

Lesson 1.6 Notes (Solve Proportional Relationships)

- **Proportion** – an equation stating that two ratios or rates are equivalent
- We can check if two ratios are equivalent by using **cross products**.
 - The cross products of any proportion are equal.

Proportion

$$\frac{a}{b} = \frac{c}{d}$$

How to Cross Multiply

$$\frac{1}{2} \rightarrow \frac{2}{4} \rightarrow 1 \times 4 = 2 \times 2$$

$$\frac{2}{4} \rightarrow \frac{4}{4} \rightarrow 4 = 4$$

$$\frac{12}{x} = \frac{30}{75}$$

$$30 \cdot x = 12 \cdot 75$$

$$30x = 900$$

$$x = 30$$

- **To Solve a Proportion → Use Cross Multiplication**

Practice:

1. After 2 hours, the air temperature had risen 7°. Write and solve a proportion to find how much longer it will take for the temperature to rise an additional 13 degrees.

$$\frac{7^\circ \text{F}}{2 \text{ hr}} = \frac{13^\circ \text{F}}{x \text{ hr}} \Rightarrow 7x = 2(13)$$

$$7x = 26 \Rightarrow x = \boxed{3.7 \text{ hours}}$$

2. $\frac{x}{4} = \frac{9}{10}$

$$10x = 4(9)$$

$$\frac{10x}{10} = \frac{36}{10} \Rightarrow x = \boxed{3.6}$$

3. $\frac{7}{3} = \frac{n}{21}$

$$7(21) = 3n$$

$$\frac{147}{3} = \frac{3n}{3} \Rightarrow \boxed{49} = n$$

4. If the ratio of type O to non-type O donors at a blood drive was 37:43, how many donors would be type O out of 300 donors? $37 + 43 = 80 \text{ total}$

$$\frac{37 \text{ type O}}{80 \text{ total}} = \frac{x \text{ type O}}{300 \text{ total}}$$

$$300(37) = 80x$$

$$\frac{11,100}{80} = \frac{80x}{80} \Rightarrow x = 138.75$$

About 139 Donors

5. For every 17 male students in a soccer league, there are 23 female students. If there are 200 students in all, how many are male?

$$17 + 23 = 40 \text{ total}$$

$$\frac{17 \text{ male}}{40 \text{ total}} = \frac{x \text{ male}}{200 \text{ total}}$$

$$200(17) = 40x$$

$$\frac{3400}{40} = \frac{40x}{40} \Rightarrow x = \boxed{85 \text{ male students}}$$