

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

$56 \div 8 =$

$8 \div 1 =$

$84 \div 6 =$

$98 \div 14 =$

$40 \div 8 =$

$48 \div 4 =$

$72 \div 6 =$

$36 \div 3 =$

$18 \div 2 =$

$78 \div 13 =$

$45 \div 3 =$

$28 \div 7 =$

$55 \div 5 =$

$8 \div 8 =$

$140 \div 10 =$

$54 \div 6 =$

$143 \div 13 =$

$150 \div 10 =$

$64 \div 8 =$

$65 \div 13 =$

$5 \div 1 =$

$3 \div 1 =$

$18 \div 6 =$

$24 \div 8 =$

$70 \div 5 =$

$21 \div 7 =$

$77 \div 7 =$

$42 \div 3 =$

$35 \div 5 =$

$182 \div 14 =$

$28 \div 14 =$

$9 \div 9 =$

$36 \div 6 =$

$30 \div 6 =$

$81 \div 9 =$

$30 \div 15 =$

$28 \div 2 =$

$96 \div 12 =$

$24 \div 4 =$

$108 \div 9 =$

$36 \div 4 =$

$40 \div 5 =$

$7 \div 7 =$

$72 \div 8 =$

$20 \div 10 =$

$48 \div 12 =$

$80 \div 10 =$

$75 \div 15 =$

$14 \div 7 =$

$70 \div 7 =$

$10 \div 1 =$

$120 \div 8 =$

$12 \div 12 =$

$24 \div 2 =$

$6 \div 1 =$

$12 \div 6 =$

$12 \div 4 =$

$7 \div 1 =$

$120 \div 15 =$

$52 \div 4 =$

$100 \div 10 =$

$16 \div 4 =$

$54 \div 9 =$

$195 \div 13 =$

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# Warm Up Answers

$56 \div 8 = 7$

$8 \div 1 = 8$

$84 \div 6 = 14$

$98 \div 14 = 7$

$40 \div 8 = 5$

$48 \div 4 = 12$

$72 \div 6 = 12$

$36 \div 3 = 12$

$18 \div 2 = 9$

$78 \div 13 = 6$

$45 \div 3 = 15$

$28 \div 7 = 4$

$55 \div 5 = 11$

$8 \div 8 = 1$

$140 \div 10 = 14$

$54 \div 6 = 9$

$143 \div 13 = 11$

$150 \div 10 = 15$

$64 \div 8 = 8$

$65 \div 13 = 5$

$5 \div 1 = 5$

$3 \div 1 = 3$

$18 \div 6 = 3$

$24 \div 8 = 3$

$70 \div 5 = 14$

$21 \div 7 = 3$

$77 \div 7 = 11$

$42 \div 3 = 14$

$35 \div 5 = 7$

$182 \div 14 = 13$

$28 \div 14 = 2$

$9 \div 9 = 1$

$36 \div 6 = 6$

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$30 \div 15 = 2$

$28 \div 2 = 14$

$96 \div 12 = 8$

$24 \div 4 = 6$

$108 \div 9 = 12$

$36 \div 4 = 9$

$40 \div 5 = 8$

$7 \div 7 = 1$

$72 \div 8 = 9$

$20 \div 10 = 2$

$48 \div 12 = 4$

$80 \div 10 = 8$

$75 \div 15 = 5$

$14 \div 7 = 2$

$70 \div 7 = 10$

$10 \div 1 = 10$

$120 \div 8 = 15$

$12 \div 12 = 1$

$24 \div 2 = 12$

$6 \div 1 = 6$

$12 \div 6 = 2$

$12 \div 4 = 3$

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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**

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Lesson 14.3

January 17, 2017

## Essential Question:

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

Lesson 14.3

January 17, 2017

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

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# Reduce, then use mental math

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

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

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

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

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# Assignment

Complete problems:

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

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



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# Assignment Answers

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

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

$$16. z = 5$$

$$18. k = 15$$

$$20. b = 20$$

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

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.

