

## Cross Multiplying to Find an Unknown

PRO 1

**Instructions:** For each of these proportions (without units), use the cross-multiplying procedure you learned in the video to solve for the unknown number 'n'.

1  $\frac{n}{9} = \frac{2}{3}$

$$n \times 3 = 9 \times 2$$

$$\frac{n \times \cancel{3}}{\cancel{3}} = \frac{18}{3}$$

$$n = 6$$

2  $\frac{5}{n} = \frac{2}{8}$

$$5 \times 8 = n \times 2$$

$$\frac{40}{2} = \frac{n \times \cancel{2}}{\cancel{2}}$$

$$n = 20$$

3  $\frac{n}{4} = \frac{12}{6}$

$$n \times 6 = 4 \times 12$$

$$\frac{n \times \cancel{6}}{\cancel{6}} = \frac{48}{6}$$

$$n = 8$$

4  $\frac{2}{9} = \frac{n}{45}$

$$2 \times 45 = 9 \times n$$

$$\frac{90}{9} = \frac{\cancel{9} \times n}{\cancel{9}}$$

$$n = 10$$

5  $\frac{3}{8} = \frac{n}{32}$

$$3 \times 32 = 8 \times n$$

$$\frac{96}{8} = \frac{8 \times n}{8}$$

$$n = 12$$

6  $\frac{7}{3} = \frac{21}{n}$

$$7 \times n = 3 \times 21$$

$$\frac{\cancel{7} \times n}{\cancel{7}} = \frac{63}{7}$$

$$n = 9$$

7  $\frac{7}{3} = \frac{35}{n}$

$$7 \times n = 3 \times 35$$

$$\frac{\cancel{7} \times n}{\cancel{7}} = \frac{105}{7}$$

$$n = 15$$

8  $\frac{n}{6} = \frac{5}{30}$

$$n \times 30 = 6 \times 5$$

$$\frac{n \times \cancel{30}}{\cancel{30}} = \frac{30}{30}$$

$$n = 1$$

## Cross Multiplying to Find an Unknown - Set 2

PRO 2

**Instructions:** For each of these proportions (without units), use the cross-multiplying procedure you learned in the video to solve for the unknown number 'n'. You can use a calculator for this set.

1  $\frac{n}{7} = \frac{2}{5}$

$$n \times 5 = 7 \times 2$$

$$\frac{n \times \cancel{5}}{\cancel{5}} = \frac{14}{5}$$

$$n = 2.8$$

2  $\frac{8}{n} = \frac{15}{6}$

$$8 \times 6 = n \times 15$$

$$\frac{48}{15} = \frac{n \times \cancel{15}}{\cancel{15}}$$

$$n = 3.2$$

3  $\frac{n}{5} = \frac{3}{10}$

$$n \times 10 = 5 \times 3$$

$$\frac{n \times \cancel{10}}{\cancel{10}} = \frac{15}{10}$$

$$n = 1.5$$

4  $\frac{7}{12} = \frac{n}{6}$

$$7 \times 6 = 12 \times n$$

$$\frac{42}{12} = \frac{\cancel{12} \times n}{\cancel{12}}$$

$$n = 3.5$$

5  $\frac{3}{5} = \frac{n}{32}$

$$3 \times 32 = 5 \times n$$

$$\frac{96}{5} = \frac{5 \times n}{5}$$

$$n = 19.2$$

6  $\frac{4}{3} = \frac{51}{n}$

$$4 \times n = 3 \times 51$$

$$\frac{4 \times n}{4} = \frac{153}{4}$$

$$n = 38.25$$

7  $\frac{5}{7} = \frac{1.2}{n}$

$$5 \times n = 7 \times 1.2$$

$$\frac{5 \times n}{5} = \frac{8.4}{5}$$

$$n = 1.68$$

8  $\frac{n}{10} = \frac{3}{2.5}$

$$n \times 2.5 = 10 \times 3$$

$$\frac{n \times \cancel{2.5}}{\cancel{2.5}} = \frac{30}{2.5}$$

$$n = 12$$

## Proportion Word Problems

PRO 3

**Instructions:** Use proportions to answer each of these word problems. You can use a calculator.

- 1 If 2 liters of sea water contain 70 grams of salt, how much salt is in 32 liters of sea water?

$$\frac{70 \text{ grams}}{2 \text{ liters}} = \frac{n \text{ grams}}{32 \text{ liters}}$$

$$70 \times 32 = 2 \times n$$

$$\frac{2,240}{2} = \frac{\cancel{2} \times n}{\cancel{2}}$$

$$n = 1,120 \text{ grams}$$

- 2 If it takes 930 kg of food to feed a pair of elephants for 3 days, how much food would you need to feed them for a week?

$$\frac{930 \text{ kg}}{3 \text{ days}} = \frac{n \text{ kg}}{7 \text{ days}}$$

$$930 \times 7 = 3 \times n$$

$$\frac{6,510}{3} = \frac{\cancel{3} \times n}{\cancel{3}}$$

$$n = 2,170 \text{ kg}$$

- 3 If a fuel efficient car can go 210 miles on 4 gallons of fuel, how far can it go on 12 gallons?

$$\frac{210 \text{ mi}}{4 \text{ gal}} = \frac{n \text{ mi}}{12 \text{ gal}}$$

$$210 \times 12 = 4 \times n$$

$$\frac{2,520}{4} = \frac{\cancel{4} \times n}{\cancel{4}}$$

$$n = 630 \text{ mi}$$

- 4 If a farmer gets 340 bushels of corn from 2 acres of land, how many bushels can they get from 15 acres?

$$\frac{2 \text{ acres}}{340 \text{ bushels}} = \frac{15 \text{ acres}}{n \text{ bushels}}$$

$$2 \times n = 340 \times 15$$

$$\frac{\cancel{2} \times n}{\cancel{2}} = \frac{5,100}{2}$$

$$n = 2,550 \text{ bushels}$$

- 5 A factory can make 20 toasters in a half-hour (0.5 hrs) How many toasters can the factory make in 6.5 hours?

$$\frac{20 \text{ toasters}}{0.5 \text{ hours}} = \frac{n \text{ toasters}}{6.5 \text{ hours}}$$

$$20 \times 6.5 = 0.5 \times n$$

$$\frac{130}{0.5} = \frac{\cancel{0.5} \times n}{\cancel{0.5}}$$

$$n = 260 \text{ toasters}$$

- 6 On a scaled drawing, a building measures 4.5 cm tall. If the scale of the drawing is 25 meters per 2 cm, how tall is the actual building?

$$\frac{2 \text{ cm}}{25 \text{ m}} = \frac{4.5 \text{ cm}}{n \text{ m}}$$

$$2 \times n = 25 \times 4.5$$

$$\frac{\cancel{2} \times n}{\cancel{2}} = \frac{112.5}{2}$$

$$n = 56.25 \text{ m}$$

## Proportion Word Problems - Set 2

PRO 4

**Instructions:** Use proportions to answer each of these word problems. You can use a calculator.

- 1 A rain gauge collected 0.2 inches of rain in 30 minutes. If it keeps raining at the same rate, what's the total time it will take to collect 1 inch of rain?

$$\frac{0.2 \text{ in}}{30 \text{ min}} = \frac{1 \text{ in}}{n \text{ min}}$$

$$0.2 \times n = 30 \times 1$$

$$\frac{\cancel{0.2} \times n}{\cancel{0.2}} = \frac{30}{0.2}$$

$$n = 150 \text{ min}$$

- 2 A biologist counted 15 squirrels in 3 acres of forest. Based on that data, how many squirrels would be expected to inhabit a 275 acre forest?

$$\frac{15 \text{ squirrels}}{3 \text{ acres}} = \frac{n \text{ squirrels}}{275 \text{ acres}}$$

$$15 \times 275 = 3 \times n$$

$$\frac{4,125}{3} = \frac{\cancel{3} \times n}{\cancel{3}}$$

$$n = 1,375 \text{ squirrels}$$

- 3 A runner burned 120 calories on a 1.6 km run. How many calories would they burn on a 5 km run?

$$\frac{1.6 \text{ km}}{120 \text{ cal}} = \frac{5 \text{ km}}{n \text{ cal}}$$

$$1.6 \times n = 120 \times 5$$

$$\frac{\cancel{1.6} \times n}{\cancel{1.6}} = \frac{600}{1.6}$$

$$n = 375 \text{ cal}$$

- 4 If 3 oranges cost \$1.75, how much would 20 oranges cost?

$$\frac{3 \text{ oranges}}{1.75 \text{ dollars}} = \frac{20 \text{ oranges}}{n \text{ dollars}}$$

$$3 \times n = 1.75 \times 20$$

$$\frac{\cancel{3} \times n}{\cancel{3}} = \frac{35}{3}$$

$$n = \$11.67$$

- 5 If it takes 2.3 gallons of milk to make 2 pounds of cheese, how many pounds of cheese can you make with 50 gallons of milk?

$$\frac{2.3 \text{ gal}}{2 \text{ lbs}} = \frac{50 \text{ gal}}{n \text{ lbs}}$$

$$2.3 \times n = 2 \times 50$$

$$\frac{\cancel{2.3} \times n}{\cancel{2.3}} = \frac{100}{2.3}$$

$$n = 43.5 \text{ lbs}$$

- 6 If you need 8 oz of chocolate chips to make 1.6 lbs of cookie dough, how many ounces of chocolate chips will you need to make 7 pounds of cookie dough?

$$\frac{8 \text{ oz}}{1.6 \text{ lbs}} = \frac{n \text{ oz}}{7 \text{ lbs}}$$

$$8 \times 7 = 1.6 \times n$$

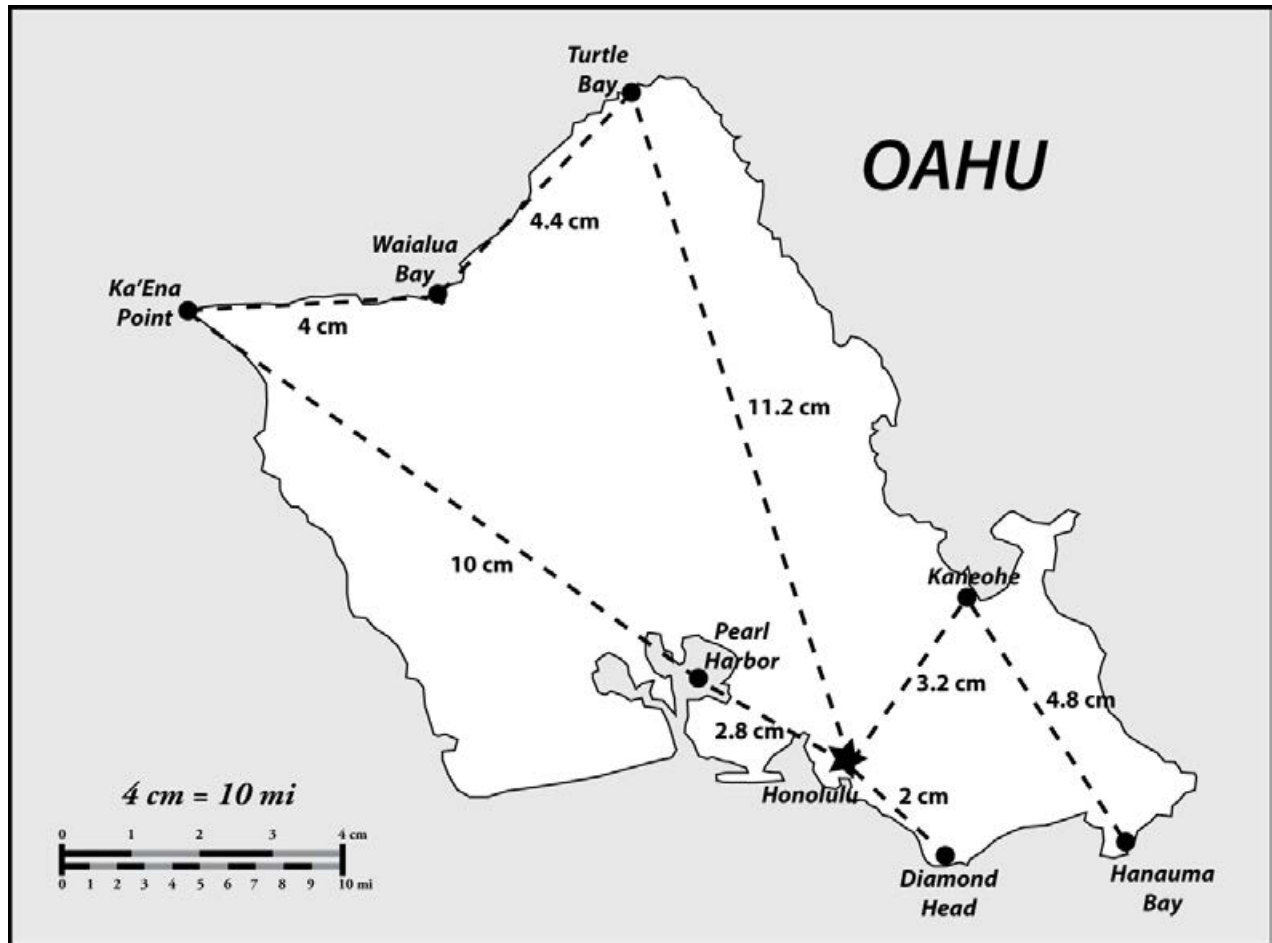
$$\frac{56}{1.6} = \frac{\cancel{1.6} \times n}{\cancel{1.6}}$$

$$n = 35 \text{ oz}$$

Scaled Drawing Problems - page 1

PRO 5

Instructions: Use this map to answer the questions below and on the following page.



note: all measurements are approximate, printout may not be to scale

1 How many miles is it from Honolulu to Diamond Head?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{2 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 2$$

$$\frac{4 \cancel{\times} n}{\cancel{4}} = \frac{20}{4}$$

$$n = 5 \text{ miles}$$

2 How many miles is it from Honolulu to Pearl Harbor?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{2.8 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 2.8$$

$$\frac{4 \cancel{\times} n}{\cancel{4}} = \frac{28}{4}$$

$$n = 7 \text{ miles}$$

Scaled Drawing Problems - page 2

Instructions: Use the map on the previous page to answer these questions.



see previous page

- 3 How many miles is it from Honolulu to Turtle Bay?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{11.2 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 11.2$$

$$\frac{4 \times n}{4} = \frac{112}{4}$$

$$n = 28 \text{ miles}$$

- 4 How many miles is it from Turtle Bay to Waialua Bay?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{4.4 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 4.4$$

$$\frac{4 \times n}{4} = \frac{44}{4}$$

$$n = 11 \text{ miles}$$

- 5 How many miles is it from Pearl Harbor to Ka'Ena Point?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{10 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 10$$

$$\frac{4 \times n}{4} = \frac{100}{4}$$

$$n = 25 \text{ miles}$$

- 6 How many miles is it from Honolulu to Kaneohe?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{3.2 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 3.2$$

$$\frac{4 \times n}{4} = \frac{32}{4}$$

$$n = 8 \text{ miles}$$

- 7 How many miles is it from Kaneohe to Hanauma Bay?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{4.8 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 4.8$$

$$\frac{4 \times n}{4} = \frac{48}{4}$$

$$n = 12 \text{ miles}$$

- 8 How many miles is it from Ka'Ena Point to Waialua Bay?

$$\frac{4 \text{ cm}}{10 \text{ mi}} = \frac{4 \text{ cm}}{n \text{ mi}}$$

$$4 \times n = 10 \times 4$$

$$\frac{4 \times n}{4} = \frac{40}{4}$$

$$n = 10 \text{ miles}$$