

Unit 7: Ratios, Rates, & Proportions**7.3 Proportional Reasoning**

Proportion: a relationship that says two ratios or two rates are equal

ex. $\underline{2} : \underline{3} = \underline{6} : \underline{9}$ ex. $\frac{5 \text{ km}}{2 \text{ h}} = \frac{15 \text{ km}}{6 \text{ h}}$

ex. Solve a Rate Problem Using Proportional Reasoning

Electricity costs \$11.58 for 2 kWh. How much does 30 kWh cost?

Method One: Use a Unit Rate

$$\frac{\$11.58}{2 \text{ kWh}} = \$5.79/\text{kWh} \times 30 \text{ kWh} = \boxed{\$173.70}$$

Method Two: Use a Proportion

$$\frac{\$11.58}{2 \text{ kWh}} = \frac{?}{30 \text{ kWh}} \quad 11.58 \times 15 = \boxed{\$173.70}$$

Method Three: Another way to use a proportion (Better way?)

Multiply the pair, divide by the spare.

$$\frac{\$11.58}{2 \text{ kWh}} \quad \frac{?}{30 \text{ kWh}} \quad 11.58 \times 30 \div 2 = \boxed{\$173.70}$$

SHOW YOU KNOW: There are 72 players on 8 baseball teams. Determine the number of players on 2 teams. Show how to find the answer in more than one way.

$$\frac{72 \text{ players}}{8 \text{ teams}} = 9 \text{ players/team}$$

$$9 \times 2 = \boxed{18 \text{ players}}$$

$$\frac{72 \text{ players}}{8 \text{ teams}} = \frac{?}{2 \text{ teams}} \quad 72 \div 4 = 18$$

$$72 \times 2 \div 8 = 18 \text{ players}$$

ex. Solve a Ratio Problem Using Proportional Reasoning

A wildlife biologist wants to know how many trout are in a slough in Saskatchewan. He captures and tags 24 trout and releases them back into the slough. Two weeks later he returns and catches 30 trout and finds that 5 of them are tagged. He uses the following ratios to estimate the number of fish in the slough.

$$\frac{\text{Fish Caught with tags}}{\text{Total fish caught}} = \frac{\text{Fish captured and tagged}}{\text{Total fish in slough}}$$

Method One: Use a proportion

$$\frac{5 \text{ tags}}{30 \text{ caught}} = \frac{24 \text{ tags}}{?}$$
$$\frac{1 \text{ tag}}{6 \text{ caught}} = \frac{24 \text{ tags}}{?}$$

$\times 24$

144 fish

Method Two: Multiply the pair, Divide by the Spare.

$$24 \times 30 \div 5 = \text{144 fish}$$

SHOW YOU KNOW: How much will fourteen erasers cost if three erasers cost 75 cents? Show how to find the answer in more than one way.

$$\frac{14 \text{ erasers}}{\text{?}} = \frac{3 \text{ erasers}}{75 \text{ ¢}}$$

$$14 \times 75 \div 3 = 350 \quad \checkmark$$

$$350 \text{ ¢}$$

OR \$3.50

$$75 \text{ ¢} \div 3 = \$25 \text{ ¢/eraser}$$
$$\times 14$$
$$= 350 \text{ ¢}$$

