

Proportional Reasoning

same units

different units

A proportion is a relationship that says two **ratios** or two **rates** are equal.

Examples:

$$\frac{1}{2} = \frac{4}{8}$$

could assume
a ratio (same units)

$$\frac{2 \text{ km}}{3 \text{ h}} = \frac{6 \text{ km}}{9 \text{ h}}$$

rate (different units)

Example 1

Solve each proportion statement:

a) $\frac{x}{3} = \frac{8}{6}$ Cross multiply

$$6x = 8 \cdot 3$$

$$\frac{6x}{6} = \frac{24}{6} \quad \text{Solve the linear equation}$$

$$x = 4$$

b) $\frac{10}{x} = \frac{6}{9}$ Cross multiply

$$10 \cdot 9 = 6x$$

$$\frac{90}{6} = \frac{6x}{6} \quad \text{Solve the linear equation}$$

$$15 = x$$

Example 2

There are **72 players** on **8 baseball teams**. Determine the **number of players** on **2 teams**.

Set up a proportion statement to solve.

$$\left(\frac{\text{number of players}}{\text{number of teams}} \right)$$

$$\frac{n}{2} = \frac{72}{8}$$

$$n = \frac{72 \cdot 2}{8}$$

$$n = \frac{144}{8}$$

$$n = 18$$

// If unknown is in numerator
you can really do half
the cross multiplication. //

There are 18 players
on 2 teams.

Outcome:

N5 - Solve problems that involve ratios, rates, and proportional reasoning

Example 3

Electricity costs 11.58 cents for 2 kWh. How much does 30 kWh cost? Round to the nearest cent.

$$\left(\frac{\text{cost}(\text{\$})}{\text{kWh}} \right) \quad \frac{c}{30} = \frac{11.58}{2}$$

$$c = \frac{11.58 \cdot 30}{2}$$

$$c = \frac{347.40}{2}$$

$$c = 173.7$$

$$\rightarrow c = 174 \text{ \text{\$}}$$

30 kWh will cost 174 \text{\\$}
OR \underline{\underline{\\$1.74}}

Example 4

A farmer can plant three potato plants per 0.5 m². How many potato plants can she plant in an area of 85 m²?

$$\left(\frac{\text{potato plants}}{\text{area (m}^2\text{)}} \right) \quad \frac{p}{85} = \frac{3}{0.5}$$

$$p = \frac{3 \cdot 85}{0.5}$$

$$p = \frac{255}{0.5}$$

$$p = 510$$

What happened ???

$$255 \div 0.5 = 255 \div \frac{1}{2}$$

$$= 255 \cdot \frac{2}{1}$$

$$= 510$$

weird!
Bigger value!

She can plant 510 potato plants.



Practice the following:

Page 67 #8, 9, 10, 11, 12, 14

Challenge Yourself!!! Page 68 #15, 19, 20

Outcome:

N5 - Solve problems that involve ratios, rates, and proportional reasoning