

Discipline: Mathematics

Grade level: 6

Assessment Title: Solving Real-World & Mathematical Problems with Variables

Pacing: Quarter Two

Assessment Type:

- Form #1: Ten short answer questions, chosen from and/or adapted from the EnVision free-response test and the EnVision textbook.
- Form #2: Ten selected response questions, chosen from the EnVision bank of test questions.
- Form #3: Ten short answer questions, chosen from and/or adapted from the EnVision free-response test and the EnVision textbook.

Core Standard:

Expressions and Equations

6.EE.B.7 - Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

Assessment Summary:

Students will apply what they know about variables, expressions, and problem solving in order to solve real-world and mathematical problems involving variables.

Suggested Assessment Time Frame: Approximately 45 minutes

Materials and Resources: Assessment, additional sheet of paper, pencil, calculator (optional)

Required Prior Instruction:

Assessment should be given midway through Topic 4. The following lessons address concepts related to writing and solving equations involving real-world problems:

Lesson 4-1: Understand Equations and Solutions

Lesson 4-2: Apply Properties of Equality

Lesson 4-3: Write and Solve Addition and Subtraction Problems

Lesson 4-4: Write and Solve Multiplication and Division Problems

Lesson 4-5: Write and Solve Equations with Rational Numbers

Suggested Prior Instructional Time: Approximately 8-10 days.

Teacher Directions for Assessment Administration:

- The teacher should read through the assessment directions with the students, and ensure understanding.
- Students should be given an additional sheet of paper, to be used if needed.
- Students may use a calculator for this assessment.

Rubric for Forms #1 and #3

| 1 | 2 | 3 | 4 |
|---|---|--|---|
| Does Not Meet | Partially Proficient | Proficient | Exceeds |
| Student <i>does not</i> demonstrate understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has earned 0-4 points. | Student demonstrates <i>partial</i> understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has earned 5-9 points. | Student demonstrates understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has earned 10-13 points. | Student demonstrates <i>full</i> understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has earned 14 points. |

* Questions 1-6 are worth one point each. Questions 7-10 are worth two points each. One point for writing a correct equation, and one point for a correct answer.

Rubric for Form #2

| 1 | 2 | 3 | 4 |
|--|--|---|--|
| Does Not Meet | Partially Proficient | Proficient | Exceeds |
| Student <i>does not</i> demonstrate understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has correctly answered 0-3 questions. | Student demonstrates <i>partial</i> understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has correctly answered 4-6 questions. | Student demonstrates understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has correctly answered 7-9 questions. | Student demonstrates <i>full</i> understanding of how to solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. Student has correctly answered 10 questions. |

Name: _____ Date: _____

Expressions and Equations 6.EE.B.7: Solve real world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q , and x are all nonnegative rational numbers.

Evaluate each expression to find the value of x :

1) $x - 8 = 14$ _____

2) $x + 4 = 28$ _____

3) $52 = x + 9$ _____

4) $x \div 3 = 17$ _____

5) $15x = 75$ _____

6) $8 = x \div 7$ _____

For numbers 7-10, write an equation and solve the equation to find the answer:

- 7) Jessica needs \$58.75 to purchase a new skateboard. So far she has saved \$32.00. How much more money does she need?

Equation: _____

Answer: _____

For numbers 7-10, write an equation and solve the equation to find the answer:

- 8) Steve was assigned the task of replacing all the light bulbs in the school cafeteria over the summer. So far he has replaced 56 light bulbs and has 109 more to change. What is the total number of light bulbs in the school cafeteria?

Equation: _____

Answer: _____

- 9) Cooper used 100 feet of string to braid 4 hot pads. How many feet of string are in each hot pad?

Equation: _____

Answer: _____

- 10) Emily calculated that she needs 40 inches of framing to make a picture frame. How many inches of framing will she need to make 7 picture frames?

Equation: _____

Answer: _____

ANSWER KEY

Expressions and Equations 6.EE.B.7: Solve real world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q , and x are all nonnegative rational numbers.

Evaluate each expression to find the value of x :

1) $x - 8 = 14$ **$x = 22$**

2) $x + 4 = 28$ **$x = 24$**

3) $52 = x + 9$ **$x = 43$**

4) $x \div 3 = 17$ **$x = 51$**

5) $15x = 75$ **$x = 5$**

6) $8 = x \div 7$ **$x = 56$**

For numbers 7-10, write an equation and solve the equation to find the answer:

- 7) Jessica needs \$58.75 to purchase a new skateboard. So far she has saved \$32.00. How much more money does she need?

Equation: **$58.75 - 32.00 = m$** or **$32.00 + m = 58.75$**

Answer: **$m = \$26.75$**

For numbers 7-10, write an equation and solve the equation to find the answer:

- 8) Steve was assigned the task of replacing all the light bulbs in the school cafeteria over the summer. So far he has replaced 56 light bulbs and has 109 more to change. What is the total number of light bulbs in the school cafeteria?

Equation: $56 + 109 = t$

Answer: $t = 165$ light bulbs

- 9) Cooper used 100 feet of string to braid 4 hot pads. How many feet of string are in each hot pad?

Equation: $100 \div 4 = f$

Answer: $f = 25$ feet

- 10) Emily calculated that she needs 40 inches of framing to make a picture frame. How many inches of framing will she need to make 7 picture frames?

Equation: $40 \times 7 = f$

Answer: $f = 280$ inches