

7-1, 7-2: Ratios and Proportions; Similar Polygons

Date _____

Ratio: Comparison of 2 numbers.Written as: $\frac{a}{b}$ or $a \div b$ or $a : b$ **Equivalent Ratios:** Ratios which have different forms but are equal in value

Example: $\frac{1}{3} = \frac{2}{6} = \frac{8}{24} = \frac{x}{3x}$ *Multiply or divide both numbers by an equal amount to produce an equivalent ratio

Simplest form $\left(\frac{1}{3}\right)$ - fraction reduced to lowest terms

Example: Sides of a triangle are in the ratio of 3:4:5. Perimeter of the $\Delta = 72$. Find the length of each side.

Let $3x = 1^{\text{st}}$ side; $4x = 2^{\text{nd}}$ side; $5x = 3^{\text{rd}}$ side

Equation:

Example: Out of 1000 households surveyed, 460 had at least one dog or cat as a pet. What is the ratio of pet owners to households?

Proportion: Equation where 2 ratios are equal:

$$\frac{3}{5} = \frac{9}{15}$$

or

$$\begin{array}{c} \text{extremes} \\ \swarrow \quad \searrow \\ 3:5 = 9:15 \\ \nwarrow \quad \nearrow \\ \text{Means} \end{array}$$

The product of the **means** (5 x 9) equals the product of the **extremes** (3 x 15)
(cross-products are equal)

Cross Multiply to determine if 2 ratios form a proportion:

$$5 \times 9 = 3 \times 15 \quad \text{or} \quad 45 = 45 \quad (\text{Yes, it is a proportion!})$$

Example: Do $\frac{4}{16}$ and $\frac{5}{24}$ form a proportion?

Cross multiply to solve a proportion:

Examples:

a) $\frac{4}{x} = \frac{12}{60}$

b) $\frac{3x+3}{2} = \frac{7x-1}{5}$

c) $\frac{x}{2} = \frac{x-2}{x+6}$