

Solving Equations and Isolating Variables

Solve each equation or formula for the variable indicated.

1. $d = rt$, for r

$$\frac{d}{t} = r$$

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2. $6w - y = 2z$, for w

$$+y \quad +y$$

$$\frac{6w}{6} = \frac{2z+y}{6} \rightarrow w = \frac{2z+y}{6}$$

3. $mx + 4y = 3t$, for x

$$-4y \quad -4y$$

$$\frac{mx}{m} = \frac{3t-4y}{m} \rightarrow x = \frac{3t-4y}{m}$$

4. $9s - 5g = -4u$, for s

$$+5g \quad +5g$$

$$\frac{9s}{9} = \frac{-4u+5g}{9} \rightarrow s = \frac{-4u+5g}{9}$$

5. $ab + 3c = 2x$, for b

$$-3c \quad -3c$$

$$\frac{ab}{a} = \frac{2x-3c}{a} \rightarrow b = \frac{2x-3c}{a}$$

6. $2p = kx - t$, for x

$$+t \quad +t$$

$$\frac{2p+t}{k} = \frac{kx}{k} \rightarrow \frac{2p+t}{k} = x$$

7. $\frac{2}{3}y + v = x$, for y

$$-v \quad -v$$

$$\frac{3}{2} \left(\frac{2}{3}y \right) = (x-v) \cdot \frac{3}{2}$$

$$y = \frac{3}{2}(x-v)$$

8. $\frac{3}{4}a - q = k$, for a

$$+q \quad +q$$

$$\frac{4}{3} \cdot \frac{3}{4}a = (k+q) \cdot \frac{4}{3}$$

$$a = \frac{4}{3}(k+q)$$

9. $\frac{rx+9}{5} = h$, for x

5

$$rx+9 = 5h$$

$$-9 \quad -9$$

$$rx = 5h-9$$

$$\rightarrow x = \frac{5h-9}{r}$$

10. $\frac{3b-4}{2} = c$, for b

2

$$3b-4 = 2c$$

$$+4 \quad +4$$

$$3b = 2c+4$$

$$\rightarrow b = \frac{2c+4}{3}$$

11. $2w - y = 7w - 2$, for w

$$2w - 7w = -2 + y$$

$$-5w = -2 + y$$

$$w = \frac{-2+y}{-5}$$

12. $3l + y = 5 + 5l$, for l

$$3l - 5l = 5 - y$$

$$-2l = 5 - y$$

$$l = \frac{5-y}{-2}$$

13. **ELECTRICITY** The formula for Ohm's Law is $E = IR$, where E represents voltage measured in volts, I represents current measured in amperes, and R represents resistance measured in ohms.

a. Solve the formula for R .

b. Suppose a current of 0.25 ampere flows through a resistor connected to a 12-volt battery. What is the resistance in the circuit?

14. **MOTION** In *uniform circular motion*, the speed v of a point on the edge of a spinning disk is $v = \frac{2\pi}{t}r$, where r is the radius of the disk and t is the time it takes the point to travel once around the circle.

a. Solve the formula for r .

b. Suppose a merry-go-round is spinning once every 3 seconds. If a point on the outside edge has a speed of 12.56 feet per second, what is the radius of the merry-go-round? (Use 3.14 for π .)

15. **HIGHWAYS** Interstate 90 is the longest interstate highway in the United States, connecting the cities of Seattle, Washington and Boston, Massachusetts. The interstate is 4,987,000 meters in length. If 1 mile = 1.609 kilometers, how many miles long is Interstate 90?