

Proportional Relationships: Solve Equations

Procedural Lesson

Grade 7 • Unit 3 • Lesson 11

MC: 7.RP.2c▲

MPs

✓ Applied MP
* Embedded MP

1	2	3	4	5	6	7	8
*		*	*		*	✓	✓*

Problem of the Day

Objective: _____

Vocabulary

Notes

Inverse Operations: operations that undo each other; the opposite operation

Addition \longleftrightarrow Subtraction
Multiplication \longleftrightarrow Division

Isolate Variables: to get a variable alone on one side of the equation. Use inverse operations to isolate variables

Proportional Equation:

$$y = kx$$

y is directly proportional to x
 k is the Constant of Proportionality

Steps:

1. Isolate each variable. Use inverse operations to find unit rate.
2. Label the x , y , and k in your unit rate equation.
3. Plug values into the equation.

Structured Guided Practice

(A/B Partners Practice)

Directions: Find the unit rate for both variables in $y = kx$ form. Solve.

1. $15q = 12r$

Unit rates:

If $r = 6$, then $q = ?$

If $q = 10$, then $r = ?$

2. $4.5w = 6v$

Unit Rates:

If $w = 4.5$, then $v = ?$

If $v = 2.8$, then $w = ?$

Final Check for Understanding

(Teacher Checks Work)

Directions: Find the unit rate for both variables in $y = kx$ form. Solve for the given variable.

1. $25y = 8z$

Unit rates:

If $y = 19$, then $z = ?$

If $z = 11$, then $y = ?$

2. $\frac{1}{2}c = 2\frac{1}{4}d$

Unit rates:

If $c = \frac{3}{4}$, then $d = ?$

If $d = 5\frac{1}{3}$, then $c = ?$

Student Practice

Unit 3 · Lesson 11: Proportional Relationships: Solve Equations

Name: _____

Date: _____

Directions: Find the unit rate for both variables in $y = kx$ form. Solve for the given variable.

1. $5u = 3t$

Unit Rates:

If $u = 4$, then $t = ?$

If $t = 7$, then $u = ?$

2. $16s = 10g$

Unit Rates:

If $s = 8$, then $g = ?$

If $g = 3$, then $s = ?$

3. $0.1x = 2.5y$

Unit Rates:

If $x = 3$, then $y = ?$

If $y = 2$, then $x = ?$

4. $\frac{3}{4}d = \frac{1}{10}e$

Unit Rates:

If $d = 8$, then $e = ?$

If $e = \frac{1}{2}$, then $d = ?$

5. $0.4j = 1.8k$

Unit Rates:

If $k = 6$, then $j = ?$

If $j = 20$, then $k = ?$

6. $\frac{1}{8}m = \frac{1}{5}n$

Unit Rates:

If $n = 5$, then $m = ?$

If $m = 3$, then $n = ?$

Challenge Problems

Directions: Read and solve.

1. A jet can travel 1,625 miles in $2\frac{1}{2}$ hours. At that rate, if the jet left at 3:00am to travel 6,825 miles, what time would it arrive at its destination?
2. The harbor has 250 ships that can carry a total of 3,750,000 cargo containers. Each container can hold a total of 55,000 lbs. of cargo. Assuming all boats are the same size, how many pounds of cargo can each ship hold?

Extension Activity

- * **MP1:** Make sense of the problem and persevere in solving it.
- * **MP4:** Apply mathematics in everyday life.

Think of how a supermarket and its affiliates use ratios to plan its orders and shelf space. Give an example of something you purchase and how you think ratios were related to that product's design, shelf space, and packaging quantity. What are the problems of having a ratio either too high or too low?

Closure

Reaching Consensus

**MP3: Do you agree or disagree with your classmate? Why or why not?*

Student Presentations

**MP1: What steps in the process are you most confident about?*

**MP6: Explain how you might show that your solution answers the problem.*

Closure

Recap today's lesson with one or more of the following questions:

✓MP7: Why does using an inverse operation isolate a variable?

✓MP8: What pattern do you notice in equivalent ratios?