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1. Find the value of the polynomial $(x)=5x-4x^2+3$
(i) $x = 0$
(ii) $x = -1$
(iii) $x = 2$

Solution:

Let $f(x) = 5x-4x^2+3$

(iii) When $x = 0$

$f(0) = 5(0)-4(0)^2+3$

$= 3$

(ii) When $x = -1$

$f(x) = 5x-4x^2+3$
$f(-1) = 5(-1)-4(-1)^2+3$
$= -5-4+3$
$= -6$

(iii) When $x = 2$

$f(x) = 5x-4x^2+3$
$f(2) = 5(2)-4(2)^2+3$
$= 10-16+3$
$= -3$

2. Find p(0), p(1) and p(2) for each of the following polynomials:

(i) $p(y)=y^2-y+1$

Solution:

$p(y) = y^2-y+1$
$\therefore p(0) = (0)^2-(0)+1=1$
$p(1) = (1)^2-(1)+1=1$
$p(2) = (2)^2-(2)+1=3$

(ii) $p(t)=2+t+2t^2-t^3$

Solution:

$p(t) = 2+t+2t^2-t^3$
$\therefore p(0) = 2+0+2(0)^2-(0)^3=2$
$p(1) = 2+1+2(1)^2-(1)^3=2+1+2-1=4$
$p(2) = 2+2+2(2)^2-(2)^3=2+2+8-8=4$

(iii) $p(x)=x^3$

Solution:

$p(x) = x^3$
$\therefore p(0) = (0)^3 = 0$

$p(1) = (1)^3 = 1$
$p(2) = (2)^3 = 8$

(iv) P(x) = (x−1)(x+1)

Solution:

$p(x) = (x–1)(x+1)$
$\therefore p(0) = (0–1)(0+1) = (−1)(1) = –1$
$p(1) = (1–1)(1+1) = 0(2) = 0$
$p(2) = (2–1)(2+1) = 1(3) = 3$

3. Verify whether the following are zeroes of the polynomial, indicated against them.

(i) p(x)=3x+1, x=−1/3

Solution:

For, $x = -1/3$, $p(x) = 3x+1$
$\therefore p(−1/3) = 3(-1/3)+1 = −1+1 = 0$
$\therefore$ -1/3 is a zero of p(x).

(ii) p(x)=5x–π, x = 4/5

Solution:

For, $x = 4/5$, $p(x) = 5x–\pi$
$\therefore p(4/5) = 5(4/5)-\pi = 4-\pi$
$\therefore$ 4/5 is not a zero of p(x).

(iii) p(x)=x^2−1, x=1, −1

Solution:

For, $x = 1, −1$;
$p(x) = x^2−1$
$\therefore p(1)=1^2−1=1−1 = 0$
$p(−1)=(-1)^2−1 = 1−1 = 0$
$\therefore$1, −1 are zeros of p(x).

(iv) p(x) = (x+1)(x–2), x =−1, 2

Solution:

For, $x = −1,2$;
$p(x) = (x+1)(x–2)$
$\therefore p(−1) = (−1+1)(−1–2)$
$= (0)(−3) = 0$
$p(2) = (2+1)(2–2) = (3)(0) = 0$
$\therefore$−1,2 are zeros of p(x).

(v) p(x) = x^2, x = 0

Solution:

For, $x = 0$ $p(x) = x^2$
$p(0) = 0^2 = 0$
$\therefore$ 0 is a zero of p(x).

(vi) p(x) = lx+m, x = −m/l

Solution:

For, x = -m/l ; p(x) = lx+m

∴ p(-m/l)= l(-m/l)+m = −m+m = 0

∴-m/l is a zero of p(x).

(vii) p(x) = 3x^2−1, x = -1/√3 , 2/√3

Solution:

For, x = -1/√3 , 2/√3 ; p(x) = 3x^2−1

∴p(-1/√3) = 3(-1/√3)^2-1 = 3(1/3)-1 = 1-1 = 0

∴p(2/√3) = 3(2/√3)^2-1 = 3(4/3)-1 = 4−1=3 ≠ 0

∴-1/√3 is a zero of p(x) but 2/√3 is not a zero of p(x).

(viii) p(x) =2x+1, x = 1/2

Solution:

For, x = 1/2 p(x) = 2x+1

∴ p(1/2)=2(1/2)+1 = 1+1 = 2≠0

∴1/2 is not a zero of p(x).

4. Find the zero of the polynomials in each of the following cases:

(i) p(x) = x+5

Solution:

p(x) = x+5

⇒ x+5 = 0

⇒ x = −5

∴ -5 is a zero polynomial of the polynomial p(x).

(ii) p(x) = x–5

Solution:

p(x) = x−5

⇒ x−5 = 0

⇒ x = 5

∴ 5 is a zero polynomial of the polynomial p(x).

(iii) p(x) = 2x+5

Solution:

p(x) = 2x+5

⇒ 2x+5 = 0

⇒ 2x = −5

⇒ x = -5/2

∴x = -5/2 is a zero polynomial of the polynomial p(x).

(iv)p(x) = 3x–2

Solution:

p(x) = 3x–2

⇒ 3x−2 = 0

⇒ 3x = 2

⇒x = 2/3

∴x = 2/3 is a zero polynomial of the polynomial p(x).

(v) p(x) = 3x

Solution:

p(x) = 3x

⇒ 3x = 0

⇒ x = 0

∴0 is a zero polynomial of the polynomial p(x).

(vi)p(x) = ax, a≠0

Solution:

p(x) = ax

⇒ ax = 0

⇒ x = 0

∴x = 0 is a zero polynomial of the polynomial p(x).

(vii)p(x) = cx+d, c ≠ 0, c, d are real numbers.

Solution:

p(x) = cx + d

⇒ cx+d =0

⇒ x = -d/c

∴ x = -d/c is a zero polynomial of the polynomial p(x).