Exercise 6.2 Page No: 6.8

Question 1: If $f(x) = 2x^3 – 13x^2 + 17x + 12$, find
(i) f (2)
(ii) f (-3)
(iii) f(0)
Solution:
$f(x) = 2x^3 – 13x^2 + 17x + 12$

(i) $f(2) = 2(2)^3 – 13(2)^2 + 17(2) + 12$
= 2 x 8 - 13 x 4 + 17 x 2 + 12
= 16 - 52 + 34 + 12
= 62 – 52
= 10

(ii) $f(-3) = 2(-3)^3 – 13(-3)^2 + 17 \times (-3) + 12$
= 2 x (-27) – 13 x 9 + 17 x (-3) + 12
= -54 - 117 -51 + 12
= -222 + 12
= -210

(iii) $f(0) = 2 \times (0)^3 – 13(0)^2 + 17 \times 0 + 12$
= 0-0 + 0+ 12
= 12

Question 2: Verify whether the indicated numbers are zeros of the polynomials corresponding to them in the following cases:
(i) f(x) = 3x + 1, x = −1/3
(ii) $f(x) = x^2 – 1$, x = 1,−1
(iii) $g(x) = 3x^2 – 2$, x = 2/√3 , −2/√3
(iv) $p(x) = x^3 – 6x^2 + 11x – 6$, x = 1, 2, 3
(v) f(x) = 5x – π, x = 4/5
(vi) $f(x) = x^2$, x = 0
(vii) f(x) = lx + m, x = −m/l
(viii) f(x) = 2x + 1, x = 1/2

Solution:

(i) f(x) = 3x + 1, x = −1/3

f(x) = 3x + 1

Substitute $x = -1/3$ in f(x)

$f(-1/3) = 3(-1/3) + 1$

$= -1 + 1$

$= 0$

Since, the result is 0, so $x = -1/3$ is the root of $3x + 1$

(ii) $f(x) = x^2 - 1, x = 1, -1$

$f(x) = x^2 - 1$

Given that x = (1 , -1)

Substitute x = 1 in f(x)

$f(1) = 1^2 - 1$

$= 1 - 1$

$= 0$

Now, substitute x = (-1) in f(x)

$f(-1) = (-1)^2 - 1$

$= 1 - 1$

$= 0$

Since , the results when x = 1 and x = -1 are 0, so (1 , -1) are the roots of the polynomial $f(x) = x^2 - 1$

(iii) $g(x) = 3x^2 - 2$, $x = 2/\sqrt{3}$, $-2/\sqrt{3}$

$g(x) = 3x^2 - 2$

Substitute $x = 2/\sqrt{3}$ in g(x)

$g(2/\sqrt{3}) = 3(2/\sqrt{3})^2 - 2$

= 3(4/3) – 2

= 4 – 2

= 2 ≠ 0

Now, Substitute x = −2/√3 in g(x)

$g(2/\sqrt{3}) = 3(-2/\sqrt{3})^2 - 2$

= 3(4/3) – 2

= 4 – 2

= 2 ≠ 0

Since, the results when x = 2/√3 and x = −2/√3) are not 0. Therefore (2/√3 , −2/√3) are not zeros of $3x^2–2$.

(iv) $p(x) = x^3 - 6x^2 + 11x - 6$, x = 1, 2, 3

$p(1) = 1^3 - 6(1)^2 + 11x\ 1 - 6 = 1 - 6 + 11 - 6 = 0$

$p(2) = 2^3 - 6(2)^2 + 11x2 - 6 = 8 - 24 - 22 - 6 = 0$

$p(3) = 3^3 - 6(3)^2 + 11x3 - 6 = 27 - 54 + 33 - 6 = 0$

Therefore, x = 1, 2, 3 are zeros of p(x).

(v) f(x) = 5x – π, x = 4/5

f(4/5) = 5 x 4/5 – π = 4 – π ≠ 0

Therefore, x = 4/5 is not a zeros of f(x).

(vi) $f(x) = x^2$, x = 0

$f(0) = 0^2 = 0$

Therefore, x = 0 is a zero of f(x).

(vii) f(x) = lx + m, x = −m/l

f(−m/l) = l x −m/l + m = -m + m = 0

Therefore, x = −m/l is a zero of f(x).

(viii) f(x) = 2x + 1, x = ½

f(1/2) = 2x 1/2 + 1 = 1 + 1 = 2 ≠ 0

Therefore, x = ½ is not a zero of f(x).