

Name _____ Date _____

Dividing with Fractions

$$\frac{1}{2} \div \frac{1}{4} = \frac{1}{2} \times \frac{4}{1} = \frac{4}{2} = 2$$

Find the quotient.

$$\textcircled{1} \quad \frac{1}{4} \div \frac{1}{8} = 2$$

$$\textcircled{2} \quad \frac{3}{8} \div \frac{1}{4} = \frac{3}{2}$$

$$\textcircled{3} \quad \frac{5}{6} \div \frac{1}{3} = \frac{5}{2}$$

$$\textcircled{4} \quad 5 \div \frac{1}{5} = 25$$

$$\textcircled{5} \quad \frac{1}{4} \div 5 = \frac{1}{20}$$

$$\textcircled{6} \quad -6 \div \frac{1}{3} = -18$$

$$\textcircled{7} \quad -\frac{4}{5} \div -\frac{1}{4} = \frac{16}{5}$$

$$\textcircled{8} \quad \frac{1}{10} \div -10 = -\frac{1}{100}$$

$$\textcircled{9} \quad \frac{1}{7} \div \frac{4}{5} = \frac{5}{28}$$

$$\textcircled{10} \quad -\frac{1}{2} \div \frac{1}{8} = -4$$

$$\textcircled{11} \quad -\frac{5}{24} \div 5 = -\frac{1}{24}$$

$$\textcircled{12} \quad -\frac{1}{3} \div \frac{1}{3} = -1$$

$$\textcircled{13} \quad -\frac{1}{9} \div -\frac{8}{9} = \frac{1}{8}$$

$$\textcircled{14} \quad \frac{1}{10} \div -1,000 = -\frac{1}{10,000}$$

$$\textcircled{15} \quad \frac{3}{10} \div \frac{2}{9} = \frac{27}{20}$$

$$\textcircled{16} \quad \frac{8}{9} \div \frac{2}{7} = \frac{28}{9}$$

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Multiplying and Dividing Fractions by Integers

60

★ To multiply or divide a fraction by an integer, follow the same rules as multiplying two fractions. An integer can be considered to be a fraction with a denominator of 1.

$$\frac{11}{32} \times 4 = \frac{11}{32} \times \frac{4}{1} = \frac{44}{32}$$

$$\frac{44}{32} = -1 \frac{12}{32} = -1 \frac{3}{8}$$

Multiply or divide.

$$① \quad \frac{3}{8} \times 8 = -3$$

$$\frac{5}{7} \times 7 = -5$$

$$\frac{5}{12} \times 9 = -\frac{15}{4}$$

$$② \quad \frac{7}{10} \times 3 = -\frac{21}{10}$$

$$\frac{5}{12} \times 6 = -\frac{5}{2}$$

$$\frac{4}{5} \times 8 = -\frac{32}{5}$$

$$③ \quad \frac{5}{8} \div 3 = -\frac{5}{24}$$

$$\frac{1}{3} \div 8 = -\frac{1}{24}$$

$$\frac{3}{10} \div 7 = -\frac{3}{70}$$

$$④ \quad \frac{4}{9} \div 8 = -\frac{1}{18}$$

$$\frac{9}{12} \div 6 = -\frac{1}{8}$$

$$\frac{7}{8} \div 5 = -\frac{7}{40}$$

$$⑤ \quad \frac{19}{36} \div 3 = -\frac{19}{108}$$

$$\frac{5}{6} \times 4 = \text{scribble} - \frac{10}{3}$$

$$\frac{7}{12} \div 5 = -\frac{7}{60}$$

$$⑥ \quad \frac{2}{9} \div 6 = -\frac{1}{27}$$

$$\frac{5}{8} \times 2 = -\frac{5}{4}$$

$$\frac{6}{7} \div 12 = -\frac{1}{14}$$

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Ratios

56

★ A ratio may be used to compare one set of things to another.

If Mike has 8 books and Michelle has 10 books, we can say the ratio of Mike's books to Michelle's books is 8:10 or 4:5. This ratio may also be written as $\frac{4}{5}$, or 4 to 5.

A ratio may also be used for comparing part of a set to all of it.

Luke has 25 CDs. If he has 8 jazz CDs, the ratio of jazz CDs to his entire collection is 8:25.

Are these ratios equivalent? Write y for yes and n for no.

- ① 3:5 and 6 to 10 7:8 and $\frac{64}{56}$ 1:2 and 8 to 2
- ② 4:7 and 49 to 28 2:3 and $\frac{6}{9}$ 5:6 and 10 to 18
- ③ 6:9 and 2 to 3 40:36 and $\frac{9}{10}$ 12:15 and 5 to 3

The table shows the daily mileage that John and Marian jogged. Use the table to answer questions 4-7.

Day	John	Marian
Monday	5 miles	7 miles
Tuesday	2 miles	3 miles
Wednesday	2½ miles	3½ miles
Thursday	4 miles	6 miles
Friday	1 miles	3 miles

- ④ What is the ratio of miles that John jogged that week compared to Marian's mileage?
 $14.5:22.5$ or $\frac{14.5}{22.5}$ or 14.5 miles to 22.5 miles
- ⑤ What was the ratio of miles Marian ran on Tuesday compared to her mileage for the week?
 $3:22.5$ or $\frac{3}{22.5}$ or 3 miles to 22.5 miles
- ⑥ Why is the ratio of John's mileage compared to Marian's mileage different on Friday than on Tuesday and Thursday?
- ⑦ Explain why the ratio of John's mileage to Marian's mileage is the same on Monday and Wednesday.

Name _____

Ratios

57

- ★ A ratio can also be used to compare one portion to another portion of the same thing.

If Carlos has 5 apples and 7 oranges, the ratio of apples to oranges is 5 to 7.

Remember, the second number in the ratio becomes the denominator when the ratio is expressed as a fraction.

Simplify the following ratios.

- 1 6:10 12 to 15 20:45
- 2 16:8 28 to 42 55:95
- 3 25:60 36 to 81 110:74
- 4 The ratio of boys to girls in a class is 2:3. Explain why this would not be expressed as a ratio of $\frac{2}{3}$.
- 5 If Karen has 15 pencils and 10 pens, how can the ratio of pencils to pens be expressed in simplest terms?

The table shows the food choices in the school cafeteria. Use the table to answer 6–8.

Food	Boys	Girls
Pizza	60	45
Hamburgers	25	30
Chicken	40	30
Tacos	35	50

- 6 What is the ratio of people choosing hamburgers to tacos?
- 7 $55:85$ or $\frac{55}{85}$
What is the ratio of boys surveyed to girls?
- 8 $160:155$ or $\frac{160}{155}$
Why is the ratio of boys choosing pizza compared to girls the same as the ratio shown for chicken?
- 9 The width and length of a rectangle have a ratio of 1:5. If the perimeter of the rectangle is 36 feet, what is the length?

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Proportion Problems

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★ A proportion is an equation stating that two ratios are equal. $\frac{2}{3} = \frac{6}{9}$

To solve a proportion, cross multiply. $\frac{2}{3} = \frac{?}{9}$ $? \times 3 = 2 \times 9$
 $? \times 3 = 18$
 $? = 6$

Solve these proportions.

① $\frac{4}{8} = \frac{?}{10}$

$\frac{?}{15} = \frac{20}{30}$

$\frac{5}{9} = \frac{15}{?}$

$\frac{12}{?} = \frac{16}{24}$

② $\frac{1}{3} = \frac{?}{21}$ 7

$\frac{?}{25} = \frac{4}{5}$ 20

$\frac{1}{10} = \frac{100}{?}$ 1,000

$\frac{36}{?} = \frac{9}{12}$ 48

③ $\frac{5}{6} = \frac{?}{12}$

$\frac{?}{42} = \frac{3}{7}$

$\frac{7}{8} = \frac{35}{?}$

$\frac{50}{?} = \frac{10}{20}$

④ $\frac{2}{3} = \frac{?}{9}$ 6

$\frac{?}{8} = \frac{10}{40}$ 2

$\frac{5}{6} = \frac{25}{?}$ 30

$\frac{9}{?} = \frac{15}{20}$ 12

⑤ $\frac{5}{7} = \frac{?}{28}$

$\frac{?}{80} = \frac{240}{320}$

$\frac{1}{5} = \frac{65}{?}$

$\frac{156}{?} = \frac{25}{125}$

⑥ $\frac{480}{120} = \frac{?}{2}$ 8

$\frac{?}{18} = \frac{40}{30}$ 24

$\frac{7}{4} = \frac{28}{?}$ 16

$\frac{16}{?} = \frac{1}{11}$ 176

⑦ Among visitors to a museum, there is a ratio of 4 children to every 3 adults. If 120 adults visited the museum, how many children visited?

Even

Name _____

Proportion Problems

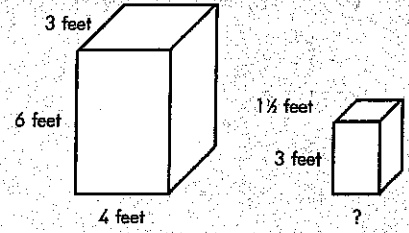
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★ Proportions can be used to solve many different problems, such as scale drawings.

$$\frac{1 \text{ inch}}{5 \text{ feet}} = \frac{3 \text{ inches}}{15 \text{ feet}}$$

If a drawing is created using a scale of 1 inch = 5 feet, then 3 inches on the drawing represents 15 feet.

Proportions can also be used to find the lengths of sides in similar figures. To find the length of the side in the smaller rectangular prism, set up a proportion. The length of the side in the smaller rectangular prism is 2 feet.



$$\frac{6}{3} = \frac{4}{?} \quad 6 \times ? = 3 \times 4 \quad 6 \times ? = 12 \quad ? = 2$$

Solve the following proportion problems.

- 1 If 5 books cost \$35, how much will 15 books cost?
- 2 A bakery sells 20 cookies for \$25. How much will 5 cookies cost? *\$6.25*
- 3 If six students weigh a total of 840 pounds, how much will two students weigh?
- 4 Joanne bought a dozen packages of paper for \$1.50. How much will 48 packages of paper cost? *\$6*
- 5 A store is selling nine rolls of film for \$31.50. How many rolls can you buy for \$52.50?
- 6 Marge rides her bike at an average rate of 3 miles in 10 minutes. How many miles will she bike in 2 hours? *36 miles*
- 7 Bill bought a box of 65 crayons, with 13 different shades of green. If he bought a box of 130 crayons, how many crayons can Bill expect to **not** be a shade of green?
- 8 A 2-pound box of grass seed covers an area of 300 square feet of lawn. How many 1-pound boxes will be needed to cover a 750 square foot lawn? *5 boxes*

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Rates

RATIO AND PROPORTION

Rate: Represents the relationship of two quantities that have different units of measure. A rate is a kind of ratio.

Trip distance = 250 miles

Trip time = 5 hours

$$\frac{250}{5} = \frac{50}{1} \text{ or } 50 \text{ miles per hour}$$

Write the rate in fraction form.

① 1,200 m in 3 days

② \$260 in 20 days

\$13/day

③ 300 flowers planted in 20 days

④ 480 beads for 12 necklaces

40 beads/necklace

⑤ \$810 in 9 hours

⑥ 2,500 fish in 50 tanks

50 fish/tank

⑦ 232 mi. in 16 hrs.

⑧ 258 km in 3 hours

86 km/hr

⑨ 15 yards of fabric for 5 dresses

⑩ \$50 for 2 classes

\$25/class

⑪ 8 mi. in 2 days

⑫ 160 eggs for 40 omelets

4 eggs/omelet

even

Proportions

RATIO AND PROPORTION

Proportion: An equation that sets two ratios equal to each other.

$$\frac{a}{4} = \frac{1}{2}$$

$$\frac{2}{4} = \frac{1}{2}$$

Solve.

$$\textcircled{1} \quad \frac{a}{5} = \frac{8}{10}$$

$$\textcircled{2} \quad \frac{1}{3} = \frac{4}{d} \quad d = 12$$

$$\textcircled{3} \quad \frac{2}{10} = \frac{c}{5}$$

$$\textcircled{4} \quad \frac{24}{80} = \frac{x}{60} \quad x = 18$$

$$\textcircled{5} \quad \frac{1}{b} = \frac{4}{16}$$

$$\textcircled{6} \quad \frac{50}{100} = \frac{10}{d} \quad d = 20$$

$$\textcircled{7} \quad \frac{3}{b} = \frac{6}{16}$$

$$\textcircled{8} \quad \frac{a}{9} = \frac{2}{6} \quad a = 3$$

$$\textcircled{9} \quad \frac{a}{5} = \frac{8}{10}$$

$$\textcircled{10} \quad \frac{6}{24} = \frac{2}{d} \quad d = 8$$

$$\textcircled{11} \quad \frac{20}{x} = \frac{16}{36}$$

$$\textcircled{12} \quad \frac{10}{16} = \frac{x}{56} \quad x = 35$$

$$\textcircled{13} \quad \frac{33}{99} = \frac{21}{x}$$

$$\textcircled{14} \quad \frac{48}{80} = \frac{x}{5} \quad x = 3$$

$$\textcircled{15} \quad \frac{5}{n} = \frac{25}{45}$$