

Lesson #53 - Solving Proportions Algebraically

Do Now: Solve the following proportions.

a) $\frac{3 \cdot 2}{4 \cdot 2} = \frac{x}{8}$

$x = 6$

b) $\frac{x}{6} = \frac{15 \div 3}{18 \div 3}$

$x = 5$

c) $\frac{2 \cdot 3}{7 \cdot 3} = \frac{6}{y}$

$y = 21$

When asked to solve algebraically, each problem must be set up this way:

- Cross multiply
(write = sign)
- Use the division property of equality
(divide both sides by coefficient)
- Write final answer.

step 1: $4x = 24$

step 2: $\frac{4x}{4} = \frac{24}{4}$

step 3: $x = 6$

Example 1

$$\frac{x}{6} = \frac{15}{18}$$

$$\frac{18x}{18} = \frac{90}{18}$$

$$\boxed{x = 5}$$

Example 2

$$\frac{2}{7} = \frac{6}{y}$$

$$\frac{2y}{2} = \frac{42}{2}$$

$$\boxed{y = 21}$$

Directions: Solve each proportion algebraically. Be sure to set it up the correct way and show all work.

$$1) \frac{4}{9} = \frac{10}{x}$$

$$\frac{4x}{4} = \frac{90}{4}$$

$$x = 22.5$$

$$2) \frac{5}{2} = \frac{6}{x}$$

$$\frac{5x}{5} = \frac{12}{5}$$

$$x = 2.4$$

$$3) \frac{5}{2} = \frac{2}{x}$$

$$\frac{5x}{5} = \frac{4}{5}$$

$$x = .8 \text{ or } x = \frac{4}{5}$$

$$4) \frac{21}{27} = \frac{x}{18}$$

$$\frac{27x}{27} = \frac{378}{27}$$

$$x = 14$$

$$5) \frac{15}{21} = \frac{20}{y}$$

$$\frac{15y}{15} = \frac{420}{15}$$

$$y = 28$$

$$6) \frac{26}{b} = \frac{39}{9}$$

$$\frac{39b}{39} = \frac{234}{39}$$

$$b = 6$$

$$7) \frac{h}{108} = \frac{7}{18}$$

$$\frac{18h}{18} = \frac{756}{18}$$

$$h = 42$$

$$8) \frac{45}{792} = \frac{70}{w}$$

$$\frac{45w}{45} = \frac{55440}{45}$$

$$w = 1232$$

$$9) \frac{16}{120} = \frac{j}{15}$$

$$\frac{120j}{120} = \frac{240}{120}$$

$$j = 2$$

$$10) \frac{9.3}{6} = \frac{x}{24}$$

$$\frac{6x}{6} = \frac{223.2}{6}$$

$$x = 37.2$$

$$11) \frac{14.6}{10} = \frac{x}{15}$$

$$\frac{10x}{10} = \frac{219}{10}$$

$$x = 21.9$$

$$12) \frac{12}{x} = \frac{4}{16}$$

$$\frac{4x}{4} = \frac{192}{4}$$

$$x = 48$$