

## Rearranging Formulas

1. The formula for finding the perimeter of a rectangle can be found using the following formula, where  $P$  is the perimeter,  $L$  is the length, and  $w$  is the width. If a rectangle has a perimeter of 46 m and a length of 15 m, what is the width?

$$P = 2(L + W)$$

Method #1: Substitute & Rearrange

Method #2: Rearrange & Substitute

2. Rearrange each of the following equations to isolate for  $x$ .

a)  $M = 4(x + y)$

b)  $\frac{(x + b)h}{2} = A$

c)  $A = P(1 + rx)$

d)  $a = 3(b - x)$

## Practice

3

Rearrange each formula to isolate the indicated variable.

a)  $P = 2(L + E)$ : for L

b)  $V = P(1 + rt)$ ; for r

c)  $\frac{(a+b)h}{2} = A$ : for b

d)  $S = 180(n - 2)$ ; for n

e)  $SA = 2(bh + lw + lh)$ ; for w

f)  $t = a + (n - 1)d$ ; for n

g)  $SA = w^2(b + ht)$ ; for t

h)  $A = 2(w^2 + hw)$ ; for h

## Rearranging Formulas

1. The formula for finding the perimeter of a rectangle can be found using the following formula, where P is the perimeter, L is the length, and w is the width. If a rectangle has a perimeter of 46 m and a length of 15 m, what is the width?

$$P = 2(L + W)$$

Method #1: Substitute & Rearrange

$$\text{* sub } P = 46, L = 15$$

$$\frac{46}{2} = \frac{2}{2}(15 + W)$$

$$\begin{array}{r} 23 = 15 + W \\ -15 \quad -15 \\ \hline 8 = W \end{array}$$

$\therefore$  width is 8 m

Method #2: Rearrange & Substitute

$$P = 2(L + W)$$

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

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

$$\text{* now sub } P = 46, L = 15$$

$$W = \frac{46}{2} - 15 = 8$$

2. Rearrange each of the following equations to isolate for x.

a)  $M = 4(x + y)$

$$\frac{M}{4} = x + y$$

$$\frac{M}{4} - y = x$$

c)  $A = P(1 + rx)$

$$\frac{A}{P} = 1 + rx$$

$$\frac{A}{P} - 1 = rx$$

$$\frac{\left(\frac{A}{P}\right)}{r} \leftarrow \left(\frac{A}{Pr}\right) - \frac{1}{r} = x$$

$$= \frac{A}{P} \div r \text{ or } \frac{A}{P} \cdot \frac{1}{r}$$

b)  $\frac{(x+b)h}{2} = A \cdot 2$

$$(x+b)h = 2A$$

$$x+b = \frac{2A}{h}$$

$$x = \frac{2A}{h} - b$$

d)  $a = 3(b - x)$

$$\frac{a}{3} = b - x$$

$$\frac{a}{3} - b = -x$$

$$-\frac{a}{3} + b = x$$

## Practice

3

Rearrange each formula to isolate the indicated variable.

a)  $P = 2(L + E)$ ; for L

$$\frac{P}{2} = L + E$$

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

c)  $\frac{(a+b)h \cdot 2}{2} = A$ ; for b

$$(a+b)h = 2A$$

$$a+b = \frac{2A}{h}$$

$$b = \frac{2A}{h} - a$$

e)  $SA = 2(bh + lw + lh)$ ; for w

$$\frac{SA}{2} = bh + lw + lh$$

$$\frac{SA}{2} - bh - lh = lw$$

$$\frac{SA}{2L} - \frac{bh}{L} - h = w$$

g)  $SA = w^2(b + ht)$ ; for t

$$\frac{SA}{w^2} = b + ht$$

$$\frac{SA}{w^2} - b = ht$$

$$\frac{SA}{w^2 h} - \frac{b}{h} = t$$

b)  $V = P(1 + rt)$ ; for r

$$\frac{V}{P} = 1 + rt$$

$$\frac{V}{P} - 1 = rt$$

$$\frac{V}{Pt} - \frac{1}{t} = r$$

d)  $S = 180(n - 2)$ ; for n

$$\frac{S}{180} = n - 2$$

$$\frac{S}{180} + 2 = n$$

f)  $t = a + (n - 1)d$ ; for n

$$t - a = (n - 1)d$$

$$\frac{t}{d} - \frac{a}{d} = n - 1$$

$$\frac{t}{d} - \frac{a}{d} + 1 = n$$

h)  $A = 2(w^2 + hw)$ ; for h

$$\frac{A}{2} = w^2 + hw$$

$$\frac{A}{2} - w^2 = hw$$

$$\frac{A}{2w} - w = h$$