

Ma8 Sec 5.8 – Solving Ratio Problems

1. Proportion

A proportion is a comparison that says that two ratios or two rates are equal. When we do not know one of the terms of a ratio, a variable is often used to represent this unknown value or number.

$$\frac{40}{8} = \frac{x}{2}$$

2. Solving a Proportion

To solve a proportion, we can use equivalent ratios/fractions and cross multiply.

a) $\frac{24}{x} = \frac{3}{5}$

$$3x = 24(5)$$

$$3x = 120$$

$$x = 40$$

b) $\frac{16}{14} = \frac{9}{n}$

$$16n = 14(9)$$

$$16n = 126$$

$$n = 7.9$$

c) $15:42 = 20:w$

$$\frac{15}{42} = \frac{20}{w}$$

$$15w = 42(20)$$

$$w = 56$$

Practice

Identify the missing number to make an equivalent fraction.

a) $\frac{3}{4} = \frac{n}{12}$

$$\times 3$$

$$\text{So } 3 \times 3 = 9$$

$$n = 9$$

b) $\frac{2}{x} = \frac{10}{15}$

$$\times 5$$

$$5x = 15$$

$$x = 3$$

c) $\frac{x}{6} = \frac{25}{30} = \frac{y}{72}$

$$\times 5$$

$$5x = 25$$

$$x = 5$$

$$\frac{25}{30} = \frac{y}{72}$$

$$72(25) = 30y$$

$$1800 = 30y$$

$$60 = y$$

Solving Problems using Proportional Reasoning

You can solve proportional reasoning problems using a proportion.

Examples

- 1) Ms. Lo is making apple pie. The recipe calls for 500 mL of flour and 200 mL of butter. Ms. Lo only has 150 mL of butter. How much flour should she use?

$$\frac{\text{flour}}{\text{butter}} = \frac{500}{200} = \frac{x}{150}$$
$$150(500) = 200x$$
$$\underline{\underline{375 = x}}$$

Alternatively,

$$\frac{200}{500} = 0.4 = 40\%$$

$$\text{So } \frac{150}{x} = \frac{40}{100} \quad x = \underline{\underline{375 \text{ ml}}}$$



- 2) In a photo of a father and his daughter, the father's height is 8 cm and the daughter's height is 6 cm. The father's actual height is 1.6 m. What is the daughter's actual height?

father : daughter

$$8 : 6$$

$$160 : x$$

$$\text{So } \frac{8}{160} = \frac{6}{x} \quad \text{OR} \quad \frac{8}{6} = \frac{160}{x}$$

Cross multiply $x = \underline{\underline{120 \text{ cm}}}$

- 3) The ratio of people in Ms. Lo's class who have had the MMR (German measles) vaccine is 3:2. If there are 600 students at the school, how many people have had the vaccine if the ratio is proportional to the whole school?

$$3 : 2$$

$$\frac{3}{2} = \frac{600}{x}$$

$$600 : x$$

$$x = \underline{\underline{400 \text{ people}}}$$

∴ 400 people do not have the vaccine