AS1.2: 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^o *in the Fahrenheitsystem 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