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Using Formulas

1 Here's How

A formula is an equation that states a relationship between quantities. The quantities are often represented by variables. If you know some of the values in a formula, you can find an unknown value.

$$\text{Distance} = \text{rate} \cdot \text{time}$$
$$D = rt$$

Look at these examples.

$$D = rt$$

Example 1

$$D = 60 \cdot 3$$

At 60 miles an hour, how far will a car travel in 3 hours?

$$D = 180$$

In this problem, r is 60 and t is 3. Multiply them to find D , a distance of 180 miles.

$$D = rt$$

Example 2

$$200 = r \cdot 4$$

What speed must a car travel in order to go 200 miles in 4 hours?

$$\frac{200}{4} = \frac{4r}{4}$$

In this problem, D is 200 and t is 4. Set up an equation and solve for r .

$$50 = r$$

Use the inverse operation. The rate, r , equals 50 miles per hour.

$$D = rt$$

Example 3

$$360 = 55 \cdot t$$

How long will it take a car to travel 360 miles at 55 miles per hour?

$$\frac{360}{55} = \frac{55t}{55}$$

In this problem, D is 360 and r is 55. Set up an equation and solve for t .

$$6.55 = t$$

Use the inverse operation. The time, t , equals 6.55 hours.

2 Try It

Complete each step.

$$D = rt$$

A jet flew a distance of 2,850 miles in 6 hours. What was its speed?

Fill in the values you know. Use the variable for the unknown value.

Distance: _____ . Rate: _____ . Time: _____ .

Write the formula using the values in the space at the left.

How can you isolate the variable? _____

Do that step at the left.

The speed of the jet was _____ .

3 On Your Own

Use the formula $D = rt$ to find each unknown value.

1. $r = 45$ mph, $t = 5$ h

$$D = 45 \cdot 5$$

$$D = 225$$

2. $D = 2,400$ km, $t = 8$ h

3. $D = 7.7$ mi, $r = 2.2$ mph

$$D = \underline{225 \text{ miles}}$$

$$r = \underline{\hspace{2cm}}$$

$$t = \underline{\hspace{2cm}}$$

Use the formula $A = lw$ for *Area = length · width* to find each unknown value.

4. $l = 2.5$ cm, $w = 4.5$ cm

5. $A = 30$ in.², $l = 6$ in.

6. $A = 625$ km², $w = 25$ km

$$A = \underline{\hspace{2cm}}$$

$$w = \underline{\hspace{2cm}}$$

$$l = \underline{\hspace{2cm}}$$

Use the formula $I = prt$ for *Interest = principal · rate · time* to find each unknown value.

7. $p = \$250$, $r = 5\%$,
 $t = 2$ years

8. $I = \$4,000$, $r = 8\%$,
 $t = 5$ years

9. $I = \$1,500$, $p = \$5,000$,
 $r = 10\%$

$$I = \underline{\hspace{2cm}}$$

$$p = \underline{\hspace{2cm}}$$

$$t = \underline{\hspace{2cm}}$$

4 Think About It

Answer the question. Write your answer below.

10. A rectangular computer screen has a perimeter of 60 inches. Its length is 18 inches. How can you use formulas to find the area? Explain.