January 8, 2015 Period 5 Lesson 14.3

Learning Objective: Students will be able to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.

Warm Up

$56 \div 8 =$	$143 \div 13 =$	$36 \div 6 =$	$14 \div 7 =$
$8 \div 1 =$	$150 \div 10 =$	$30 \div 6 =$	$70 \div 7 =$
$84 \div 6 =$	$64 \div 8 =$	$81 \div 9 =$	$10 \div 1 =$
$98 \div 14 =$	$65 \div 13 =$	$30 \div 15 =$	$120 \div 8 =$
$40 \div 8 =$	$5 \div 1 =$	$28 \div 2 =$	$12 \div 12 =$
$48 \div 4 =$	$3 \div 1 =$	$96 \div 12 =$	$24 \div 2 =$
$72 \div 6 =$	$18 \div 6 =$	$24 \div 4 =$	$6 \div 1 =$
$36 \div 3 =$	$24 \div 8 =$	$108 \div 9 =$	$12 \div 6 =$
$18 \div 2 =$	$70 \div 5 =$	$36 \div 4 =$	$12 \div 4 =$
$78 \div 13 =$	$21 \div 7 =$	$40 \div 5 =$	$7 \div 1 =$
$45 \div 3 =$	$77 \div 7 =$	$7 \div 7 =$	$120 \div 15 =$
$28 \div 7 =$	$42 \div 3 =$	$72 \div 8 =$	$52 \div 4 =$
$55 \div 5 =$	$35 \div 5 =$	$20 \div 10 =$	$100 \div 10 =$
$8 \div 8 =$	$182 \div 14 =$	$48 \div 12 =$	$16 \div 4 =$
$140 \div 10 =$	$28 \div 14 =$	$80 \div 10 =$	$54 \div 9 =$
$54 \div 6 =$	$9 \div 9 =$	$75 \div 15 =$	$195 \div 13 =$

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Warm Up Answers

$56 \div 8 = 7$	$143 \div 13 = 11$	$36 \div 6 = 6$	$14 \div 7 = 2$
$8 \div 1 = 8$	$150 \div 10 = 15$	$30 \div 6 = 5$	$70 \div 7 = 10$
$84 \div 6 = 14$	$64 \div 8 = 8$	$81 \div 9 = 9$	$10 \div 1 = 10$
$98 \div 14 = 7$	$65 \div 13 = 5$	$30 \div 15 = 2$	$120 \div 8 = 15$
$40 \div 8 = 5$	$5 \div 1 = 5$	$28 \div 2 = 14$	$12 \div 12 = 1$
$48 \div 4 = 12$	$3 \div 1 = 3$	$96 \div 12 = 8$	$24 \div 2 = 12$
$72 \div 6 = 12$	$18 \div 6 = 3$	$24 \div 4 = 6$	$6 \div 1 = 6$
$36 \div 3 = 12$	$24 \div 8 = 3$	$108 \div 9 = 12$	$12 \div 6 = 2$
$18 \div 2 = 9$	$70 \div 5 = 14$	$36 \div 4 = 9$	$12 \div 4 = 3$
$78 \div 13 = 6$	$21 \div 7 = 3$	$40 \div 5 = 8$	$7 \div 1 = 7$
$45 \div 3 = 15$	$77 \div 7 = 11$	$7 \div 7 = 1$	$120 \div 15 = 8$
$28 \div 7 = 4$	$42 \div 3 = 14$	$72 \div 8 = 9$	$52 \div 4 = 13$
$55 \div 5 = 11$	$35 \div 5 = 7$	$20 \div 10 = 2$	$100 \div 10 = 10$
$8 \div 8 = 1$	$182 \div 14 = 13$	$48 \div 12 = 4$	$16 \div 4 = 4$
$140 \div 10 = 14$	$28 \div 14 = 2$	$80 \div 10 = 8$	$54 \div 9 = 6$
$54 \div 6 = 9$	$9 \div 9 = 1$	$75 \div 15 = 5$	$195 \div 13 = 15$

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Homework Answers

14.2 Record and Practice Journal

Tell whether the ratios form a proportion.

1. $\frac{1}{5}, \frac{5}{15}$ — **no**
2. $\frac{2}{3}, \frac{12}{18}$ — **yes**
3. $\frac{15}{2}, \frac{4}{30}$ — **no**
4. $\frac{56}{21}, \frac{8}{3}$ — **yes**
5. $\frac{5}{8}, \frac{62.5}{100}$ — **yes**
6. $\frac{17}{20}, \frac{90.1}{106}$ — **yes**
7. $\frac{3.2}{4}, \frac{16}{24}$ — **no**
8. $\frac{34}{50}, \frac{6.8}{10}$ — **yes**

Tell whether the two rates form a proportion.

9. 28 points in 3 games; 112 points in 12 games — **yes**
10. 32 notes in 4 measures; 12 notes in 2 measures — **no**

11. You can type 105 words in two minutes. Your friend can type 210 words in four minutes. Are these rates proportional? Explain. — **yes**

Learning Objective: Students will be able to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.

Lesson 14.3

January 8, 2015

Essential Question:

How can you write a proportion that solves a problem in real life?

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Lesson Objective:

Students will be able to:

write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.

Self-Evaluation Scale

Score	Description
4	I can teach other students how to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.
3	I can write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.
2	I recognize, but still need help to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.
1	I do not know how to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.

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One way to write a proportion is to use a table.

	Last Month	This Month
Purchase	2 ringtones	3 ringtones
Total Cost	6 dollars	x dollars

Use the columns or the rows to write a proportion.

Use columns:

$$\frac{2 \text{ ringtones}}{6 \text{ dollars}} = \frac{3 \text{ ringtones}}{x \text{ dollars}}$$

Numerators have the same units.

Denominators have the same units.

Use rows:

$$\frac{2 \text{ ringtones}}{3 \text{ ringtones}} = \frac{6 \text{ dollars}}{x \text{ dollars}}$$

The units are the same on each side of the proportion.

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1 Writing a Proportion

Black Bean Soup

1.5 cups black beans
0.5 cup salsa
2 cups water
1 tomato
2 teaspoons seasoning

A chef increases the amounts of ingredients in a recipe to make a proportional recipe. The new recipe has 6 cups of black beans. Write a proportion that gives the number x of tomatoes in the new recipe.

Organize the information in a table.

	Original Recipe	New Recipe
Black Beans	1.5 cups	6 cups
Tomatoes	1 tomato	x tomatoes

One proportion is $\frac{1.5 \text{ cups beans}}{1 \text{ tomato}} = \frac{6 \text{ cups beans}}{x \text{ tomatoes}}$.

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2 Solving Proportions Using Mental Math

Solve $\frac{3}{2} = \frac{x}{8}$.

Step 1: Think: The product of 2 and what number is 8?

$\frac{3}{2} = \frac{x}{8}$

$2 \times ? = 8$

Step 2: Because the product of 2 and 4 is 8, multiply the numerator by 4 to find x.

$3 \times 4 = 12$

$\frac{3}{2} = \frac{x}{8}$

$2 \times 4 = 8$

∴ The solution is $x = 12$.

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3 Solving Proportions Using ...

cross multiplication and inverse operations.

Solve $\frac{3}{2} = \frac{x}{8}$.

$3 \cdot 4 = 2x$

$24 = 2x$

$12 = x$

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Reduce, then use mental math

$$\frac{14}{21} = \frac{35}{X}$$

$X = 55$

Learning Objective: Students will be able to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.

$$\frac{5}{9} = \frac{3}{w}$$

$5w = 27$

$w = \frac{27}{5}$

$w = 5\frac{2}{5}$

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Inverse Operation

The operation that reverses the effect of another operation.

Example: Addition and subtraction are inverse operations. Start with 7, then add 3 we get 10, now subtract 3 and we get back to 7.

Another Example: Multiplication and division are inverse operations. Start with 6, multiply by 2 we get 12, now divide by 2 and we get back to 6.

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$\frac{5}{9} = \frac{3}{w}$

$9w$ $9w$

$5w = 27$

$27 = 5w$

$\frac{5w}{5} = \frac{27}{5}$

$w = 5\frac{2}{5}$

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$$\frac{22}{t} = \frac{2}{7}$$

$$\frac{154}{2} = \frac{2t}{2}$$

$$77 = t$$

$$\frac{8}{9} = \frac{13}{5}$$

$$65 = 117$$

$$5 = 14\frac{5}{8}$$

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Assignment

Complete problems:

8, 10, 16, 18, 20, 22, & 24

on pages 618 - 619 in your Big Ideas Text Book.

Learning Objective: Students will be able to write proportions to represent real life situations, and solve by using cross multiplication and inverse operations.

Assignment Answers

8. $\frac{12 \text{ points}}{14 \text{ shots}} = \frac{18 \text{ points}}{w \text{ shots}}$

10. $\frac{15 \text{ miles}}{2.5 \text{ hours}} = \frac{m \text{ miles}}{4 \text{ hours}}$

16. $z = 5$

18. $k = 15$

20. $b = 20$

22. **a.** $\frac{1 \text{ trombone}}{3 \text{ violas}} = \frac{t \text{ trombones}}{9 \text{ violas}}$

b. 3 trombones

24. no; The solution of that equation is $x = 1.5$, but using mental math, you can see that the solution of the proportion is $x = 24$.

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Homework

In your Big Ideas Record and Practice Journal page 316.