

## A1.2 ALGEBRAIC SUBSTITUTION

The process of replacing a *pronumeral* (or variable or letter) in an expression or formula with a number is called *substitution*.

It is then possible to *evaluate* the algebraic expression.

### Examples

1. Evaluate  $3p$  if  $p = -5$

$$\begin{aligned}3p &= 3 \times p \\ &= 3 \times -5 \\ &= -15\end{aligned}$$

2. Evaluate  $\frac{a+5}{b}$  if  $a = -9$  and  $b = 2$

$$\begin{aligned}\frac{a+5}{b} &= \frac{-9+5}{2} \\ &= \frac{-4}{2} \\ &= -2\end{aligned}$$

3. Evaluate  $w^2 - 2z$  if  $w = -1$ ,  $z = 5$

$$\begin{aligned}w^2 - 2z &= (-1)^2 - 2 \times 5 \\ &= 1 - 10 \\ &= -9\end{aligned}$$

4. Use the formula  $C = \frac{5(F-32)}{9}$  to convert a temperature of  $100^\circ$  Fahrenheit to Centigrade.

$$\begin{aligned}C &= \frac{5(F-32)}{9} \\ &= \frac{5(100-32)}{9} \\ &= \frac{5(68)}{9} \\ &= 37.78\end{aligned}$$

## Exercises

1. Evaluate the following

- a)  $-4k$  if  $k = 7$                       b)  $2mn$  if  $m = 4, n = -2$   
c)  $e^2 - 5$  if  $e = 2$                       d)  $5 - b + b^2$  if  $b = 3$   
e)  $2k^2 + 4$  if  $k = -6$                       f)  $-3ab^2$  if  $a = 4, b = 2$   
g)  $\frac{n}{4} + 2$  if  $n = 10$                       h)  $\frac{u}{5v}$  if  $u = -20, v = 2$

2. Evaluate the following if  $a = -1, b = 6, c = 3, m = -2, n = 2$

- a)  $3a^2 - 7$                                       b)  $3a - b^2$   
c)  $(2m + 1)^2$                                       d)  $3(a^2 + 4)$   
e)  $\frac{2m}{n}$     f)  $(m - n)^2$

## Answers

1. a) -28 b) -16 c) -1 d) 11 e) 76 f) -48 g) 4.5 h) -2  
2. a) -4 b) -39 c) 9 d) 15 e) -2 f) 16