

We will solve¹ problems involving proportional relationships.

CCSS 7.RP.1 - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1}{2} / \frac{1}{4}$ miles per hour, equivalently 2 miles per hour.*

CFU

What are we going to do?

What does *solve* mean?

Solve means _____.

Activate Prior Knowledge

A **ratio** is a relationship between two quantities.

- A ratio can be written with words or numbers.

Write each situation as a ratio.

1. At the park, there are five ducks for every six geese.



2. On a piano, there are five black keys for every seven white keys.



Make Connection

Students, you already know how to write a situation as a ratio. Now, we will use ratios to solve problems involving proportional relationships.

Vocabulary

¹ find the answer

A **proportional relationship** is a set of equivalent ratios.
Equivalent ratios have **equal values** using different numbers.

- To generate² an equivalent ratio, multiply or divide each quantity in a ratio by the **same** number.
- Multiplying or dividing by the **same** number does **NOT** change the ratio.

Proportional Relationship

On a piano, the ratio of **black keys** to **white keys** is **5 to 7**.



black keys	5	10	15	20	25	30	35
white keys	7	14	21	28	35	42	49

Diagram showing a table with two rows: 'black keys' and 'white keys'. The 'black keys' row contains values 5, 10, 15, 20, 25, 30, 35. The 'white keys' row contains values 7, 14, 21, 28, 35, 42, 49. An arrow labeled 'x 4' points from the first column (5, 7) to the fourth column (20, 28). Another arrow labeled 'x 4' points from the fourth column (20, 28) to the first column (5, 7).



If there are **20 black keys** then there are **28 white keys**.

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Explain why the ratios $\frac{5}{7}$ and $\frac{25}{35}$ are equivalent ratios.

In your own words, what is a proportional relationship?
 A proportional relationship _____.

Vocabulary

² create

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Solve problems involving proportional relationships.

- 1 Read the problem carefully.
 - a Identify₃ the given ratio. (underline)
 - b Identify information about the unknown ratio. (circle)
- 2 Represent₄ the proportional relationship. Hint: Use a table.
- 3 Generate an equivalent ratio to solve for the unknown.
Hint: Multiply or divide by the same value.
- 4 Interpret₅ the solution.

1. Neil's recipe for walnut spice cake calls for two cups of flour for every cup of walnuts. If Neil uses six cups of flour, how many cups of walnuts should he use?



2. Selena is buying gas at four dollars for every gallon of gas. If Selena spent 16 dollars, how many gallons of gas did she buy?



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- 1a How did I/you identify information about the given ratio?
- 1b How did I/you identify information about the unknown ratio?
- 2 How did I/you represent the proportional relationship?
- 3 How did I/you solve for the unknown?

Vocabulary

- ³ find (synonym)
- ⁴ show (synonym)
- ⁵ explain (synonym)

A **proportional relationship** is a set of **equivalent ratios**.
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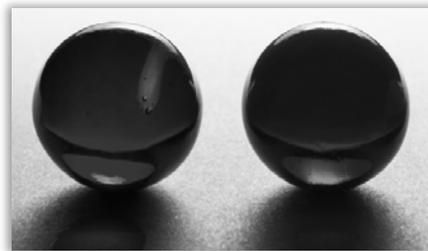
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- 4 Interpret the solution.

3. A grocery store is selling three melons for seven dollars. If Harold spent \$28 on melons, how many did he buy?



4. In Maya's marble collection, she has three red marbles for every four blue marbles. If Maya has 28 blue marbles, how many red marbles are in her collection?



CFU

- 1a How did I/you identify information about the given ratio?
- 1b How did I/you identify information about the unknown ratio?
- 2 How did I/you represent the proportional relationship?
- 3 How did I/you solve for the unknown?

Vocabulary

- 3 find (synonym)
- 4 show (synonym)
- 5 explain (synonym)

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Hint: Multiply or divide by the same value.
- 4 Interpret the solution.

5. A koi pond has 27 orange fish and 45 white fish. How many orange fish are there for every five white fish? A second koi pond has 20 white fish. If the fish are in the same ratio, how many orange fish are in the second koi pond?



6. Monique bought yams at the store. She spent 24 dollars on 18 yams. At this price, how much did Monique pay for every 3 yams? Martin bought yams at the same store and spent 16 dollars. How many yams did Martin buy?



CFU

- 1a How did I/you identify information about the given ratio?
- 1b How did I/you identify information about the unknown ratio?
- 2 How did I/you represent the proportional relationship?
- 3 How did I/you solve for the unknown?

A **proportional relationship** is a set of **equivalent ratios**.
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Skill Closure

Solve problems involving proportional relationships.

- 1 Read the problem carefully.
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 - b Identify information about the unknown ratio. (circle)
- 2 Represent the proportional relationship. *Hint: Use a table.*
- 3 Generate an equivalent ratio to solve for the unknown.
Hint: Multiply or divide by the same value.
- 4 Interpret the solution.

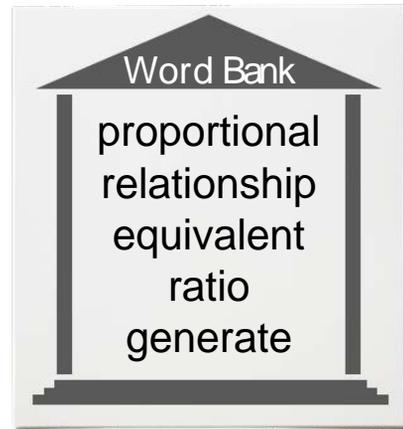
1. There were four adults for every child in line at the movie theatre. If there were 8 children in line, how many adults were in line at the movie theatre?



Access Common Core

Yuri created a table to solve the problem above.
Explain the error Yuri made.

adults	children
4	1
8	?



Summary Closure

What did you learn today about solving problems involving proportional relationships? (Pair-Share) Use words from the word bank.

Day 1 _____

Day 2 _____

A **proportional relationship** is a set of **equivalent ratios**. **Equivalent ratios** have **equal values** using different numbers.

Solve problems involving proportional relationships.

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 - a Identify the given ratio. (underline)
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- 2 Represent the proportional relationship. Hint: Use a table.
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Hint: Multiply or divide by the same value.
- 4 Interpret the solution.

1. Jason is cooking rice for his family for dinner. The recipe calls for 2 cups of water for every 1 cup of rice. If he uses 4 cups of water, how much rice should he add?



2. Raymond is shopping for produce at the local farmer's market. A fruit stand sells 4 avocados for \$3. How much will he pay for 20 avocados?



3. In a box, there are 35 pencils and 10 pens. How many pens are there for every seven pencils? Another box has pencils and pens in the same ratio. If there are 20 pens, how many pencils are in the second box?



1. The 6th-grade classes are taking a field trip to the aviary¹. There is one adult for every five students. If there are fifteen adults on the field trip, how many students are taking the field trip?



2. The aviary has three macaws for every two cockatoos. If there are twelve cockatoos at the aviary, how many macaws are there?



Access Common Core

Fill in the missing values for each proportional relationship. Explain how you found the missing values.

1.

3	6	9			18	
4		12	16			28

2.

2	4	6	8			14
5			20	25		

3.

	14	21		35		
8	16			40	48	56

Vocabulary

¹ large building or cage for birds

1. A map of Seattle uses a scale of six inches for every twenty miles. How many miles are represented by twelve inches on the map?



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1. Choose Yes or No to indicate whether each ratio is equivalent to $\frac{6}{10}$.

A $\frac{3}{5}$

O Yes O No

B $\frac{6}{8}$

O Yes O No

C $\frac{21}{35}$

O Yes O No

2. Choose Yes or No to indicate whether each ratio is equivalent to $\frac{5}{10}$.

A $\frac{1}{2}$

O Yes O No

B $\frac{1}{5}$

O Yes O No

C $\frac{15}{30}$

O Yes O No

3. Choose Yes or No to indicate whether each ratio is equivalent to $\frac{3}{9}$.

A $\frac{21}{63}$

O Yes O No

B $\frac{1}{3}$

O Yes O No

C $\frac{1}{6}$

O Yes O No