

Proportion: an equation stating two rates or ratios are equal $\frac{8}{4} = \frac{2}{1}$

Cross Product (heart method). method used for solving proportions If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Ex. 1 Solve each proportion.

A) $\frac{7}{14} = \frac{x}{12}$

$$\frac{7}{14} = \frac{x}{12}$$

$$12 \cdot 7 = 14x$$

$$\frac{84}{14} = \frac{14x}{14}$$

$$6 = x \quad [x = 6]$$

B) $\frac{16}{y} = \frac{4.8}{1.5}$

$$\frac{16}{y} = \frac{4.8}{1.5}$$

$$1.5 \cdot 16 = 4.8y$$

$$\frac{24}{4.8} = \frac{4.8y}{4.8}$$

$$5 = y \quad [y = 5]$$

C) $\frac{31}{x} = \frac{4}{3}$

$$\frac{31}{x} = \frac{4}{3}$$

$$3 \cdot 31 = 4x$$

$$\frac{93}{4} = \frac{4x}{4}$$

$$23.25 = x$$

$$[x = 23.25]$$

Note:
Cannot cross
cancel across
the equal sign!

Ex. 2 Assume all situations are proportional.

A) Olivia mixed 5oz of red paint with 3oz of green paint. She decided to make 16oz of the same mixture. Write and solve a proportion to find the number of ounces of red paint Olivia will need for the new mixture.

Original mixture: $\frac{5 \text{oz Red}}{3 \text{oz Green}} = \frac{8 \text{oz total}}$

Rate for red paint: 5oz of red per 8oz mixture

$$\frac{\text{Red } 5 \text{oz}}{\text{total } 8 \text{oz}} = \frac{x \text{oz}}{16 \text{oz}}$$

$$\frac{5}{8} = \frac{x}{16}$$

$$16 \cdot 5 = 8x$$

$$\frac{80}{8} = \frac{8x}{8}$$

$$10 = x$$

Olivia will need 10 ounces of red paint.

*Means rates or ratios are equal.

B) Haley bought 4 pounds of tomatoes for \$11.96. How much would she pay for 6 lbs? 10 lbs? *Money always goes in numerator

$$\frac{\$11.96}{4 \text{ lbs}} = \frac{x}{6 \text{ lbs}}$$

$$6 \cdot 11.96 = 4x$$

$$\frac{71.76}{4} = \frac{4x}{4}$$

$$17.94 = x$$

\$17.94 for 6 lbs.

$$\frac{\$11.96}{4 \text{ lbs}} = \frac{x}{10 \text{ lbs}}$$

$$10 \cdot 11.96 = 4x$$

$$\frac{119.6}{4} = \frac{4x}{4}$$

$$29.90 = x$$

\$29.90 for 10 lbs.