Chapter 8 Algebraic Expressions Ex 8.3

Question 1.
If m = 2, find the value of:
(i) 3m – 5
(ii) 9 – 5m
(iii) $3m^2$ – 2m – 1
(iv) $\frac{5}{2}$ m – 4
Solution:

(i) 3m – 5 = 3 × 2 – 5 = 6 – 5 = 1

(ii) 9 – 5m = 9 – 5 × 2 = 9 – 10 = -1

(iii) $3m^2$ – 2m – 7

= $3(2)^2$ – 2 × 2 – 7

= 12 – 4 – 7

= 12 – 11

= 1

(iv) $\frac{5}{2}$ m – 4 = $\frac{5}{2}$ × 2 – 4 = 5 – 4 = 1

Question 2.
If p = -2, find the value of:
(1) 4p + 7
(ii) $-3p^2$ + 4p + 7
(iii) $-2p^3$ – $3p^2$ + 4p + 7

Solution:

p = -2

(i) 4p + 7

= 4 × (-2) + 7

= -8 + 7

= -1

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

= $-3(-2)^2 + 4(-2) + 7$

= -12 – 8 + 7

= -20 + 7

= -13

(iii) $-2p^3 – 3p^2 + 4p + 7$

= $-2(-2)^3 – 3(-2)^2 + 4(-2) + 7$

= 16 – 12 – 8 + 7

= 23 – 20

= 3

Question 3.

If a = 2, b = -2, find the value of:

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

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

(iii) $a^2 – b^2$

Solution:

a = 2, b = -2

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

$= (2)^2 + (-2)^2$

$= 4 + 4$

$= 8$

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

$= (2)^2 + 2 \times (-2) + (-2)^2$

$= 4 - 4 + 4$

$= 8 - 4$

$= 4$

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

$= (2)^2 - (-2)^2$

$= 4 - 4$

$= 0$

Question 4.
When a = 0, b = -1, find the value of the given expressions:
(i) $2a^2 + b^2 + 1$
(ii) $a^2 + ab + 2$
(iii) $2a^2b + 2ab^2 + ab$
Solution:

a = 0, b = -1

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

$= 2(0)^2 + (-1)^2 + 1$

$= 0 + 1 + 1$

$= 2$

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

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

$= 0 + 0 + 2$

$= 2$

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

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

$= 0 + 0 + 0$

$= 0$

Question 5.
If $p = -10$, find the value of $p^2 - 2p - 100$.
Solution:

$p = -10$,

$p^2 - 2p - 100$

$= (-10)^2 - 2(-10) - 100$

$= 100 + 20 - 100$

$= 20$

Question 6.
If $z = 10$, find the value of $z^3 - 3(z - 10)$.
Solution:

$z = 10$

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

$= (10)^3 - 3(10 - 10)$

$= 1000 - 3 \times o$

$= 1000 - 0$

$= 1000$

Question 7.
Simplify the following expressions and find their values when $x = 2$:
(i) $x + 7 + 4(x - 5)$
(ii) $3(x + 2) + 5x - 7$
(iii) $6x + 5(x - 2)$
(iv) $4(2x - 1) + 3x + 11$
Solution:

x = 2

(i) x + 7 + 4(x − 5)

= x + 7 + 4x − 20

= 5x − 13

= 5 × 2 − 13

= 10 − 13

= -3

(ii) 3(x + 2) + 5x − 7

= 3x + 6 + 5x − 7

= 8x − 1

= 8(2) − 1

= 16 − 1

= 15

(iii) 6x + 5(x − 2)

= 6x + 5x − 10

= 11x − 10

= 11 × 2 − 10

= 22 − 10

= 12

(iv) 4(2x − 1) + 3x + 11

= 8x − 4 + 3x + 11

= 11x + 7

= 11 × 2 + 7

= 22 + 7

= 29

Question 8.
Simplify the following expressions and find their values when a = -1, b = -2:
(i) 2a − 2b − 4 − 5 + a
(ii) 2(a² + ab) + 3 − ab

<u>Solution:</u>

a = -1, b = -2

(i) 2a − 2b − 4 − 5 + a

= 3a − 2b − 9

= 3(-1) − 2(-2) − 9

= -3 + 4 − 9

= -12 + 4

= -8

(ii) $2(a^2 + ab) + 3 − ab$

= $2a^2 + 2ab + 3 − ab$

= $2a^2 + ab + 3$

= $2(-1)^2 + (-1)(-2) + 3$

= 2 × 1 + 2 + 3

= 2 + 2 + 3

= 7