

Learning Objective: Students will be able to express the relationship between two quantities.

Warm Up

Find the value of each expression in lowest terms.

1. $13 \div \left(\frac{13}{10} \div \frac{6}{5} \right)$

4. $\frac{19}{5} \div 2 \div \frac{2}{7}$

7. $\frac{7}{3} \div \left(\frac{9}{2} \div \frac{2}{3} \right)$

2. $\frac{2}{3} \div \left(\frac{8}{7} \div \frac{13}{7} \right)$

5. $\frac{17}{4} \div \left(\frac{2}{5} \div 2 \right)$

8. $\frac{6}{7} \div \left(\frac{4}{7} \div 1 \right)$

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Warm Up Answers

Find the value of each expression in lowest terms.

$$1. 13 \div \left(\frac{13}{10} \div \frac{6}{5} \right) \\ = 12$$

$$4. \frac{19}{5} \div 2 \div \frac{2}{7} \\ = \frac{133}{20} = 6\frac{13}{20}$$

$$7. \frac{7}{3} \div \left(\frac{9}{2} \div \frac{2}{3} \right) \\ = \frac{28}{81}$$

$$2. \frac{2}{3} \div \left(\frac{8}{7} \div \frac{13}{7} \right) \\ = \frac{13}{12} = 1\frac{1}{12}$$

$$5. \frac{17}{4} \div \left(\frac{2}{5} \div 2 \right) \\ = \frac{85}{4} = 21\frac{1}{4}$$

$$8. \frac{6}{7} \div \left(\frac{4}{7} \div 1 \right) \\ = \frac{3}{2} = 1\frac{1}{2}$$

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Self-Evaluation Scale

Score	Description
4	I can teach other students how to express the relationship between two quantities.
3	I can express the relationship between two quantities.
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November 21, 2016 Lesson 5.1

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There are graphing calculators to protractors.

There are protractors to graphing calculators.

There are compasses to protractors.

There are graphing calculators to compasses.



There are protractors to total objects.

The number of graphing calculators is $\frac{\text{input}}{\text{input}}$ of the total number of objects.

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Work with a partner. You mix different amounts of paint to create new colors. Write a statement that describes the relationship between the amounts of paint shown in each diagram.



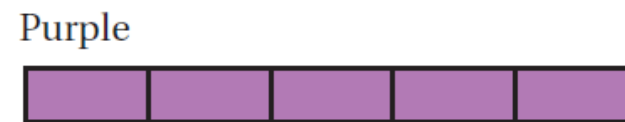
There are  parts blue for every  parts green.



There are  for every .









Key Idea

Ratio

Words A **ratio** is a comparison of two quantities. Ratios can be part-to-part, part-to-whole, or whole-to-part comparisons.

Examples 2 red crayons *to* 6 blue crayons
1 red crayon *for every* 3 blue crayons
3 blue crayons *per* 1 red crayon
3 blue crayons *for each* red crayon
3 blue crayons *out of every* 4 crayons
2 red crayons *out of* 8 crayons

Algebra The ratio of a to b can be written as $a : b$.



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1 Writing Ratios

You have the coins shown.

a. Write the ratio of pennies to quarters.

6 pennies → 6 to 7 ← 7 quarters

••• So, the ratio of pennies to quarters is 6 to 7, or 6 : 7.

b. Write the ratio of quarters to dimes.

7 quarters → 7 to 3 ← 3 dimes

••• So, the ratio of quarters to dimes is 7 to 3, or 7 : 3

c. Write the ratio of dimes to the total number of coins.

3 dimes → 3 to 16 ← 16 coins

••• So, the ratio of dimes to the total number of coins is 3 to 16, or 3 : 16.



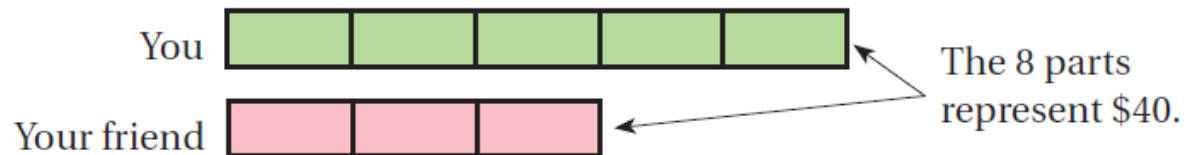
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A *tape diagram* is a diagram that looks like a segment of tape. It shows the relationship between two quantities.

2 Using a Tape Diagram

The ratio of your monthly allowance to your friend's monthly allowance is 5 : 3. The monthly allowances total \$40. How much is each allowance?

To help visualize the problem, express the ratio 5 : 3 using a tape diagram.



Because there are 8 parts, you know that 1 part represents $\$40 \div 8 = \5 .

5 parts represent $\$5 \cdot 5 = \25 .

3 parts represent $\$5 \cdot 3 = \15 .

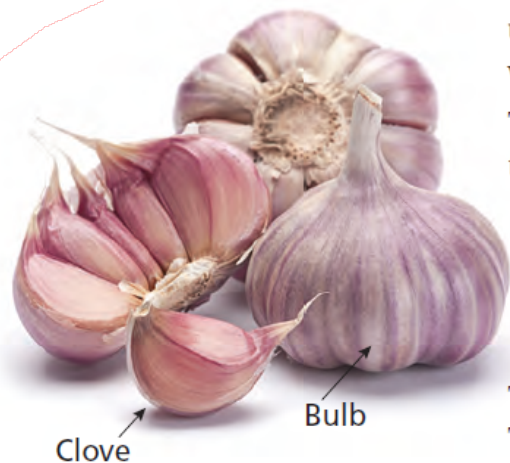
❖ So, your monthly allowance is \$25, and your friend's monthly allowance is \$15.

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3 Using a Tape Diagram

You separate 42 bulbs of garlic into two groups: one for planting and one for cooking. You will plant 3 bulbs for every 4 bulbs that you will use for cooking. Each bulb has about 8 cloves. About how many cloves will you plant?

To help visualize the problem, express the ratio 3 for every 4 using a tape diagram.



Planting

6	6	6
---	---	---

Cooking

6	6	6	6
---	---	---	---

The 7 parts represent 42 bulbs, so each part represents $42 \div 7 = 6$ bulbs.

There are $3 \cdot 6 = 18$ bulbs for planting and $4 \cdot 6 = 24$ bulbs for cooking. The group of 18 bulbs has about $18 \cdot 8 = 144$ cloves.

❖ So, you will plant about 144 cloves.

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Assignment

Complete problems 6, 8, 10, 12, 16, 18, 20, 22, & 24
on pages 194 - 195 in your Big Ideas Text Book.

Assignment Answers

6. 2 to 5, or $2 : 5$; For every 2 frogs, there are 5 turtles.

8. 2 to 6, or $2 : 6$; For every 2 calculators, there are 6 pencils.

10. 3 to 15, or $3 : 15$; 3 out of 15 movies are dramas.

12. 15 to 4, or $15 : 4$; Out of 15 movies, 4 are action.

16. 4 h

18. 21 states

20. 8; The ratio of boys to girls is $5 : 7$, so each part is $48 \div 12 = 4$. So, there are $5 \cdot 4 = 20$ boys and $7 \cdot 4 = 28$ girls.

22. 67.5 in.; *Sample answer:* Using a tape diagram, 2 parts represents 15 inches, so each part is 7.5 inches. There are 9 total parts, which represents 67.5 inches.

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Homework

In your Big Ideas Record and Practice Journal
page 100.