

## Chapter

## 7

## Ratio

## Practice 1 Finding Ratio

The table shows the number of points each student scored in a math game.

**Find the total number of points the students scored.**

1.

Student	Number of Points
Yolanda	8
Sue	3
Norita	5
Vanna	11
Total	

**Complete the table to show the ratios.**

2.

The ratio of ...	Ratio
the number of points Yolanda has to the number of points Vanna has is	8 : 11
the number of points Norita has to the number of points Sue has is	
the number of points Sue has to the number of points Norita has is	
the number of points Yolanda has to the total number of points is	
the total number of points to the number of points Vanna has is	

### Complete.

Mr. Gonzales put some pencils into bundles of 10. He gave 4 bundles to Charlie and 9 bundles to Lisa.

- The ratio of the number of pencils Charlie has to the number of pencils Lisa has is \_\_\_\_\_ : \_\_\_\_\_.
- The ratio of the number of pencils Lisa has to the number of pencils Charlie has is \_\_\_\_\_ : \_\_\_\_\_.
- The ratio of the number of pencils Lisa has to the total number of pencils is \_\_\_\_\_ : \_\_\_\_\_.

This table shows the amount of milk and spring water that four families drink in a week.

### Find the total amount of milk and water that they drink.

6.

Family	Amount of Milk	Amount of Spring Water
Lee	4 qt	6 gal
Modano	9 qt	9 gal
Santos	13 qt	10 gal
Willis	5 qt	7 gal
Total		

### Use the above table to fill in the blanks.

*Example*

The ratio of the amount of water the Santos family drinks to the amount of water the Modano family drinks is 10 : 9.

- The ratio of the amount of milk the Modano family drinks to the amount of milk the Willis family drinks is \_\_\_\_\_.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Use the table on page 210 to fill in the blanks.**

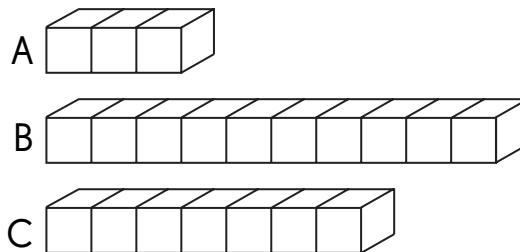
8. The ratio of the amount of water the Willis family drinks to the amount of water the Lee family drinks is \_\_\_\_\_.
9. The ratio of the total amount of milk to the amount of milk the Modano family drinks is \_\_\_\_\_.
10. The ratio of the amount of water the Santos family drinks to the total amount of water is \_\_\_\_\_.

When writing two quantities as a ratio, the quantities must be in the same unit. The ratio itself however has no units.



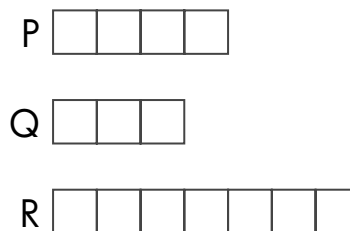
**Complete.**

11. The ratio of the length of A to the length of C is \_\_\_\_\_ : \_\_\_\_\_.
12. The ratio of the length of C to the length of B is \_\_\_\_\_ : \_\_\_\_\_.
13. The ratio of the length of A to the total length of A, B and C is \_\_\_\_\_ : \_\_\_\_\_.



**Complete.**

14. The ratio of the length of R to the length of P is \_\_\_\_\_ : \_\_\_\_\_.
15. The ratio of the length of P to the length of Q is \_\_\_\_\_ : \_\_\_\_\_.
16. The ratio of the length of P to the total length of P, Q and R is \_\_\_\_\_ : \_\_\_\_\_.



**Draw models to show each ratio.**

**17.**  $5 : 9$

**18.**  $12 : 7$

**Solve.**

**19.** Grandma gave \$15 to Linda and Dianne. Linda got \$7.

**a.** How much money did Dianne get?

**b.** Find the ratio of the amount of money Linda got to the amount of money Dianne got from Grandma.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Solve.**

**20.** Amelia has 25 postcards. She gives 8 away.

**a.** How many postcards does she have left?

**b.** Find the ratio of the number of postcards Amelia has left to the number of postcards she had at first.

**21.** Clark has two 16-ounce cans of corn. He uses 18 ounces of it to make a corn soup and the rest to make a casserole.

**a.** How many ounces of corn did he use to make the casserole?

**b.** What is the ratio of the amount of corn Clark used to make the casserole to the amount of corn he had at first?

- 22.** In a supermarket bin, the number of packages of red peppers to the number of packages of green peppers is in the ratio 8 : 13. The peppers are sold in 2-pound packages.
- a.** What is the least possible weight of red peppers in the bin?

- b.** What is the least possible weight of green peppers in the bin?

Leanne put 6 counters into a bag. She took out some counters from the bag but not all of them.

**Find the ratio of the number of counters taken out from the bag to the number of the counters left in the bag. Make a list of all possible ratios using the table.**

**23.**

Number of Counters Taken Out	Number of Counters Left in the Bag	Ratio
1	5	1 : 5

## Practice 2 Equivalent Ratios

Write ratios to compare the two sets of items.



A



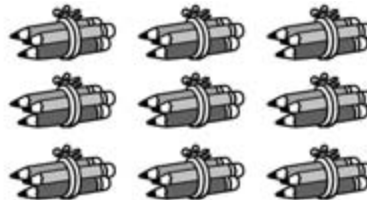
B

- The ratio of the number of CDs in Group A to the number of CDs in Group B is \_\_\_\_\_ : \_\_\_\_\_.
- The ratio of the number of CD-holders in Group A to the number of CD-holders in Group B is \_\_\_\_\_ : \_\_\_\_\_.
- \_\_\_\_\_ : \_\_\_\_\_ = \_\_\_\_\_ : \_\_\_\_\_ in simplest form.

Write ratios to compare the two sets of items.



A



B

- The ratio of the number of pencils in Group A to the number of pencils in Group B is \_\_\_\_\_ : \_\_\_\_\_.
- The ratio of the number of bundles in Group A to the number of bundles in Group B is \_\_\_\_\_ : \_\_\_\_\_.
- $18 : 27 = 6 : 9 =$  \_\_\_\_\_ : \_\_\_\_\_ in simplest form.

**Find the greatest common factor of each set of numbers.**

*Example*

$$4 \text{ and } 6 \underline{\hspace{1cm}} \mathbf{2}$$

**7.** 6 and 9 \_\_\_\_\_

**8.** 6 and 18 \_\_\_\_\_

**9.** 12 and 32 \_\_\_\_\_

**Complete.**

**10.**  $\times \text{ --- } \left( \begin{array}{c} 3 : 5 \\ \curvearrowright \end{array} \right) \times \text{ ---}$   
 $= \text{ --- } : 15$

**11.**  $\times \text{ --- } \left( \begin{array}{c} 7 : 4 \\ \curvearrowright \end{array} \right) \times \text{ ---}$   
 $= \text{ --- } : 16$

**12.**  $4 : 3 = 24 : \text{ ---}$

**13.**  $8 : 3 = 64 : \text{ ---}$

**14.**  $4 : 9 = \text{ --- } : 45$

**15.**  $6 : 7 = 42 : \text{ ---}$

**16.**  $5 : 8 = 45 : \text{ ---}$

**17.**  $9 : 6 = \text{ --- } : 54$

**Complete to express each ratio in simplest form.**

**18.**  $\div \text{ --- } \left( \begin{array}{c} 18 : 12 \\ \curvearrowright \end{array} \right) \div \text{ ---}$   
 $= 3 : \text{ ---}$

**19.**  $\div \text{ --- } \left( \begin{array}{c} 15 : 21 \\ \curvearrowright \end{array} \right) \div \text{ ---}$   
 $= 5 : \text{ ---}$

**20.**  $12 : 30 = \text{ --- } : 5$

**21.**  $14 : 28 = 1 : \text{ ---}$

**22.**  $60 : 45 = \text{ --- } : 3$

**23.**  $72 : 104 = \text{ --- } : 13$

**24.**  $6 : 16 = \text{ --- } : \text{ ---}$

**25.**  $15 : 35 = \text{ --- } : \text{ ---}$

**26.**  $4 : 48 = \text{ --- } : \text{ ---}$

**27.**  $56 : 21 = \text{ --- } : \text{ ---}$





**Solve. Show your work.**

- 3.** There were 12 boys and 18 girls in a class. Then, 3 more boys joined the class and 2 girls left. What is the ratio of the number of boys to the number of girls in the class now?
- 4.** Monica had \$42 and Naomi had \$18 at first. Monica then gave \$6 to Naomi. What is the ratio of the amount of money Monica has to the amount of money Naomi has in the end?

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Solve. Show your work.**

- 5.** In a competition, the ratio of the number of tickets Mark collected to the number of tickets Julia collected is  $4 : 3$ . Julia collected 36 tickets. How many tickets did they collect altogether?

- 6.** The ratio of the number of stamps Calvin has to the number of stamps Roger has is  $7 : 3$ . Roger has 18 stamps. How many stamps do they have altogether?

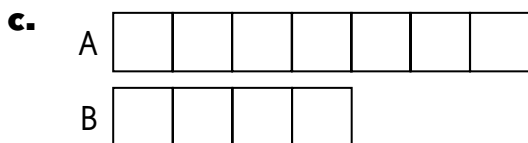
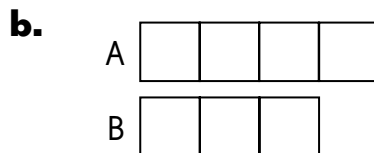
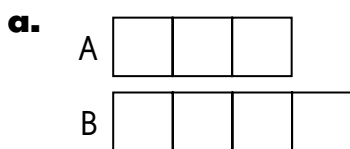
**Solve. Show your work.**

- 7.** On a Saturday, the ratio of the amount of water used by Household A to the amount of water used by Household B was 13 : 5. Household A used 260 gallons of water for that day. Find the total amount of water used by the two households on that Saturday.
- 8.** A cleaning solution and water are mixed in the ratio 4 : 15. The amount of water in the mixture is 1,200 milliliters. What is the total volume of the mixture?

## Practice 4 Ratio in Fraction Form

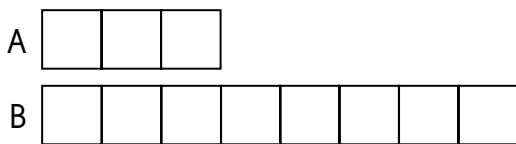
Write your answer in the box.

1. Which model correctly shows that 'A is  $\frac{7}{4}$  times B'?




**Complete.**

The ratio of the lengths of Stick A and Stick B are as shown.



2. The ratio of the length of Stick A to the length of Stick B is  $\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$ .

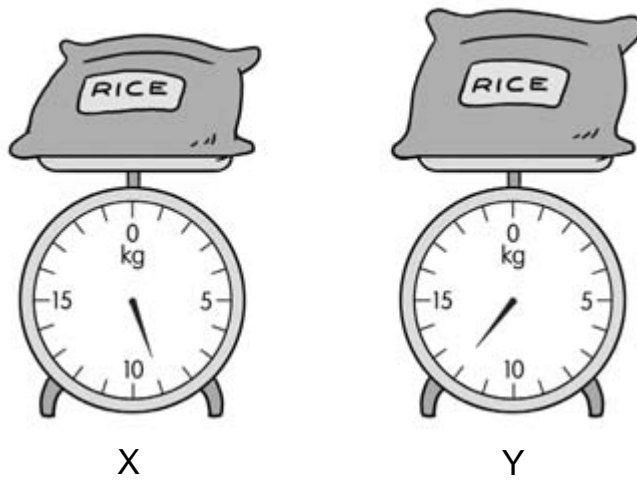
3. The length of Stick A is  $\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$  times the length of Stick B.

4. The ratio of the length of Stick B to the length of Stick A is  $\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$ .

5. The length of Stick B is  $\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$  times the length of Stick A.

**Complete.**

The diagram shows the masses of two bags of rice, X and Y.



6. The mass of Y is  $\frac{\square}{\square}$  times the mass of X.
7. The mass of X is  $\frac{\square}{\square}$  times the mass of Y.
8. The ratio of the mass of X to the total mass of X and Y  
is \_\_\_\_\_ : \_\_\_\_\_.
9. The mass of X is  $\frac{\square}{\square}$  times the total mass of X and Y.
10. The mass of Y is  $\frac{\square}{\square}$  times the total mass of X and Y.



**Solve. Draw a model to help you.**

**12.** Kenny's weight is  $\frac{6}{7}$  times Melvin's weight.

**a.** What is the ratio of Kenny's weight to Melvin's weight? Give your answer in fraction form.

**b.** What is the ratio of Melvin's weight to the total weight of the two boys? Give your answer in fraction form.

**c.** How many times the total weight of the two boys is Kenny's weight?



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Solve.**

**13.** Kimberly is 3 times as old as her sister, Halley.

**a.** Find the ratio of Kimberly's age to Halley's age. Give your answer in fraction form.

**b.** Find the ratio of Halley's age to their total age. Give your answer in fraction form.

**c.** How many times Kimberly's age is Halley's age?

**d.** How many times their total age is Kimberly's age?

**Solve.**

- 14.** In a college library, there are 4 times as many nonfiction books as fiction books.
- a.** Find the ratio of the number of nonfiction books to the number of fiction books. Give your answer in fraction form.
  
  
  
  
  
  
  
  
  
  
  - b.** How many times the number of nonfiction books is the number of fiction books?
  
  
  
  
  
  
  
  
  
  
  - c.** Suppose the number of fiction books is  $\frac{2}{7}$  times the number of nonfiction books. What would be the ratio of the number of nonfiction books to the total number of books? Give your answer in fraction form.

## Practice 5 Comparing Three Quantities

Find the greatest common factor for each set of numbers.

	Set of Numbers	Greatest Common Factor
<i>Example</i>	2, 6 and 8	2
<b>1.</b>	5, 10 and 20	
<b>2.</b>	3, 9 and 15	
<b>3.</b>	6, 24 and 27	

Complete to express each ratio in simplest form.

**4.**  $16 : 12 : 8$

$$\div \frac{\quad}{\quad} \left( \begin{array}{c} \div \frac{\quad}{\quad} \\ \downarrow \end{array} \right) \div \frac{\quad}{\quad}$$

$$= \quad : \quad : \quad$$

**5.**  $21 : 15 : 18$

$$\div \frac{\quad}{\quad} \left( \begin{array}{c} \div \frac{\quad}{\quad} \\ \downarrow \end{array} \right) \div \frac{\quad}{\quad}$$

$$= \quad : \quad : \quad$$

**6.**  $20 : 30 : 45$

$$\div \frac{\quad}{\quad} \left( \begin{array}{c} \div \frac{\quad}{\quad} \\ \downarrow \end{array} \right) \div \frac{\quad}{\quad}$$

$$= \quad : \quad : \quad$$

**7.**  $7 : 21 : 35$

$$\div \frac{\quad}{\quad} \left( \begin{array}{c} \div \frac{\quad}{\quad} \\ \downarrow \end{array} \right) \div \frac{\quad}{\quad}$$

$$= \quad : \quad : \quad$$

Express each ratio in simplest form.

**8.**  $4 : 16 : 18 = \quad : \quad : \quad$

**9.**  $27 : 12 : 21 = \quad : \quad : \quad$

**10.**  $32 : 8 : 20 = \quad : \quad : \quad$

**11.**  $63 : 18 : 27 = \quad : \quad : \quad$

**Complete.**

**12.**

$$\begin{array}{c} 2 : 5 : 7 \\ \times \text{---} \left( \begin{array}{c} \times \text{---} \\ \downarrow \\ \times \text{---} \end{array} \right) \times \text{---} \\ = \text{---} : 15 : \text{---} \end{array}$$

**13.**

$$\begin{array}{c} 3 : 7 : 11 \\ \times \text{---} \left( \begin{array}{c} \times \text{---} \\ \downarrow \\ \times \text{---} \end{array} \right) \times \text{---} \\ = 12 : \text{---} : \text{---} \end{array}$$

**14.**

$$\begin{array}{c} 20 : 15 : 30 \\ \div \text{---} \left( \begin{array}{c} \div \text{---} \\ \downarrow \\ \div \text{---} \end{array} \right) \div \text{---} \\ = \text{---} : \text{---} : 6 \end{array}$$

**15.**

$$\begin{array}{c} 32 : 20 : 28 \\ \div \text{---} \left( \begin{array}{c} \div \text{---} \\ \downarrow \\ \div \text{---} \end{array} \right) \div \text{---} \\ = 8 : \text{---} : \text{---} \end{array}$$

**Complete.**

**16.**  $1 : 2 : 5 = \text{---} : 6 : \text{---}$

**17.**  $7 : 4 : 3 = 28 : \text{---} : \text{---}$

**18.**  $4 : 5 : 9 = \text{---} : 25 : \text{---}$

**19.**  $16 : 14 : 6 = \text{---} : \text{---} : 3$

**20.**  $18 : 24 : 30 = \text{---} : 4 : \text{---}$

**21.**  $35 : 42 : 56 = 5 : \text{---} : \text{---}$

## Practice 6 Real-World Problems: More Ratios

**Solve. Show your work.**

1. For a school fair, Lolita's parents donated 4 bottles of orange juice, 10 bottles of fruit punch and 8 bottles of apple juice. Find the ratio of the number of bottles of orange juice to the number of bottles of fruit punch to the number of bottles of apple juice Lolita's parents donated.
  
2. A company gave a total of \$900 to three charities. Charity A received \$200, Charity B received \$400 and Charity C received the remaining amount. What is the ratio of the amount Charity A received to the amount Charity B received to the amount Charity C received?

**Solve. Show your work.**

- 3.** Ruth cuts a piece of string into three parts. Their lengths are in the ratio  $2 : 3 : 5$ . The longest part is 35 centimeters long. How long is the shortest part?
- 4.** The ages of three brothers, Dave, Randy, and Martin, are in the ratio  $1 : 2 : 3$ . Dave is 7 years old. Find the total age of all three brothers.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Solve. Show your work.**

**5.** The number of dolls that Lisa, Mia, and Nina have are in the ratio 6 : 4 : 7. Nina has 21 dolls.

**a.** How many dolls does Lisa have?

**b.** What is the total number of dolls that the three girls have?

**6.** Amin, Barb, and Curt collected seashells in the ratio of 10 : 12 : 7. Curt collected 98 seashells. How many seashells did they collect together?

**Solve. Show your work.**

- 7.** By the end of a year, Kieran's savings is  $\frac{9}{2}$  of Simon's savings.
- a.** What is the ratio of Kieran's savings to Simon's savings to their total savings?
- b.** How many times the total amount of money saved is Kieran's savings?
- c.** How many times the total amount of money saved is Simon's savings?
- d.** Simon saves \$28 less than Kieran. How much do both of them save altogether?



Name: \_\_\_\_\_

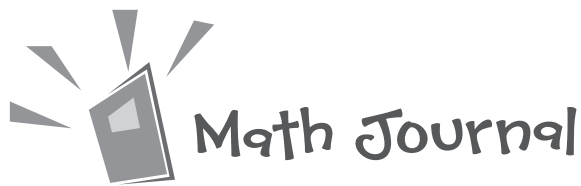
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**Solve. Show your work.**

- 8.** Lita, Kala, and Rose entered a typing competition. Lita typed 2 times as fast as Kala. The ratio of the number of words Kala typed to the number of words Rose typed was 4 : 1. If Rose typed 48 words, how many words did Lita type?

**Solve. Show your work.**

- 9.** Camry's Dairy Factory produces milk in three flavors: vanilla, strawberry, and chocolate. The amount of vanilla-flavored milk they produce in a day is 2 times the amount of chocolate-flavored milk. The amount of chocolate-flavored milk they produce in a day is 3 times the amount of strawberry-flavored milk.
- a.** What is the ratio of the amount of vanilla-flavored milk to the amount of chocolate-flavored milk to the amount of strawberry-flavored milk it produces in a day?
- b.** How many times the total amount of milk produced is the amount of vanilla-flavored milk produced?

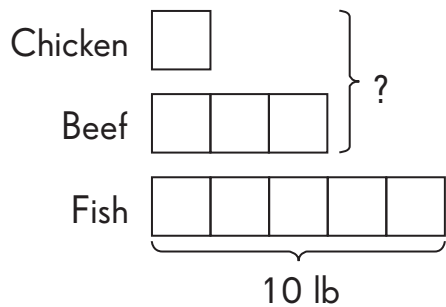


Andy and Clara each drew a model to solve this word problem.

Mr. Marcos bought chicken and beef from the butcher and fish from the fish market for a barbecue. The ratio of the weight of chicken to the weight of beef to the weight of fish he bought was 3 : 1 : 5. He bought 10 pounds of fish. What was the total weight of meat he bought from the butcher?

**Both models however are incorrect. Explain the mistakes that they each made.**

**Andy's model**



Andy's model is incorrect because

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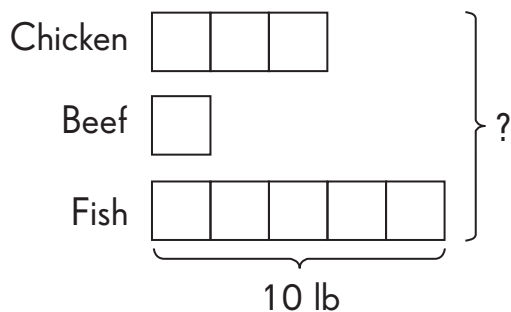


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**Clara's model**



Clara's model is incorrect because

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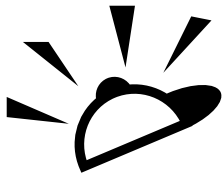


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**Draw the correct model. Then solve the problem.**

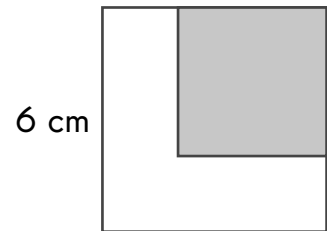


# Put On Your Thinking Cap!



## Challenging Practice

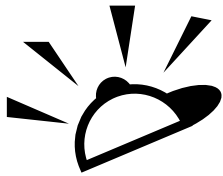
1. A small square of area 16 square centimeters is cut from a larger square with sides that measure 6 centimeters. Find the ratio of the area of the small square to the area of the remaining part of the larger square.



2. The perimeters of two squares are in the ratio 2 : 4. The perimeter of the larger square is 16 centimeters.

a. What is the perimeter of the smaller square?

b. What is the length of one side of the smaller square?



# Put On Your Thinking Cap!



## Problem Solving

### Solve.

- 1.** The ratio of the number of plants Trish bought to the number of plants Sarah bought is 2 : 5. Trish bought 16 plants.
  - a.** What is the total number of plants Trish and Sarah bought altogether?
  
  
  
  
  
  
  
  
  
  
  - b.** If each plant cost \$17, what is the total cost of the plants Trish and Sarah bought?
  
  
  
  
  
  
  
  
  
  
- 2.** The ratio of the number of boys to the number of girls at a town fair is 5 : 8. There are 60 boys at the fair.
  - a.** What is the total number of boys and girls at the fair?
  
  
  
  
  
  
  
  
  
  
  - b.** The admission fee for each child is \$3. Find the total admission fees for the boys and girls.