Board – CBSE	Class – 7th	Topic – Algebraic Expressions 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) $2a + 2b$ (ii) $2a^2 + b^2 + 1$ (iii) $2a^2 b + 2ab^2 + ab$ (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) $x + 7 + 4\,(x - 5)$ (ii)$3\,(x + 2) + 5x - 7$ (iii) $6x + 5\,(x - 2)$

(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) $6x + 5\,(x - 2)$

$= 6x + 5x - 10$

$= 11x - 10$

$= (11 \times 2) - 10$

$= 22 - 10$

$= 12$

(iv) $4\,(2x - 1) + 3x + 11$

$= 8x - 4 + 3x + 11$

$= 11x + 7$

$= (11 \times 2) + 7$

$= 22 + 7$

$= 29$

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

(i) $3x - 5 - x + 9$ (ii) $2 - 8x + 4x + 4$ (iii) $3a + 5 - 8a + 1$

(iv) $10 - 3b - 4 - 5b$ (v) $2a - 2b - 4 - 5 + a$

Sol: (i) $3x - 5 - x + 9 = 3x - x - 5 + 9$

$= 2x + 4 = (2 \times 3) + 4 = 10$

(ii) $2 - 8x + 4x + 4 = 2 + 4 - 8x + 4x$

$= 6 - 4x = 6 - (4 \times 3) = 6 - 12 = -6$

(iii) $3a + 5 - 8a + 1 = 3a - 8a + 5 + 1$

$= -5a + 6 = -5 \times (-1) + 6$

$= 5 + 6 = 11$

(iv) $10 - 3b - 4 - 5b = 10 - 4 - 3b - 5b$

$= 6 - 8b = 6 - 8 \times (-2)$

$= 6 + 16 = 22$

(v) $2a - 2b - 4 - 5 + a = 2a + a - 2b - 4 - 5$

$= 3a - 2b - 9s$

$= 3 \times (-1) - 2(-2) - 9$

$= -3 + 4 - 9 = -8$

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: (i) $z^3 - 3(z - 10)$

$= z^3 - 3z + 30$

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

$= 1000 - 30 + 30 = 1000$

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

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

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

$= 2a^2 + ab + 3$

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

$= 50 - 15 + 3$

$= 38$