

CBSE Class –VII Mathematics
NCERT Solutions
Algebraic Expressions (Ex. 12.3)

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

(i) $m - 2$

(ii) $3m - 5$

(iii) $9 - 5m$

(iv) $3m^2 - 2m - 7$

(v) $\frac{5m}{2} - 4$

Answer: (i) $m - 2 = 2 - 2$ [Putting $m = 2$]

$= 0$

(ii) $3m - 5 = 3 \times 2 - 5$ [Putting $m = 2$]

$= 6 - 5 = 1$

(iii) $9 - 5m = 9 - 5 \times 2$ [Putting $m = 2$]

$= 9 - 10 = -1$

(iv) $3m^2 - 2m - 7 = 3(2)^2 - 2(2) - 7$ [Putting $m = 2$]

$= 3 \times 4 - 2 \times 2 - 7 = 12 - 4 - 7$

$= 12 - 11 = 1$

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

[Putting $m = 2$]

$= 5 - 4 = 1$

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

(i) $4p + 7$

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

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

Answer: (i) $4p + 7 = 4(-2) + 7$

[Putting $p = -2$]

$$= -8 + 7 = -1$$

$$(ii) -3p^2 + 4p + 7 = -3(-2)^2 + 4(-2) + 7 \text{ [Putting } p = -2]$$

$$= -3 \times 4 - 8 + 7 = -12 - 8 + 7$$

$$= -20 + 7 = -13$$

$$(iii) -2p^3 - 3p^2 + 4p + 7 = -2(-2)^3 - 3(-2)^2 + 4(-2) + 7 \text{ [Putting } p = -2]$$

$$= -2 \times (-8) - 3 \times 4 - 8 + 7 = 16 - 12 - 8 + 7$$

$$= -20 + 23 = 3$$

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

$$(i) 2x - 7$$

$$(ii) -x + 2$$

$$(iii) x^2 + 2x + 1$$

$$(iv) 2x^2 - x - 2$$

Answer: (i) $2x - 7 = 2(-1) - 7$

[Putting $x = -1$]

$$= -2 - 7 = -9$$

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

[Putting $x = -1$]

$$= 1 + 2 = 3$$

$$(iii) x^2 + 2x + 1 = (-1)^2 + 2(-1) + 1 \text{ [Putting } x = -1]$$

$$= 1 - 2 + 1 = 2 - 2 = 0$$

$$(iv) 2x^2 - x - 2 = 2(-1)^2 - (-1) - 2 \text{ [Putting } x = -1]$$

$$= 2 \times 1 + 1 - 2 = 2 + 1 - 2$$

$$= 3 - 2$$

$$= 1$$

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

(i) $a^2 + b^2$

(ii) $a^2 + ab + b^2$

(iii) $a^2 - b^2$

Answer: (i) $a^2 + b^2 = (2)^2 + (-2)^2$ [Putting $a = 2, b = -2$]

$$= 4 + 4 = 8$$

(ii) $a^2 + ab + b^2 = (2)^2 + (2)(-2) + (-2)^2$ [Putting $a = 2, b = -2$]

$$= 4 - 4 + 4 = 4$$

(iii) $a^2 - b^2 = (2)^2 - (-2)^2$ [Putting $a = 2, b = -2$]

$$= 4 - 4 = 0$$

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

(i) $2a + 2b$

(ii) $2a^2 + b^2 + 1$

(iii) $2a^2b + 2ab^2 + ab$

(iv) $a^2 + ab + 2$

Answer: (i) $2a + 2b = 2(0) + 2(-1)$

[Putting $a = 0, b = -1$]

$$= 0 - 2 = -2$$

$$(ii) 2a^2 + b^2 + 1 = 2(0)^2 + (-1)^2 + 1 \text{ [Putting } a = 0, b = -1]$$

$$= 2 \times 0 + 1 + 1 = 0 + 2 = 2$$

$$(iii) 2a^2b + 2ab^2 + ab = 2(0)^2(-1) + 2(0)(-1)^2 + (0)(-1) \text{ [Putting } a = 0, b = -1]$$

$$= 0 + 0 + 0 = 0$$

$$(iv) a^2 + ab + 2 = (0)^2 + (0)(-1) + 2 \text{ [Putting } a = 0, b = -1]$$

$$= 0 + 0 + 2 = 2$$

Question 6. Simplify the expressions and find the value if $x = 2$:

$$(i) x + 7 + 4(x - 5)$$

$$(ii) 3(x + 2) + 5x - 7$$

$$(iii) 6x + 5(x - 2)$$

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

Answer: (i) $x + 7 + 4(x - 5) = x + 7 + 4x - 20 = x + 4x + 7 - 20$

$$= 5x - 13 = 5 \times 2 - 13 \text{ [Putting } x = 2]$$

$$= 10 - 13 = -3$$

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

$$= 8x - 1 = 8 \times 2 - 1 \text{ [Putting } x = 2]$$

$$= 16 - 1 = 15$$

$$(iii) 6x + 5(x - 2) = 6x + 5x - 10 = 11x - 10$$

$$= 11 \times 2 - 10 \text{ [Putting } x = 2]$$

$$= 22 - 10 = 12$$

$$(iv) 4(2x - 1) + 3x + 11 = 8x - 4 + 3x + 11 = 8x + 3x - 4 + 11$$

$$= 11x + 7 = 11 \times 2 + 7 \text{ [Putting } x = 2]$$

$$= 22 + 7 = 29$$

Question 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) $2a - 2b - 4 - 5 + a$

Answer: (i) $3x - 5 - x + 9 = 3x - x - 5 + 9 = 2x + 4$

$$= 2 \times 3 + 4 \text{ [Putting } x = 3]$$

$$= 6 + 4 = 10$$

(ii) $2 - 8x + 4x + 4 = -8x + 4x + 2 + 4 = -4x + 6$

$$= -4 \times 3 + 6 \text{ [Putting } x = 3]$$

$$= -12 + 6 = -6$$

(iii) $3a + 5 - 8a + 1 = 3a - 8a + 5 + 1 = -5a + 6$

$$= -5(-1) + 6 \text{ [Putting } a = -1]$$

$$= 5 + 6 = 11$$

(iv) $10 - 3b - 4 - 5b = -3b - 5b + 10 - 4 = -8b + 6$

$$= -8(-2) + 6 \text{ [Putting } b = -2]$$

$$= 16 + 6 = 22$$

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

$$= 3a - 2b - 9 = 3(-1) - 2(-2) - 9 \text{ [Putting } a = -1, b = -2]$$

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

Question 8. (i) If $z = 10$, find the value of $z^3 - 3(z - 10)$.

(ii) If $p = -10$, find the value of $p^2 - 2p - 100$.

Answer: (i) $z^3 - 3(z - 10) = (10)^3 - 3(10 - 10)$ [Putting $z = 10$]

$$= 1000 - 3 \times 0 = 1000 - 0 = 1000$$

(ii) $p^2 - 2p - 100 = (-10)^2 - 2(-10) - 100$ [Putting $p = -10$]

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

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

Answer: Given: $2x^2 + x - a = 5$

$$\Rightarrow 2(0)^2 + 0 - a = 5 \text{ [Putting } x = 0]$$

$$\Rightarrow 0 + 0 - a = 5 \Rightarrow a = -5$$

Hence, the value of a is -5 .

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

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

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

$$\Rightarrow 2a^2 + 2ab + 3 - ab \Rightarrow 2a^2 + 2ab - ab + 3$$

$$\Rightarrow 2a^2 + ab + 3$$

$$\Rightarrow 2(5)^2 + (5)(-3) + 3 \text{ [Putting } a = 5, b = -3]$$

$$\Rightarrow 2 \times 25 - 15 + 3$$

$$\Rightarrow 50 - 15 + 3$$

$$\Rightarrow 38$$