

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 \rightarrow 9 ft 12 ft : 9 ft $\Rightarrow \frac{12}{9} = \frac{4}{3}$
- \downarrow
4 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 → 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?

$$5+1=6 \Rightarrow \frac{540}{6} = 90$$

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

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?

$$4+1+1=6 \Rightarrow \frac{36}{6} = 6$$

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

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

$a:b=c:d$
means
extremes

- To solve a proportion, cross-multiply

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

$$2a = 9 \cdot 14$$

$$2a = 126$$

$$a = 63$$

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

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

$$\cancel{4}m + 4 = 15m$$
$$-4m \qquad -4m$$

$$4 = 11m$$

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

- Setting Up Proportions

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

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

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

$$3) \frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a+b}{b} = \frac{c+d}{d}$$

$$\underline{\text{EX}} \rightarrow \frac{3}{4} = \frac{30}{40} \Rightarrow \frac{3+4}{4} = \frac{30+40}{40}$$

$$\frac{7}{4} = \frac{70}{40}$$

HW: p. 436 → 10-44 even