4$

(C)  $y = -6x + 4$

(D)  $y = -5x + 4$

13. In isosceles triangle  $BCD$ , the measure of both angle  $B$  and angle  $C$  is  $25^\circ$ . Angle  $D$  can be classified as what type of angle?

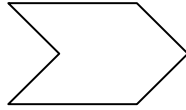
(A) Acute

(B) Right

(C) Obtuse

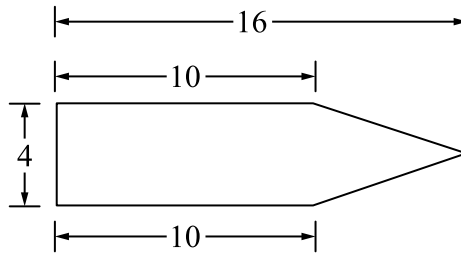
(D) Straight





14. Which of the following terms best describes the preceding polygon?

- (A) Hexagon
- (B) Parallelogram
- (C) Pentagon
- (D) Trapezoid



15. What is the area, in square units, of the preceding figure?

- (A) 32
- (B) 52
- (C) 64
- (D) 104

16. A mathematics lesson in a fourth-grade class started at 1:30 P.M. and ended at 3:10 P.M.

How many minutes long was the mathematics lesson?

- (A) 40
- (B) 80
- (C) 100
- (D) 120

70, 70, 70, 72, 74, 74, 74, 74, 74, 76, 76, 76, 76, 78, 78, 78, 78, 80, 80, 82

17. The preceding list gives the daily high temperatures of a city, in degrees Fahrenheit, for 20 days during the month of June. What is the mode of the temperatures?

- (A) 5
- (B) 74
- (C) 75.5
- (D) 76

## Answers

1. Option (B) is correct. The question requires an understanding of how to use whole-number exponents to denote powers of 10. In the number 37,500,000, the place value for the 3 is 10 million. As a power of 10, 10 million is represented by  $10^7$ . The ones place is represented by  $10^0$ . Each place to the left of the ones place increases the power of 10 by 1. Therefore, the number 37,500,000 is equal to  $10^7$  times the number 3.75, or  $3.75 \times 10^7$ .

Topic	I. Numbers and Operations
Subtopic	A. Understands the Place-Value System

2. The correct answer is 5 buses. The question requires an understanding of a remainder in a real-life context. Dividing 98 by 22 gives quotient 4 and remainder 10. However, the teacher cannot rent a partial bus, so the quotient must be rounded up to the next whole number, which is 5.

Topic	I. Numbers and Operations
Subtopic	B. Understands Operations and Properties of Rational Numbers

3. Option (C) is correct. One way to answer the question involves an understanding of how to use rounding strategies to solve problems and determine the reasonableness of results. To estimate the number of rulers each teacher will receive, you can estimate  $157 \div 4$ . The best estimate is produced by rounding 157 to the closest number that is easily divided by 4 in a mental calculation. Rounding 157 up to 160 yields the calculation  $160 \div 4$ , which produces an estimate of 40.

Alternatively, you can calculate  $157 \div 4$ , which is 39.25, and then determine which option is closest to 39.25. The closest option to 39.25 is 40.

Task of Teaching	3. Identifies problems, tasks, examples, or questions that incorporate mathematical practices (e.g., constructing viable arguments, modeling with mathematics, attending to precision)
Topic	I. Numbers and Operations
Subtopic	B. Understands Operations and Properties of Rational Numbers

4. Option (B) is correct. The question requires an understanding of how to solve problems using the order of operations. The first step when evaluating  $6 + 3 \times 4 - 3 \times 5^2$  is to evaluate the power  $5^2$ , which yields  $6 + 3 \times 4 - 3 \times 25$ . The second step is to perform the multiplications  $3 \times 4$  and  $3 \times 25$ , which yields  $6 + 12 - 75$ . The third step is to perform the addition  $6 + 12$ , which yields  $18 - 75$ . The final step is to perform the subtraction  $18 - 75$ , which yields  $-57$ .

Topic	I. Numbers and Operations
Subtopic	B. Understands Operations and Properties of Rational Numbers

5. Option (B) is correct. The question requires an understanding of the properties of operations. The associative property of multiplication states that changing the grouping of the factors in a multiplication problem does not change the product; that is, if given any three numbers  $k, m, p$ , then  $(k \times m) \times p = k \times (m \times p)$ . Therefore, the equation  $3 \times (20 \times 8) = (3 \times 20) \times 8$  illustrates the associative property of multiplication.

Topic	I. Numbers and Operations
Subtopic	B. Understands Operations and Properties of Rational Numbers

6. Option (B) is correct. The question requires an understanding of percent as a rate per 100. The word “percent” means a quantity per one hundred or a quantity for every one hundred. To calculate the percent, you must know two things: the number of ninth-grade students on the bus and the total number of students on the bus. The number of ninth-grade students, 20, is given in the problem. The total number of students is 46, which is determined by adding 20, 10, 9, and 7. To calculate the percent, divide 20 by 46 and multiply the result by 100 to get approximately 43%.

Alternatively, you can calculate the percent by setting up and solving the

proportion  $\frac{20}{46} = \frac{x}{100}$ .

Note that when a word like “approximately” is used in a question, it generally indicates that the correct option will **not** be an exact value

Topic	I. Numbers and Operations
Subtopic	C. Understands Ratios, Proportional Relationships, and Percents

7. Option (D) is correct. The question requires an understanding of how to use proportional relationships to solve ratio problems. With 1 cup of pineapple juice and 3 cups of orange juice, Edie can make 4 cups of fruit punch. Since  $48 \div 4 = 12$ , you can multiply 3 cups of orange juice by 12 to get 36 cups of orange juice, which is the amount Edie needs in order to make 48 cups of fruit punch.

Alternatively, you can answer the question by setting up and solving a proportion, such as  $\frac{3 \text{ cups of orange juice}}{4 \text{ total cups of fruit punch}} = \frac{x \text{ cups of orange juice}}{48 \text{ total cups of fruit punch}}$ , remembering that the fruit punch consists of pineapple juice and orange juice.

Note that in most multiple-choice questions that ask for numerical values, the exact answer should be found, as it should be in this question. If a multiple-choice question includes a phrase like “best approximates” or “is closest to,” it generally indicates that the correct option will **not** be an exact value.

Topic	I. Numbers and Operations
Subtopic	C. Understands Ratios, Proportional Relationships, and Percents

8. Option (B) is correct. The question requires an understanding of how to identify equivalent linear algebraic expressions by adding and subtracting like terms and using the distributive property. Using the distributive property to distribute  $-3$  to the two terms in the parentheses yields  $5x - 3(2x - 4) + 8 = 5x - 6x + 12 + 8$ . Combining like terms yields  $5x - 6x + 12 + 8 = -x + 20$ .

Task of Teaching	1. Evaluates and compares student work (e.g., solutions, conjectures, explanations, justifications, generalizations, representations) in terms of validity, generalizability, coherence, or precision
Topic	II. Algebraic Thinking
Subtopic	A. Knows How to Create, Evaluate, and Manipulate Algebraic Expressions, Equations, Inequalities, and Formulas

9. Option (B) is correct. The question requires an understanding of how to evaluate simple algebraic expressions for given values of variables. The first step is to substitute  $-2$  in the place of the variable  $x$ , which yields  $-(-2)^2 - (-2)$ . Using the order of operations, the expression is equal to  $-4 + 2 = -2$ .

Topic	II. Algebraic Thinking
Subtopic	A. Knows How to Create, Evaluate, and Manipulate Algebraic Expressions, Equations, Inequalities, and Formulas

10. Option (B) is correct. The question requires an understanding of how to translate between verbal statements and algebraic expressions. At his first job, Jack was paid 12 dollars per hour. At his second job, he was paid 4 dollars per half hour. Since there are 2 half-hour periods in 1 hour, this is equivalent to a rate of  $4 \times 2 = 8$  dollars per hour. At his third job, he was paid 5 dollars for every 20 minutes. Since there are 3 periods of 20 minutes in 1 hour, this is equivalent to a rate of  $5 \times 3 = 15$  dollars per hour. Since Jack worked  $H$  hours at each job, he was paid  $12 \times H + 8 \times H + 15 \times H$  dollars this week.

Topic	II. Algebraic Thinking
Subtopic	A. Knows How to Create, Evaluate, and Manipulate Algebraic Expressions, Equations, Inequalities, and Formulas

11. Option (A) is correct. The question requires an understanding of how to solve multistep, one-variable linear inequalities. The first step is subtracting 3 from both sides of the inequality, which yields  $-2x \leq 1$ . The next step is dividing both sides of the inequality by  $-2$ , which yields  $x \geq -\frac{1}{2}$ . Note that multiplying or dividing both sides of an inequality by a negative number changes the direction of the inequality sign.

Topic	II. Algebraic Thinking
Subtopic	A. Knows How to Create, Evaluate, and Manipulate Algebraic Expressions, Equations, Inequalities, and Formulas



12. Option (C) is correct. The question requires an understanding of how to identify relationships between the corresponding terms of two numerical patterns. Although the question does not state that the relationship shown in the table is linear, each option is a linear equation, so you can assume that the relationship is linear. The equations in the options are written in the form  $y = mx + b$ , where  $m$  is the slope and  $b$  is the  $y$ -intercept.

The slope  $m$  of the line can be found by substituting into the formula  $m = \frac{y_2 - y_1}{x_2 - x_1}$ , where

$(x_1, y_1)$  and  $(x_2, y_2)$  are two points on the line. Since the relationship is linear, any two points will yield the same slope, and substituting the ordered pairs  $(4, -20)$  and  $(7, -38)$

into the formula yields  $\frac{-38 - (-20)}{7 - 4} = \frac{-38 + 20}{3} = \frac{-18}{3} = -6$ . Since only one equation has a slope of  $-6$ , you could stop here, or you can substitute one of the ordered pairs into the equation to find the value of  $b$ . Using the ordered pair  $(4, -20)$  yields  $-20 = -6(4) + b$ , which equals  $-20 = -24 + b$ . Adding 24 to both sides of the equation yields  $4 = b$ , so the equation that represents the relationship in the table is  $y = -6x + 4$ , which is the equation in option (C).

Alternatively, one or more of the ordered pairs in the table could be substituted into each of the equations in the options, and you would find that  $y = -6x + 4$  is the only equation for which all of the ordered pairs make the equation true.

Topic	II. Algebraic Thinking
Subtopic	B. Knows How to Recognize and Represent Linear Relationships

13. Option (C) is correct. The question requires an understanding of how to classify angles based on their measures. The sum of all angles in a triangle is  $180^\circ$ . Since both angle  $B$  and angle  $C$  is  $25^\circ$ , the measure of angle  $D$  is  $180^\circ - 25^\circ - 25^\circ$ , or  $130^\circ$ . When the measure of an angle is greater than  $90^\circ$  and less than  $180^\circ$ , the angle is an obtuse angle. Therefore, angle  $D$  is an obtuse angle.

Topic	III. Geometry, Measurement, and Data
Subtopic	A. Knows Concepts of Geometry

14. Option (A) is correct. The question requires an understanding of how to use attributes to classify polygons. The polygon has six sides, and a polygon with six sides is called a hexagon. Note that a parallelogram has four sides, a pentagon has five sides, and a trapezoid has four sides

Topic	III. Geometry, Measurement, and Data
Subtopic	A. Knows Concepts of Geometry

15. Option (B) is correct. The question requires an understanding of how to find the area of polygons. An important step in answering the question is noticing that the figure is composed of a rectangle on the left and a triangle on the right. The rectangle has length 10 and width 4, so its area is equal to  $10 \times 4 = 40$  square units. The triangle can be thought of as having a base of 4, since it has the same width as the rectangle, and a height of 6, since  $16 - 10 = 6$ . The area of a triangle is equal to  $\frac{1}{2}$  times its base times its height, so the area of the triangle is equal to  $\frac{1}{2} \times 4 \times 6 = 12$  square units. Therefore, the area of the figure is equal to  $40 + 12 = 52$  square units.

Note that in most multiple-choice questions that ask for numerical values, the exact answer should be found, as it should be in this question. If a multiple-choice question includes a phrase like “best approximates” or “is closest to,” it generally indicates that the correct option will **not** be an exact value.

Topic	III. Geometry, Measurement, and Data
Subtopic	B. Knows Concepts of Measurement

16. Option (C) is correct. The question requires an understanding of how to solve problems involving elapsed time. From 1:30 P.M. to 2:30 P.M. is 1 hour, or 60 minutes. From 2:30 P.M. to 3:00 P.M. is 30 minutes, and from 3:00 P.M. to 3:10 P.M. is 10 minutes. Therefore, from 1:30 P.M. to 3:10 P.M. is 100 minutes, which is equal to 1 hour and 40 minutes.

Note that in most multiple-choice questions that ask for numerical values, the exact answer should be found, as it should be in this question. If a multiple-choice question includes a word like “approximately,” it generally indicates that the correct option will **not** be an exact value.

Topic	III. Geometry, Measurement, and Data
Subtopic	B. Knows Concepts of Measurement

17. Option (B) is correct. The question requires an understanding of how to describe a set of data using measures of center. The mode of a data set is the value that appears most frequently within the data set. In this data set, 74 is the value that appears most frequently, so the mode is 74.

Topic	III. Geometry, Measurement, and Data
Subtopic	C. Knows Basic Concepts of Data

## Understanding Question Types

The Praxis assessments include a variety of question types: constructed response (for which you write a response of your own); selected response, for which you select one or more answers from a list of choices or make another kind of selection (e.g., by selecting a sentence in a text or by selecting part of a graphic); and numeric entry, for which you enter a numeric value in an answer field. You may be familiar with these question formats from seeing them on other standardized tests you have taken. If not, familiarize yourself with them so that you won't have to spend time during the test figuring out how to answer them.

### Understanding Selected-Response and Numeric-Entry Questions

For most questions you will respond by selecting an oval to choose a single answer from a list of answer choices.

However, interactive question types may also ask you to respond by doing the following.

- Selecting more than one choice from a list of choices.
- Typing in a numeric-entry box. When the answer is a number, you may be asked to enter a numerical answer. Some questions may have more than one entry box to enter a response. Numeric-entry questions typically appear on mathematics-related tests.
- Selecting parts of a graphic. In some questions, you will select your answers by selecting a location (or locations) on a graphic such as a map or chart, as opposed to choosing your answer from a list.
- Selecting sentences. In questions with reading passages, you may be asked to choose your answers by selecting a sentence (or sentences) within the reading passage.
- Dragging and dropping answer choices into targets on the screen. You may be asked to select answers from a list of choices and to drag your answers to the appropriate location in a table, paragraph of text, or graphic.
- Selecting answer choices from a drop-down menu. You may be asked to choose answers by selecting choices from a drop-down menu (e.g., to complete a sentence).

Remember that with every question, you will get clear instructions.

## Understanding Constructed-Response Questions

Some tests include constructed-response questions, which require you to demonstrate your knowledge in a subject area by writing your own response to topics. Essay questions and short-answer questions are types of questions that call for a constructed response.

For example, an essay question might present you with a topic and ask you to discuss the extent to which you agree or disagree with the opinion stated. For such questions, you must support your position with specific reasons and examples from your own experience, observations, or reading.

Following are a few sample essay topics to review:

- *Brown v. Board of Education of Topeka*  

“We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other ‘tangible’ factors may be equal, deprive the children of the minority group of equal educational opportunities? We believe that it does.”

  - A. What legal doctrine or principle, established in *Plessy v. Ferguson* (1896), did the Supreme Court reverse when it issued the 1954 ruling quoted above?
  - B. What was the rationale given by the justices for their 1954 ruling?
- *In his self-analysis, Mr. Payton says that the better-performing students say small-group work is boring and that they learn more working alone or only with students like themselves. Assume that Mr. Payton wants to continue using cooperative learning groups because he believes they have value for all students.*
  - Describe **TWO** strategies he could use to address the concerns of the students who have complained.
  - Explain how each strategy suggested could provide an opportunity to improve the functioning of cooperative learning groups. Base your response on principles of effective instructional strategies.
- *“Minimum-wage jobs are a ticket to nowhere. They are boring and repetitive and teach employees little or nothing of value. Minimum-wage employers take advantage of people who need a job.”*
  - Discuss the extent to which you agree or disagree with this opinion. Support your views with specific reasons and examples from your own experience, observations, or reading.

Keep the following things in mind when you respond to a constructed-response question.

1. **Answer the question accurately.** Analyze what each part of the question is asking you to do. If the question asks you to describe or discuss, you should provide more than just a list.
2. **Answer the question completely.** If a question asks you to do three distinct things in your response, you should cover all three things for the best score. Otherwise, no matter how well you write, you will not be awarded full credit.
3. **Answer the question that is asked.** Do not change the question or challenge the basis of the question. You will receive no credit or a low score if you answer another question or if you state, for example, that there is no possible answer.
4. **Give a thorough and detailed response.** You must demonstrate that you have a thorough understanding of the subject matter. However, your response should be straightforward and should not be filled with unnecessary information.
5. **Take notes on scratch paper so that you don't miss any details.** Then you'll be sure to have all the information you need to answer the question.
6. **Reread your response.** Check that you have written what you intended to write. Do not leave sentences unfinished or omit clarifying information.

## General Assistance For The Test

### Praxis Interactive Practice Test

This full-length Praxis practice test lets you practice answering one set of authentic test questions in an environment that simulates the computer-delivered test.

- Timed just like the real test
- Correct answers with detailed explanations
- Practice test results for each content category

ETS provides a free interactive practice test with each test registration. You can learn more [here](#).

### Doing Your Best

#### Strategy and Success Tips

Effective Praxis test preparation doesn't just happen. You'll want to set clear goals and deadlines for yourself along the way. Learn from the experts. Get practical tips to help you navigate your Praxis test and make the best use of your time. Learn more at [Strategy and Tips for Taking a Praxis Test](#).

#### Develop Your Study Plan

Planning your study time is important to help ensure that you review all content areas covered on the test. View a sample plan and learn how to create your own. Learn more at [Develop a Study Plan](#).

### Helpful Links

[Ready to Register](#) – How to register and the information you need to know to do so.

[Disability Accommodations](#) – Testing accommodations are available for test takers who meet ETS requirements.

[PLNE Accommodations \(ESL\)](#) – If English is not your primary language, you may be eligible for extended testing time.

[What To Expect on Test Day](#) – Knowing what to expect on test day can make you feel more at ease.

[Getting Your Scores](#) – Find out where and when you will receive your test scores.



[State Requirements](#) – Learn which tests your state requires you to take.

[Other Praxis Tests](#) – Learn about other Praxis tests and how to prepare for them.



Visit our website to find test prep resources and  
preparation materials to build confidence for test day:

**<https://praxis.ets.org>**



Copyright © 2026 by ETS. ETS and Praxis are registered trademarks of ETS in the United States and other countries. The Eight-Point logo is a trademark of ETS.