



SpeedLabs

MATHS

CBSE 7<sup>th</sup>

TEEVRA EDUTECH PVT. LTD.

# Algebraic Expressions

## Exercise-12.3

**Q.1** If  $m = 2$ , find the value of:

(i)  $m - 2$                       (ii)  $3m - 5$                       (iii)  $9 - 5m$

(iv)  $3m^2 - 2m - 7$       (v)  $\frac{5m}{2} - 4$

**Sol:** (i)  $m - 2 = 2 - 2 = 0$

(ii)  $3m - 5 = (3 \times 2) - 5 = 6 - 5 = 1$

(iii)  $9 - 5m = 9 - (5 \times 2) = 9 - 10 = -1$

(iv)  $3m^2 - 2m - 7 = 3 \times (2 \times 2) - (2 \times 2) - 7 = 12 - 4 - 7 = 1$

(v)  $\frac{5m}{2} - 4 = \left(\frac{5 \times 2}{2}\right) - 4 = 1$

**Q.2** If  $p = -2$ , find the value of:

(i)  $4p + 7$

(ii)  $-3p^2 + 4p + 7$

(iii)  $-2p^3 - 3p^2 + 4p + 7$

**Sol:** (i)  $4p + 7 = 4 \times (-2) + 7 = -8 + 7 = -1$

(ii)  $-3p^2 + 4p + 7 = -3(-2) \times (-2) + 4 \times (-2) + 7 = -12 - 8 + 7 = -13$

(iii)  $-2p^3 - 3p^2 + 4p + 7$

$= -2(-2) \times (-2) \times (-2) - 3(-2) \times (-2) + 4 \times (-2) + 7$

$= 16 - 12 - 8 + 7 = 3$

**Q.3** Find the value of the following expressions, when  $x = -1$ :

(i)  $2x - 7$       (ii)  $-x + 2$       (iii)  $x^2 + 2x + 1$       (iv)  $2x^2 - x - 2$

**Sol:** (i)  $2x - 7 = 2 \times (-1) - 7 = -9$

(ii)  $-x + 2 = -(-1) + 2 = 1 + 2 = 3$

(iii)  $x^2 + 2x + 1 = (-1) \times (-1) + 2 \times (-1) + 1 = 1 - 2 + 1 = 0$

(iv)  $2x^2 - x - 2 = 2(-1) \times (-1) - (-1) - 2 = 2 + 1 - 2 = 1$

**Q.4** If  $a = 2$ ,  $b = -2$ , find the value of:

(i)  $a^2 + b^2$                       (ii)  $a^2 + ab + b^2$                       (iii)  $a^2 - b^2$

**Sol:** (i)  $a^2 + b^2 = (2)^2 + (-2)^2 = 4 + 4 = 8$

(ii)  $a^2 + ab + b^2 = (2 \times 2) + 2 \times (-2) + (-2) \times (-2) = 4 - 4 + 4 = 4$

$$(iii) a^2 - b^2 = (2)^2 - (-2)^2 = 4 - 4 = 0$$

**Q.5** When  $a = 0$ ,  $b = -1$ , find the value of the given expressions:

$$(i) 2a + 2b \quad (ii) 2a^2 + b^2 + 1 \quad (iii) 2a^2b + 2ab^2 + ab \quad (iv) a^2 + ab + 2$$

**Sol:** (i)  $2a + 2b = 2 \times (0) + 2 \times (-1) = 0 - 2 = -2$

$$(ii) 2a^2 + b^2 + 1 \\ = 2 \times (0)^2 + (-1) \times (-1) + 1 \\ = 0 + 1 + 1 = 2$$

$$(iii) 2a^2b + 2ab^2 + ab \\ = 2 \times (0)^2 \times (-1) + 2 \times (0) \times (-1) \times (-1) + 0 \times (-1) \\ = 0 + 0 + 0 = 0$$

$$(iv) a^2 + ab + 2 \\ = (0)^2 + 0 \times (-1) + 2 \\ = 0 + 0 + 2 = 2$$

**Q.6** Simplify the expressions and find the value if  $x$  is equal to 2

$$(i) x + 7 + 4(x - 5) \quad (ii) 3(x + 2) + 5x - 7 \quad (iii) 6x + 5(x - 2) \quad (iv) 4(2x - 1) + 3x + 11$$

**Sol:** (i)  $x + 7 + 4(x - 5)$   
 $= x + 7 + 4x - 20$   
 $= x + 4x + 7 - 20$   
 $= 5x - 13$   
 $= (5 \times 2) - 13$

$$= 10 - 13 = -3$$

$$(ii) 3(x + 2) + 5x - 7 \\ = 3x + 6 + 5x - 7 \\ = 3x + 5x + 6 - 7 \\ = 8x - 1$$

$$= (8 \times 2) - 1 \\ = 16 - 1 = 15$$

$$(iii) 6x + 5(x - 2) \\ = 6x + 5x - 10$$

$$= 11x - 10$$

$$= (11 \times 2) - 10$$

$$= 22 - 10$$

$$= 12$$

$$\begin{aligned}
 & \text{(iv) } 4(2x - 1) + 3x + 11 \\
 & = 8x - 4 + 3x + 11 \\
 & = 11x + 7 \\
 & = (11 \times 2) + 7 \\
 & = 22 + 7 \\
 & = 29
 \end{aligned}$$

**Q.7** Simplify these expressions and find their values if  $x = 3$ ,  $a = -1$ ,  $b = -2$ .

$$\begin{array}{lll}
 \text{(i) } 3x - 5 - x + 9 & \text{(ii) } 2 - 8x + 4x + 4 & \text{(iii) } 3a + 5 - 8a + 1 \\
 \text{(iv) } 10 - 3b - 4 - 5b & \text{(v) } 2a - 2b - 4 - 5 + a &
 \end{array}$$

**Sol:**

$$\begin{aligned}
 \text{(i) } 3x - 5 - x + 9 & = 3x - x - 5 + 9 \\
 & = 2x + 4 = (2 \times 3) + 4 = 10 \\
 \text{(ii) } 2 - 8x + 4x + 4 & = 2 + 4 - 8x + 4x \\
 & = 6 - 4x = 6 - (4 \times 3) = 6 - 12 = -6 \\
 \text{(iii) } 3a + 5 - 8a + 1 & = 3a - 8a + 5 + 1 \\
 & = -5a + 6 = -5 \times (-1) + 6 \\
 & = 5 + 6 = 11 \\
 \text{(iv) } 10 - 3b - 4 - 5b & = 10 - 4 - 3b - 5b \\
 & = 6 - 8b = 6 - 8 \times (-2) \\
 & = 6 + 16 = 22 \\
 \text{(v) } 2a - 2b - 4 - 5 + a & = 2a + a - 2b - 4 - 5 \\
 & = 3a - 2b - 9 \\
 & = 3 \times (-1) - 2 \times (-2) - 9 \\
 & = -3 + 4 - 9 = -8
 \end{aligned}$$

**Q.8** (i) If  $z = 10$ , find the value of  $z^3 - 3(z - 10)$ .  
(ii) If  $p = -10$ , find the value of  $p^2 - 2p - 100$

**Sol:**

$$\begin{aligned}
 \text{(i) } z^3 - 3(z - 10) \\
 & = z^3 - 3z + 30
 \end{aligned}$$

$$= (10 \times 10 \times 10) - (3 \times 10) + 30$$

$$= 1000 - 30 + 30 = 1000$$

$$(ii) p^2 - 2p - 100$$

$$= (-10) \times (-10) - 2(-10) - 100$$

$$= 100 + 20 - 100 = 20$$

**Q.9** What should be the value of a if the value of  $2x^2 + x - a$  equals to 5, when  $x = 0$ ?

**Sol:**  $2x^2 + x - a = 5$ , when  $x = 0$

$$(2 \times 0) + 0 - a = 5$$

$$0 - a = 5$$

$$a = -5$$

**Q.10** Simplify the expression and find its value when  $a = 5$  and  $b = -3$ .

$$2(a^2 + ab) + 3 - ab$$

**Sol:**  $2(a^2 + ab) + 3 - ab$

$$= 2a^2 + 2ab + 3 - ab$$

$$= 2a^2 + 2ab - ab + 3$$

$$= 2a^2 + ab + 3$$

$$= 2 \times (5 \times 5) + 5 \times (-3) + 3$$

$$= 50 - 15 + 3$$

$$= 38$$