Unit 1: Linear Equations

Day 3: Ratio and Proportion

Today we will...

1. Review definitions for ratio and proportions.

2. Identify and solve ratios and proportions.

Ratio: A comparison of two quantities measured in the same unit.

Examples: $\frac{3}{8}$ $2:5$ $2:3:5$

Proportional: Two ratios are proportional if one is a multiple of another.

Examples: $\frac{1}{5} \overset{\times 3}{=} \frac{3}{15}$ $2:7 \overset{\times 5}{=} 10:35$ $3:4:5 \overset{\times 3}{=} 9:12:15$

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1. State whether the ratios are proportional. Give reasons to support your answers.

a) $\frac{11}{12}, \frac{18}{27}$

No, Not multiples

b) $\frac{6}{102}, \frac{1}{17} \overset{\times 6}{\underset{\times 6}{\,}} \frac{6}{102}$

yes, multiple of 6

c) $11:8, 22:16$ $\overset{\times 2 \times 2}{\,}$

yes, multiply by 2

To solve a proportion, you need to find the value of the variable. You can cross-multiply, and solve.

2. Solve each proportion.

a) $\frac{a}{7} = \frac{18}{42}$

$\frac{126}{42} = \frac{42a}{42}$

$3 = a$

b) $\frac{2}{18} = \frac{b}{6}$

$\frac{12}{18} = \frac{18b}{18}$

$0.7 = b$

c) $\frac{2}{14} = \frac{1}{k}$

$=$

$= 7$

If the proportion is in ratio form, first write each ratio as a fraction and then solve.

3. Solve each proportion. For a triple ratio, write as fractions and then solve one proportion at a time.

a) $u:12 = 25:10$

$\frac{u}{12} = \frac{25}{10}$

$12 \times 25 = 10u$

$300 = 10u$

$\frac{300}{10} = \frac{10u}{10}$

$30 = u$

b) $5:d = 4:6$

$\frac{5}{d} = \frac{4}{6}$

$30 = 4d$

$\frac{30}{4} = \frac{4d}{4}$

$7.5 = d$

c) $6:8:x = y:2:4$

$\frac{6}{8} = \frac{y}{2}$

$8y = 12$

$\frac{8y}{8} = \frac{12}{8}$

$y = 1.5$

$\frac{8}{x} = \frac{2}{4}$

$2x = 32$

$\frac{2x}{2} = \frac{32}{2}$

$x = 16$

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Solving Proportions (Try these on your own.)

1. Solve the following.

a) $\dfrac{3}{5} = \dfrac{x}{20}$

b) $\dfrac{x}{3} = \dfrac{5}{6}$

c) $h:25 = 4:10$

d) $4:3:1 = 10:y:z$

To solve a word problem, write the information in a ratio using a variable for the unknown quantity. Then solve!

2. 2 cups of uncooked Kraft Dinner noodles yields 3 cups of cooked Kraft Dinner noodles. How many cups of uncooked noodles are needed to make 36 cups of cooked noodles?

2 cups of uncooked = 3 cups cooked

$$2 : 3$$

$$\frac{2 \text{ uncooked}}{3 \text{ cooked}} = \frac{x \text{ uncooked}}{36 \text{ cooked}}$$

$$\frac{2}{3} = \frac{x}{36}$$

$$\frac{3x}{3} = \frac{72}{3}$$

$$x = 24$$

∴ we need 24 cups of uncooked noodles to make 36 cups of cooked noodles

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Practice Work:

p. 4 #3, 4

+ Handout