

Geometry

Ch. 7 Handout 7.1

Ratios and Proportions

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Ways to write ratios

1	a to b	Ex: 3 to 4
2	$a:b$	Ex: 3 : 4
3	$a \div b$	Ex: 3 ÷ 4
4	$\frac{a}{b}$	Ex: $\frac{3}{4}$
5		

Watch video

Layer reveal

1. A scale model of a car is 4 in. long. The actual car is 15 ft. long. What is the ratio of the length of the model to the length of the car?

model length to car length
 4 to 180
 1 to 45
 $1:45$
 $\frac{1}{45}$

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2. A photo that is 8 in. wide and $5\frac{1}{3}$ in. high is enlarged to a poster that is 2 ft. wide and $1\frac{1}{3}$ ft. high. What is the ratio of the height of the photo to the height of the poster?

photo: 8 in. wide, $5\frac{1}{3}$ in. high
 poster: 2 ft. wide, $1\frac{1}{3}$ ft. high
 $2(12) = 24$ in.
 $1\frac{1}{3}(12) = 16$ in.
 $\frac{\text{height of photo}}{\text{height of poster}} = \frac{5\frac{1}{3}}{16} = \frac{\frac{16}{3}}{16} = \frac{16}{3} \cdot \frac{1}{16} = \frac{1}{3}$
 $1:3$

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$\frac{a}{b} = \frac{c}{d}$ and $a:b = c:d$ are examples of proportions

$\frac{6}{24} = \frac{4}{16} = \frac{1}{4}$ is an example of an extended proportion

$\frac{a}{b} = \frac{c}{d}$ is equivalent to $ad = bc$

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Properties of Proportions

$$\frac{a}{b} = \frac{c}{d}$$

is equivalent to

(1) $ad = bc$

(2) $\frac{b}{a} = \frac{d}{c}$

(3) $\frac{a}{c} = \frac{b}{d}$

(4) $\frac{a+b}{b} = \frac{c+d}{d}$

3. Complete: If $\frac{a}{4} = \frac{12}{b}$, then $\frac{b}{12} = \frac{4}{a}$

4. Solve each proportion.

a. $\frac{2}{5} = \frac{n}{35}$

$2(35) = 5n$

$70 = 5n$

$n = 14$

b. $\frac{x+1}{3} = \frac{x}{2}$

$2(x+1) = 3x$

$2x+2 = 3x$

$-2x -2x$

$2 = x$

c. $\frac{18}{n+6} = \frac{6}{n}$

$18n = 6(n+6)$

$18n = 6n + 36$

$-6n -6n$

$12n = 36$

$n = 3$

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5. Solve each extended proportion for x and y.

a) $\frac{x}{3} = \frac{x+5}{9} = \frac{2x}{y}$

$\frac{x}{3} = \frac{x+5}{9}$

$9x = 3(x+5)$

$9x = 3x + 15$

$-3x -3x$

$6x = 15$

$x = \frac{15}{6}$

$x = \frac{5}{2}$

b) $\frac{x}{3} = \frac{3}{y} = \frac{y}{27}$

$\frac{x}{3} = \frac{3}{y}$

$\frac{xy}{3} = \frac{9}{y}$

$xy = 9$

$x = \frac{9}{y}$

$x = \frac{9}{3}$

$x = 3$

$y = 3$

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6. A map uses the scale 1 cm = 20 mi. A county is 90 mi wide. How wide is the county on the map?

$$\frac{\text{Distance on map}}{\text{Actual distance}} = \frac{1}{20} = \frac{x}{90}$$

$$\frac{90}{20} = \frac{20x}{20}$$

$$x = \frac{9}{2}$$

wide is county on map = 4.5 cm

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7. If $\frac{x}{y} = \frac{7}{11}$, complete each of the following:

a. $\frac{y}{x} = \frac{?}{?}$

b. $7y = ?$

c. $\frac{x+y}{y} = \frac{?}{11}$

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Assignment:

Day 1: Pgs 368-370 2-20 evens,
21, 25-33, 35-46

Jan 25-8:42 AM