Solving Formulas

Definition of a Formula

A formula is an equation that contains more than one variable.

To solve a formula means to isolate one of the variables on one side.

Some Examples of Formulas

$$A = \frac{h}{2}(a+b), \qquad D = RT, \qquad C = \frac{5}{9}(F-32)$$

Examples of Solving Formulas

Solve the formula for R.

$$D = RT$$

Solution

Divide both sides by T.

$$\frac{D}{T} = \frac{RT}{T}$$

Cancel T on the right side.

$$\frac{D}{T} = R$$

or

$$R = \frac{D}{T}$$

Solve the formula for W.

$$P = 2L + 2W$$

Solution

Subtract $2L$ from both sides.

$$P = 2L + 2W$$

$$-2L \quad -2L$$

$$P - 2L = 2W$$

Divide both sides by 2.

$$\frac{P-2L}{2} = \frac{2W}{2}$$

$$W = \frac{P-2L}{2}$$

or

$$W = \frac{P}{2} - L$$

Solve the formula for R.

$$\frac{1}{R}=\frac{1}{R_1}+\frac{1}{R_2}$$

Solution

Multiply both sides
by the least common denominator RR_1R_2.

$$RR_1R_2\left(\frac{1}{R}\right)=\left(\frac{1}{R_1}+\frac{1}{R_2}\right)RR_1R_2$$

$$R_1R_2=RR_2+RR_1$$

On the right side, factor out R.

$$R_1R_2=R(R_2+R_1)$$

Divide both sides by R_2+R_1

$$\frac{R_1R_2}{R_2+R_1}=\frac{R(R_2+R_1)}{R_2+R_1}$$

Cancel R_2+R_1 on the right side.

$$\frac{R_1R_2}{R_2+R_1}=R$$

or

$$R=\frac{R_1R_2}{R_1+R_2}$$

Solve the formula for S.

$$S=\frac{C}{1-r}$$

Solution

Multiply both sides
by the least common denominator $1-r$.

$$(1-r)S=\frac{C}{1-r}(1-r)$$

Cancel $1-r$ on the right side.

$$(1-r)S=C$$

Divide both sides by $1-r$.

$$\frac{(1-r)S}{1-r}=\frac{C}{1-r}$$

Cancel $1-r$ on the left side.

$$S=\frac{C}{1-r}$$

Solve the formula for t.

$$A = P(1 + rt)$$

Solution

Use the distributive property on the right side to remove the parentheses.

$$A = P + Prt$$

Subtract P from both sides.

$$A = P + Prt$$

$$-P \quad -P$$

$$A - P = Prt$$

Divide both sides by Pr.

$$\frac{A - P}{Pr} = \frac{Prt}{Pr}$$

Cancel Pr on the right side.

$$\frac{A - P}{Pr} = t$$

or

$$t = \frac{A - P}{Pr}$$

Solve the formula for r.

$$C = \pi r^2$$

Solution

Divide both sides by π.

$$\frac{C}{\pi} = \frac{\pi r^2}{\pi}$$

Cancel π on the right side.

$$\frac{C}{\pi} = r^2$$

Take the square root on both sides.

$$\sqrt{\frac{C}{\pi}} = \sqrt{r^2}$$

$$\sqrt{\frac{C}{\pi}} = r$$

or

$$r = \sqrt{\frac{C}{\pi}}$$