

# Ratios & Proportions

- ratio  $\rightarrow$  comparison of quantities by division

- write  $\frac{a}{b}$ , "a to b", "a:b" (always simplified!)

- adding "a" + "b" gives total number of "parts"

- when writing ratio of measurements, make sure units are same

EX  $\rightarrow$  12 ft, 3 yds  $\longrightarrow$  9 ft  $\Rightarrow$  12 ft, 9 ft  $\Rightarrow \frac{12}{9} = \frac{4}{3}$

$\downarrow$   
4 yds, 3 yds  $\Rightarrow \frac{4}{3}$

- extended ratio  $\rightarrow$  3 or more #'s

$\hookrightarrow$  a:b:c (can separate into smaller ratios  $\rightarrow$  a:b, a:c, b:c)

EX → Two complementary angles are in the ratio of 5:13. What is the measure of the smallest angle?

$$5+13=18$$

$$\frac{90}{18} = 5$$

$$5 \cdot 5 = \boxed{25^\circ}$$

$$5 \cdot 13 = 65^\circ$$

EX → Angles in a triangle are in the ratio of 2:3:4. What is the measure of each angle?

$$2+3+4=9$$

$$\frac{180}{9} = 20$$

$$20 \cdot 2 = \boxed{40^\circ}$$

$$20 \cdot 3 = \boxed{60^\circ}$$

$$20 \cdot 4 = \boxed{80^\circ}$$

EX → John Calipari has a W-L ratio of  $\overset{W}{5}:\overset{L}{1}$ . If he coached 540 games, how many wins does he have?

$$5 + 1 = 6$$

$$\frac{540}{6} = 90$$

$$90 \cdot 5 = 450 \text{ wins}$$

EX → A salsa recipe calls for 4 cups of tomatoes, 1 cup of onions, 1 cup of green peppers. Jimmy is wanting to make 36 total cups of salsa. How many cups of each ingredient does he need?

$$4 + 1 + 1 = 6$$

$$\frac{36}{6} = 6$$

$$\begin{array}{l} 6 \cdot 4 = 24 \text{ cups tomatoes} \\ 6 \cdot 1 = 6 \text{ cups onions} \\ 6 \cdot 1 = 6 \text{ cups peppers} \end{array}$$

- Proportions  $\rightarrow$  2 equal ratios  $\left(\frac{a}{b} = \frac{c}{d}\right)$

- To solve a proportion, cross-multiply

EX1  $\rightarrow \frac{9}{2} \times \frac{a}{14}$

$$2a = 9 \cdot 14$$

$$\frac{2a}{2} = \frac{126}{2}$$

$$a = 63$$

EX  $\rightarrow \frac{15}{m+1} \times \frac{4}{m}$

$$15 \cdot m = 4(m+1)$$

$$15m = 4m + 4$$

$$-4m \quad -4m$$

$$\frac{11m}{11} = \frac{4}{11}$$

$$m = \frac{4}{11}$$

## - Setting Up Proportions

$$1) \frac{a}{b} = \frac{c}{d} \Rightarrow \frac{b}{a} = \frac{d}{c}$$

$$2) \frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a}{c} = \frac{b}{d} \quad (\text{Comparing same "parts"})$$

$$\underline{\text{EX}} \rightarrow \frac{8 \text{ apples}}{9 \text{ oranges}} = \frac{80 \text{ apples}}{90 \text{ oranges}} \Rightarrow \frac{8 \text{ apples}}{80 \text{ apples}} = \frac{9 \text{ oranges}}{90 \text{ oranges}}$$

HW: p. 436 → 10-38 even