Objective: Use proportional reasoning to solve problems.

Concept

Carol made 24 sugar cookies and 18 chocolate chip cookies. If Carol wanted 60% of the cookies to be chocolate chip, how many more chocolate chip cookies would she have to make?

In order to answer this question, we must realize that if Carol makes more chocolate chip cookies there will also be a larger total number of cookies.

let c = the additional chocolate chip cookies Carol needs to make

$$\frac{\text{number of chocolate chip}}{\text{total number of cookies}} = \frac{18+c \text{ chocolate chip}}{(42+c) \text{ cookies}}$$

$$= \frac{18+c}{42+c} = 0.60 \text{ (the new percentage of chocolate chip expressed as a decimal)}$$

Solving this equation for c will tell us how many more chocolate chip cookies Carol needs to make so that 60% of the cookies are chocolate chip.

Objective: Use proportional reasoning to solve problems.

Ex) There are 120 men and 160 women registered to attend a conference. Assuming no more women register for the conference, how many more men need to register for the conference to make the percentage of men attending the conference 55%?

let m = additional men

$$\frac{\text{men}}{\text{total of all people}} \rightarrow \frac{120+m}{160+120+m} = 0.55$$

(160 = women, 120 + m = men)

solve. $\frac{120+m}{280+m} = 0.55$

LCD = $(280+m)$

$$\frac{120+m}{280+m} \cdot \frac{(280+m)}{1} = 0.55(280+m)$$

$$120+m = 154 + 0.55m$$
$$-120 \quad -0.55m \quad -120 \quad -0.55m$$

$$\frac{0.45m}{0.45} = \frac{34}{0.45}$$

$m = 75.555\ldots \approx 76$ men

Seventy-six additional men need to register for the conference so that 55% are men.

Objective: Use proportional reasoning to solve problems.

Ex) A save percentage in lacrosse is found by dividing the number of saves by the number of shots faced. A lacrosse goalie saved 9 of 12 shots. How many additional consecutive saves must the goalie make to raise his save percentage to 0.850?

Save percentage = $\frac{\text{number of saves}}{\text{shots faced}}$

let s = additional consecutive saves

saves / shots faced / total $\Rightarrow \frac{9+s}{12+s} = 0.850$

LCD = (12+s)

$\frac{9+s}{12+s} \cdot (12+s) = 0.850(12+s)$

The goalie must make 8 additional consecutive saves to raise his save percentage to 0.850.

$9+s = 10.2+0.850s$

$-9 \quad -.850s \qquad -9 \quad -0.850s$

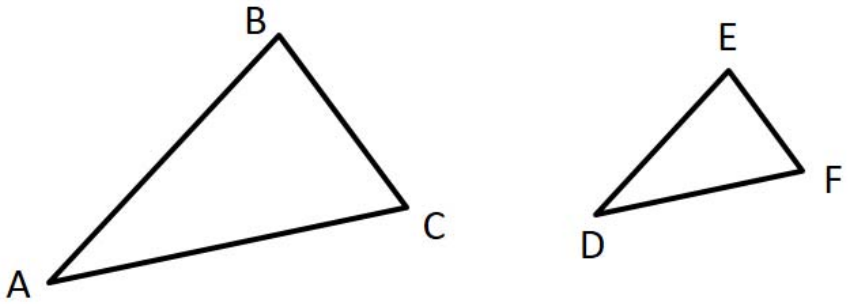
$\frac{0.15s}{0.15} = \frac{1.2}{0.15} \rightarrow s = 8$

Objective: Use proportional reasoning to solve problems.

Concept

Similar Triangles Have Proportional Sides

Given $\Delta ABC \sim \Delta DEF$

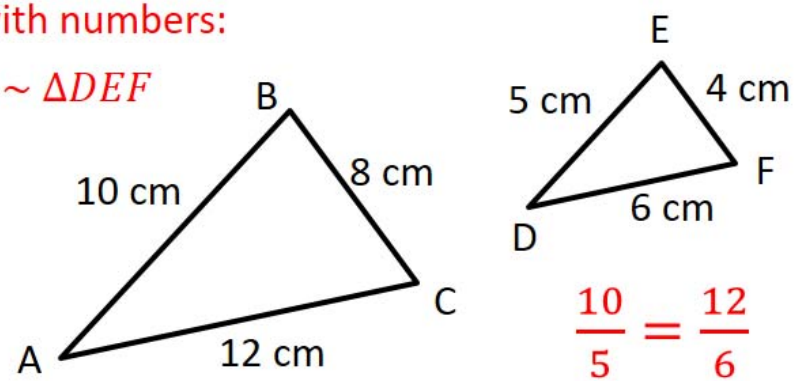


The ratios of corresponding sides of similar triangles are proportional.

For example: $\frac{AB}{DE} = \frac{AC}{DF}$ or $\frac{AB}{AC} = \frac{DE}{DF}$

An example with numbers:

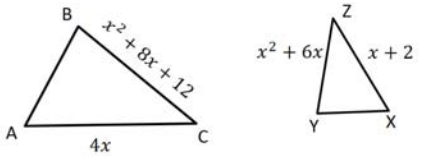
Given $\Delta ABC \sim \Delta DEF$



$\frac{10}{5} = \frac{12}{6}$ or $\frac{10}{12} = \frac{5}{6}$

Objective: Use proportional reasoning to solve problems.

Ex) Given $\Delta ABC \sim \Delta XYZ$, find the length of $\overline{YZ}$.



① $\frac{BC}{YZ} = \frac{AC}{XZ}$

$\frac{(x+6)(x+2)}{x^2+6x} = \frac{4x}{x+2}$

$\frac{x^2+8x+12}{x(x+6)} = \frac{4x}{x+2}$

② $YZ = x^2 + 6x$

$x = \frac{-2}{3}$ $\quad$ $x = 2$

$\left(\frac{-2}{3}\right)^2 + 6\left(\frac{-2}{3}\right)$ $\quad$ $(2)^2 + 6(2)$

$\frac{4}{9} - 4$ $\quad$ $4 + 12$

neg $\quad$ 16

$YZ = 16$ units

$\frac{x+2}{x} = \frac{4x}{x+2}$ $\quad$ LCD $= x(x+2)$

$\frac{x+2}{x} \cdot \frac{x(x+2)}{1} = \frac{4x}{x+2} \cdot \frac{x(x+2)}{1}$

$x^2 + 4x + 4 = 4x^2$

$-4x^2 \qquad -4x^2$

$-1 \cdot (-3x^2 + 4x + 4 = 0)$

$3x^2 - 4x - 4 = 0$

$(3x + 2)(x - 2) = 0$

$3x + 2 = 0 \quad x - 2 = 0$

$x = \frac{-2}{3} \quad x = 2$