polynomials (worksheet -1)

Grade-10

1. Which of the following is a true statement? **[1]**

   a) $5x^3$ is a monomial

   b) $x^2 + 5x - 3$ is a linear polynomial

   c) $x + 1$ is a monomial

   d) $x^2 + 4x - 1$ is a binomial

2. A quadratic polynomial whose product and sum of zeroes are $\frac{1}{3}$ and $\sqrt{2}$ respectively is **[1]**

   a) $3x^2 - x + 3\sqrt{2}x$

   b) $3x^2 - 3\sqrt{2}x + 1$

   c) $3x^2 + x - 3\sqrt{2}x$

   d) $3x^2 + 3\sqrt{2}x + 1$

3. If α, β are the zeros of the polynomial $f(x) = ax^2 + bx + c$, then $\frac{1}{\alpha^2} + \frac{1}{\beta^2} =$ **[1]**

   a) $\frac{b^2+2ac}{c^2}$

   b) $\frac{b^2-2ac}{c^2}$

   c) $\frac{b^2+2ac}{a^2}$

   d) $\frac{b^2-2ac}{a^2}$

4. The number of zeroes of a cubic polynomial is **[1]**

   a) at most 3

   b) 3

   c) at least 3

   d) 2

5. If $a - b$, a and $a + b$ are zeroes of the polynomial $x^3 - 3x^2 + x + 1$, then the value of $a + b$ is **[1]**

   a) $-1 - \sqrt{2}$

   b) 3

   c) $-1 + \sqrt{2}$

   d) $1 \pm \sqrt{2}$

6. The number polynomials having zeroes as – 2 and 5 is **[1]**

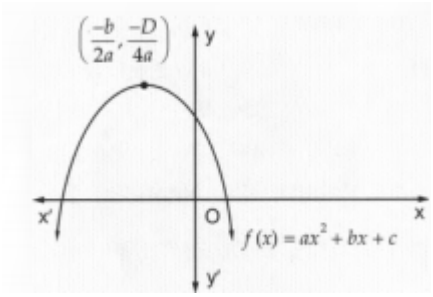
   a) 1

   b) 2

   c) 3

   d) more than 3

7. If the diagram in Fig. shows the graph of the polynomial $f(x) = ax^2 + bx + c$, then **[1]**



   a) a < 0, b < 0 and c < 0

   b) a < 0, b > 0 and c > 0

   c) a < 0, b < 0 and c > 0

   d) a < 0, b > 0 and c < 0

8. If the sum of the zeros of the quadratic polynomial for $kx^2 + 2x + 3k$ is equal to the product of **[1]**

its zeros then k = ?

a) $\frac{1}{3}$ b) $\frac{2}{3}$

c) $\frac{-2}{3}$ d) $\frac{-1}{3}$

9. The zeroes of the quadratic polynomial x^2 + 99x + 127 are **[1]**

a) both negative b) one positive and one negative

c) both positive d) both equal

10. The polynomial to be added to the polynomial $x^4 + 2x^3 - 2x^2 + x - 1$ so that the resulting polynomial is exactly divisible by $x^2 + 2x - 3$ is **[1]**

a) $x^2 + 1$ b) 2 – x

c) x – 2 d) x + 2

11. Match the column: **[2]**

(a) If Sum and Product of Polynomial respectively -3, 2, then the polynomial is	(i) x^2+7x+10
(b) Sum and Product of Polynomial respectively 0,-15, then the polynomial is	(ii) $3x^2$-x-4
(c) If Sum and Product of Polynomial respectively $\frac{1}{3}, \frac{-4}{3}$, then the polynomial is	(iii) x^2+3x+2
(d) If Sum and Product of Polynomial respectively -7,10, then the polynomial is	(iv) x^2-15

12. Match the column: **[2]**

Polynomial	Zeroes of polynomial
(a) $4x^2$-9	(i) $2\sqrt{2}, -2\sqrt{2}$
(b) x^2-16	(ii) $\sqrt{3}, -\sqrt{3}$
(c) x^2-8	(iii) $\frac{3}{2}, \frac{-3}{2}$
(d) t^2-3	(iv) 4,-4

13. Match the following: **[2]**

Linear Equation	Number of variables
(a) y - x = 1	(i) 1
(b) 2x + 3 = 7	(ii) 2
(c) p + 2q = 8r - 2s	(iii) 3
(d) ax + by + cz = 0	(iv) 4

14. Match the column: **[2]**

(a) If Polynomial and Divisor is $2x^2$+3x+1, x+2, then Quotient and remainder is	(i) x-2, 3
(b If Polynomial and Divisor is $3x^3$+x^2+2x+5, x^2+2x+1, then Quotient and remainder is	(ii) 2x-1, 3
(c) If Polynomial and Divisor is -x^3+3x^2-3x+5, -x^2+x-1, then Quotient and	(iii) -x^2-2,

remainder is	-5x+2
(d) If Polynomial and Divisor is x^4-5x+6, $-x^2$+2, then Quotient and remainder is	(iv) 3x-5, 9x+10

15. Match the column: **[2]**

Zeroes	Quadratic Polynomial
(a) $5+\sqrt{3}, 5-\sqrt{3}$	(i) x^2 + x - 20
(b) -5, 4	(ii) x^2 - 6x + 7
(c) $\frac{2-\sqrt{2}}{6}, \frac{2+\sqrt{2}}{6}$	(iii) x^2 - 10x + 22
(d) $3+\sqrt{2}, 3-\sqrt{2}$	(iv) x^2 - $\frac{2}{3}$x + $\frac{1}{18}$

16. Match the column: **[2]**

Sum and product of Zeroes	Quadratic Polynomial
(a) Sum = 6, Product = 7	(i) x^2 + 5x + 5
(b) Sum = $-\frac{1}{2}$, Product = $\frac{1}{2}$	(ii) $3x^2$ - 7x + 8
(c) Sum = -5, Product = 5	(iii) 2x + x + 1
(d) Sum = $\frac{7}{3}$, Product = $\frac{8}{3}$	(iv) x^2 - 6x + 7

17. Match the following table: **[2]**

Polynomial	Degree
(a) $7x^6 + 5x^5 + 3x^4$ - 4x + 2	(i) 2
(b) $2z^2$ + 4z - 6	(ii) 10
(c) $4y^3$ - 2y + 5	(iii) 6
(d) x^{10} - x^5 + 4	(iv) 3

18. Match the following table: **[2]**

Polynomial	Zeroes
(a) $2x^2$ - 8x + 6	(i) $\frac{1}{3}$, -2
(b) $3x^2$ + 5x - 2	(ii) -2, 4
(c) x^2 + 7x + 10	(iii) 1, 3
(d) x^2 - 2x - 8	(iv) -2, -5

19. Find a quadratic polynomial whose one zero is -5 and product of zeroes is 0. **[1]**

20. p(x) = g(x)q(x) + r(x). If degree of g(x) = 4, degree of q(x) = 3 and degree of r(x) = 2, then find the degree of p(x). **[1]**

21. Find the sum of the zeroes of the given quadratic polynomial $-3x^2$+ k. **[1]**

22. Divide $15y^4$ - $16y^3$ + $9y^2$ - $\frac{10}{3}$y by 3y - 2. **[1]**

23. Verify that x = 3 is a zero of the polynomial. p(x) = $2x^3 - 5x^2 - 4x + 3$. **[1]**

24. If α and β are the zeros of the polynomial f(x) = $x^2 + x - 2$, find the value of $\left(\frac{1}{\alpha} - \frac{1}{\beta}\right)$. **[2]**

25. α and $\frac{1}{\alpha}$ are zeroes of polynomial $4x^2 - 2x + (k - 4)$. Find the value of k. **[2]**

26. Find the zeroes of quadratic polynomial given as: $6x^2 - 3 - 7x$ and also verify the relationship between the zeroes and the coefficients. **[2]**

27. If α and β are the zeros of the quadratic polynomial f(x) = $ax^2 + bx + c$, then evaluate: $\frac{1}{\alpha} - \frac{1}{\beta}$. **[2]**

28. Find the zeros of the polynomial f(x) = $x^2 - 2$ and verify the relationship between its zeros and coefficients. **[2]**

29. Find all the zeroes of the polynomial $2x^4 - 9x^3 + 5x^2 + 3x - 1$, if two of its zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$. **[3]**

30. Divide the polynomial p(x) by the polynomial g(x) and find the quotient and remainder in given equation. $p(x) = x^4 - 3x^2 + 4x + 5, g(x) = x^2 + 1 - x$ **[3]**

31. Find all the zeros of $(2x^4 - 3x^3 - 5x^2 + 9x - 3)$, it being given that two of its zeros are $\sqrt{3}$ and $-\sqrt{3}$. **[3]**

32. If α and β are the zeros of the quadratic polynomial f(x) = $x^2 - 2x + 3$, find a polynomial whose roots are $\alpha + 2, \beta + 2$ **[3]**

33. Verify division algorithm for the polynomials f(x) = $8 + 20x + x^2 - 6x^3$ and g(x) = $2 + 5x - 3x^2$. **[3]**

34. If two zeroes of the polynomial p(x) = $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$. Find the other zeroes. **[5]**

35. If the two zeroes of the polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$are $2 \pm \sqrt{3}$, find other zeroes. **[5]**

36. Find the zeros of f(s) = $2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$ and verify the relationship between the zeros and its coefficients. **[5]**

37. When a polynomial f(x) is divided by $x^2 - 5$, the quotient is $x^2 - 2x - 3$ and remainder is zero. Find the polynomial and all its zeroes. **[5]**

38. Divide the polynomial $6x^4 - 44x^2 + 6x - 3$ by the polynomial $x^2 - 3x + 1$ and verify the division algorithm **[5]**

39. If zeroes α and β of a polynomial $x^2 - 7x + k$ are such that $\alpha - \beta = 1$, then find the value of k. **[2]**

40. For what value of k, is 3 a zero of the polynomial $2x^2 + x + k$? **[2]**

41. State True or False: **[5]**

    a) If the graph of a polynomial intersects the x-axis at only one point it need not be a quadratic polynomial. Justify your answer.

    b) Graph of constant polynomial never meets x axis.

    c) The zeros of the polynomial $x^2 + \frac{1}{6}x - 2$ are $\frac{-3}{2}, \frac{4}{3}$.

    d) A real number 'k' is said to be a zero of a polynomial p(x), if p(k) = 0.

    e) Every real number is the zero of a zero polynomial.

42. Fill in the blanks: **[5]**

    a) The remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by x - 1 is _____.

    b) The product of the zeroes of $-2x^2 + kx + 6$ is _____.

c) The highest power of x in a polynomial f(x), is called the _____ of the polynomial f(x).

d) The value of $5.63 \times 5.63 + 11.26 \times 2.37 + 2.37 \times 2.37$ is _____.

e) If -1 is a zero of the polynomial $f(x) = x^2 - 7x - 8$, then the other zero of this polynomial is _____.