

2.6B Ratios and Proportions

Variables in the Denominator

Ex. 1: Solve $\frac{15 \cdot 8}{x} = \frac{6 \cdot 15x}{15}$

$$\frac{120}{6} = \frac{6x}{6}$$

Ex. 2: Solve $\frac{30 \cdot 4}{a} = \frac{24 \cdot 30a}{30}$

$$\frac{120}{24} = \frac{24a}{24}$$

$$x = 20$$

Ex. 3: $\frac{m-6}{m} \cdot \frac{3}{m-6} = \frac{2}{m-6} \cdot \frac{m-6}{m}$

$$\begin{aligned} 3(m-6) &= 2m \\ 3m - 18 &= 2m \\ -3m &\quad -3m \\ -18 &= -1m \\ -1 &\quad -1 \end{aligned}$$

$$m = 18$$

Ex. 5: $\frac{4 \cdot 20 \cdot x}{1 \cdot 5} = \frac{x-6}{4} \cdot \frac{20 \cdot 5}{1}$

$$\begin{aligned} 4x &= 5(x-6) \\ 4x &= 5x - 30 \\ -5x &\quad -5x \\ -1x &= -30 \\ -1 &\quad -1 \end{aligned}$$

$$x = 30$$

$$a = 5$$

Ex. 4: $\frac{9a-2}{8} \cdot \frac{1}{8} = \frac{a}{9a-2} \cdot \frac{9a-2}{8}$

$$\begin{aligned} 9a-2 &= 8a \\ -9a &\quad -9a \\ -2 &= -1a \\ -1 &\quad -1 \end{aligned}$$

$$a = 2$$

Ex. 6: $\frac{w-10}{4+2w} \cdot \frac{6}{w-10} = \frac{-2}{w-10} \cdot \frac{w-10}{4+2w}$

$$\begin{aligned} 6(w-10) &= -2(4+2w) \\ 6w - 60 &= -8 - 4w \\ +4w &\quad +4w \\ 10w - 60 &= -8 \\ +60 &\quad +60 \end{aligned}$$

$$w = \frac{10w = 52}{10} = \frac{52}{10}$$

$$w = \frac{26}{5}$$

Ex. 7: Each day, the seals at an aquarium are each fed 8 pounds of food for every 100 pounds of their body weight. A seal at the aquarium weighs 280 pounds. How much food should the seal be fed per day?

Step 1: Set up the proportion.

$$\frac{8}{100} = \frac{f}{280}$$

Step 2: Solve the proportion.

Scale: a scale model or scale drawing relates the dimensions and the actual dimensions.

Ex. Maps- 1 inch : 150 miles.

Ex. 8: The ship model kits sold at a hobby store have a scale of 1 ft.: 600 ft. A completed model of the *Queen Elizabeth II* is 1.6 feet long. Estimate the actual length of the *Queen Elizabeth II*.

Step 1: Set up the proportion.

$$\frac{600x}{1} \cdot \frac{1}{600} = \frac{1.6}{x} \cdot \frac{600x}{1}$$

Step 2: Solve the proportion.

Homework: