Mathematics

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(Chapter – 12) (Algebraic Expressions)

(Class – VII)

Exercise 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 1:

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

$= 0$

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

$= 6 - 5 = 1$

(iii) $9-5m = 9 - 5 \text{ x } 2$ [Putting $m=2$]

$= 9 - 10 = -1$

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

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

$= 3 \text{ x } 4 - 2 \text{ x } 2 - 7$

$= 12 - 4 - 7$

$= 12 - 11 = 1$

(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 2:

(i) $4p+7 = 4(-2)+7$ [Putting $p=-2$]

$= -8+7 = -1$

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

$= -3(-2)^2+4(-2)+7$ [Putting $p=-2$]

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

$= -12-8+7$

$= -20+7 = -13$

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

$= -2(-2)^3-3(-2)^2+4(-2)+7$ [Putting $p=-2$]

$= -2\times(-8)-3\times4-8+7$

$= 16-12-8+7$

$= -20+23 = 3$

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 3:

(i) $2x-7 = 2(-1)-7$ [Putting $x=-1$]

$= -2-7 = -9$

(ii) $-x+2 = -(-1)+2$ [Putting $x=-1$]

$= 1 + 2 = 3$

(iii) $x^2+2x+1 = (-1)^2+2(-1)+1$ [Putting $x=-1$]

$= 1 - 2 + 1$

$= 2 - 2 = 0$

(iv) $2x^2-x-2 = 2(-1)^2-(-1)-2$ [Putting $x=-1$]

$= 2 \text{ x } 1 + 1 - 2$

$= 2 + 1 - 2$

$= 3 - 2 = 1$

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 4:

(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 5:

(i) $2a + 2b = 2(0) + 2(-1)$ [Putting $a = 0, b = -1$]

$= 0 - 2 = -2$

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

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

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

$= 0 + 0 + 0 = 0$

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

$= 0 + 0 + 2 = 2$

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

Answer 6:

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

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

$= 10 - 13 = -3$

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

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

$= 16 - 1 = 15$

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

$= 11 \times 2 - 10$ [Putting $x = -1$]

$= 22 - 10 = 12$

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

$= 11x+7 = 11 \text{ x } 2 + 7$ [Putting $x=-1$]

$= 22 + 7 = 29$

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 7:

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

$= 2\times3+4$ [Putting $x=3$]

$= 6 + 4 = 10$

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

$= -4\times3+6$ [Putting $x=3$]

$= -12+6=-12$

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

$= -5(-1)+6$ [Putting $a=-1$]

$= 5 + 6 = 11$

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

$= -8(-2)+6$ [Putting $b=-2$]

$= 16 + 6 = 22$

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

$= 3a-2b-9 = 3(-1)-2(-2)-9$ [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 8:

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

$= 1000 - 3 \text{ x } 0 = 1000 - 0$

$= 1000$

(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 9:

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

$\Rightarrow$ $2(0)^2 + 0 - a = 5$ [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 10:

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

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

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

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

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

$\Rightarrow$ 2 x 25 – 15 + 3

$\Rightarrow$ 50 – 15 + 3

$\Rightarrow$ 38