2 POLYNOMIALS

OBJECTIVE SECTION
[BASIC/STANDARD]

I. MULTIPLE CHOICE QUESTIONS

1. A quadratic polynomial, whose zeroes are –3 and 4, is : [NCERT(EP)]

(a) $x^2 - x + 12$ (b) $x^2 + x + 12$ (c) $\frac{x^2}{2} - \frac{x}{2} - 6$ (d) $2x^2 + 2x - 24$

2. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are :

(a) both positive (b) both negative

(c) one positive and one negative (d) both equal

3. If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $c \neq 0$ are equal, then :

(a) c and a have opposite signs (b) c and b have opposite signs

(c) c and a have the same sign (d) c and b have the same sign

4. If the sum of the zeroes of the polynomial $p(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is :

(a) 2 (b) 4 (c) –2 (d) –4

5. If the product of the zeroes of the polynomial $p(x) = ax^3 - 6x^2 + 11x - 6$ is 4, then the value of a is :

(a) $\frac{1}{2}$ (b) $\frac{5}{3}$ (c) $\frac{3}{2}$ (d) $\frac{-1}{5}$

6. If α and β are the zeroes of the polynomial $p(x) = x^2 + px + q$, then a polynomial having $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ as its zeroes is :

(a) $x^2 + \frac{p}{q}x + \frac{1}{q}$ (b) $x^2 - \frac{p}{q}x + \frac{1}{q}$ (c) $x^2 - \frac{p}{q}x - \frac{1}{q}$ (d) $x^2 + \frac{p}{q}x + \frac{1}{q}$

7. If α, β are the zeroes of $p(x) = x^2 - 5x + b$ and $\alpha - \beta = 1$, then b is :

(a) 1 (b) 6 (c) 4 (d) 0

8. Given that one of the zeroes of a cubic polynomial $3x^3 + 5x^2 - 9x + a$ is zero. The value of a is :

(a) $\frac{-5}{3}$ (b) –3 (c) 3 (d) 0

9. If α and β are zeroes of $x^2 + 4x + 4$, then :

(a) $\alpha = \beta$, $\alpha + \beta = -4$ (b) $\alpha = -\beta$, $\alpha + \beta = 4$

(c) $\alpha = \beta$, $\alpha + \beta = 4$ (d) $\alpha = -\beta$, $\alpha + \beta = -4$

10. If the two zeroes of the cubic polynomial $x^3 + x^2$ are zero each, then the third zero is :
(a) 0 (b) 1 (c) 2 (d) –1

11. If the graph of $y = p(x)$, where $p(x)$ is a quadratic polynomial cuts x-axis at different points, the $p(x)$ has :
(a) no zero (b) exactly one zero
(c) exactly two zeroes (d) none of these

12. If α, β and γ are zeroes of a cubic polynomial $ax^3 + bx^2 + cx + d$, then $\alpha\beta + \beta\gamma + \gamma\alpha$ is :
(a) $\frac{d}{a}$ (b) $\frac{-c}{a}$ (c) $\frac{c}{a}$ (d) $\frac{-a}{b}$

13. If two zeroes of the polynomial $x^3 - 5x^2 - 16x + 80$ are equal in magnitude but opposite in sign, then its zeroes are :
(a) 4, –4, 5 (b) 3, –3, 5 (c) 2, –2, 5 (d) 1, –1, 5

14. If α, β are the zeroes of the quadratic polynomial $p(x) = x^2 - 5x + 4$, then $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$ equals :
(a) $\frac{27}{4}$ (b) $\frac{-27}{4}$ (c) $\frac{4}{27}$ (d) $\frac{-4}{27}$

15. If two zeroes of the polynomial $x^3 + x^2 - 9x - 9$ are 3 and –3, then its third zero is :
(a) –1 (b) 2 (c) –2 (d) 3

16. If $\sqrt{5}$ and $-\sqrt{5}$ are two zeroes of the polynomial $p(x) = x^3 + 3x^2 - 5x - 15$, then its other zero is :
(a) 2 (b) –3 (c) 4 (d) –4

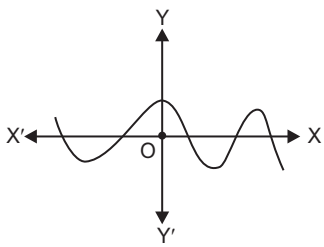
17. If the polynomial $p(x) = 3x^4 + 5x^3 - 7x^2 + 2x + 2$ is divided by $g(x) = x^2 + 3x + 1$, then the value of quotient is :
(a) $2x^2 - 4x + 2$ (b) $3x^2 - 4x + 2$ (c) $3x^2 + 4x + 2$ (d) $3x^2 - 4x - 2$

18. On dividing $2x^2 + 3x - 2$ by $x + 2$, the quotient is :
(a) $3x + 1$ (b) $3x - 1$ (c) $2x - 1$ (d) $2x + 1$

19. On dividing $3x^3 + x^2 + 2x + 5$ by $1 + 2x + x^2$, the remainder is :
(a) $9x - 10$ (b) $9x + 10$ (c) $8x + 5$ (d) $8x - 5$

20. If zeroes of a polynomial $p(x)$ are $\sqrt{2}$ and $-\sqrt{2}$, then the polynomial which is a factor of $p(x)$ is :
(a) $x^2 + 2$ (b) $x^2 - 2$ (c) $x - 2$ (d) $x + 2$

21. The graph of $y = p(x)$, where $p(x)$ is a polynomial in variable x is as follows. The number of zeroes of $p(x)$ is :
[CBSE(SP) 2019]



(a) 2 (b) 3
(c) 5 (d) 0

22. The sum of the zeroes of the polynomial $2x^2 - 8x + 6$ is :

[CBSE(SP) 2019]

(a) -3 (b) 3 (c) -4 (d) 4

23. If α and β are the zeroes of the polynomial $px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then p =

(a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) 3 (d) 2

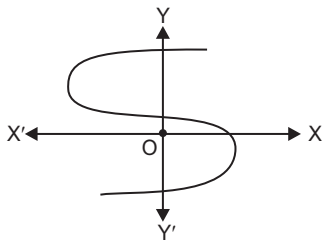
24. If α and β are the zeroes of $ax^2 - bx + c = 0$ ($a \neq 0$), then $\alpha + \beta$ is :

(a) $\frac{-b}{a}$ (b) $\frac{c}{a}$ (c) $\frac{b}{a}$ (d) $\frac{-c}{a}$

25. If α and β are the zeroes of the polynomial $x^2 + x + 1$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is :

(a) -1 (b) 1 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

26. The graph of $y = p(x)$, where $p(x)$ is a polynomial, is shown. The number of zeroes of the polynomial $p(x)$ is :



(a) 3 (b) 2

(c) 1 (d) no zero

27. If α and β are the zeroes of the polynomial $x^2 + 6x + 2$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is :

(a) 3 (b) -3 (c) 12 (d) -12

28. A quadratic polynomial whose zeroes are $\frac{3}{5}$ and $\frac{-1}{2}$ is :

(a) $10x^2 + x + 3$ (b) $10x^2 + x - 3$ (c) $10x^2 - x + 3$ (d) $10x^2 - x - 3$

29. If 1 is a zero of the polynomial $p(x) = ax^2 - 3(a - 1)$, then the value of a is :

(a) 3 (b) 2 (c) $-\frac{2}{3}$ (d) $\frac{3}{2}$

30. If one zero of the quadratic polynomial $2x^2 - 3x + p$ is 3, then its other zero is :

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

31. If α, β are the zeroes of a polynomial such that $\alpha + \beta = 6$ and $\alpha\beta = 4$, then the polynomial is :

(a) $x^2 - 6x + 4$ (b) $-x^2 + 6x - 4$ (c) $x^2 - 6x - 4$ (d) none of these

32. If two zeroes of a quadratic polynomial are $5 - 3\sqrt{2}$ and $5 + 3\sqrt{2}$, then the quadratic polynomial is :

(a) $x^2 - 10x - 7$ (b) $x^2 - 10x + 6$ (c) $x^2 - 10x + 14$ (d) $x^2 - 10x + 7$

33. If α and β are the zeroes of the quadratic polynomial $p(x) = ax^2 + bx + c$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is :

(a) $\frac{-b}{a}$ (b) $\frac{b}{c}$ (c) $\frac{-b}{c}$ (d) $\frac{-a}{b}$

34. If α and β are the zeroes of the quadratic polynomial $p(x) = ax^2 + bx + c$, then $\frac{1}{\alpha}+\frac{1}{\beta} - 2\alpha\beta$ is :

(a) $\frac{-ab-2c^2}{ac}$ (b) $\frac{ab+2c^2}{ac}$ (c) $\frac{ab+b^2}{2c}$ (d) $\frac{-c^2+ab}{2ac}$

35. If α and β are the zeroes of the quadratic polynomial $p(x) = ax^2 + bx + c$, then $\alpha^3\beta^2 + \alpha^2\beta^2 =$

(a) $\frac{-bc}{a^3}$ (b) $\frac{-bc^2}{a^3}$ (c) $\frac{-ac}{b^3}$ (d) $\frac{-a^2c}{b^3}$

36. If α and β are the zeroes of the quadratic polynomial $x^2 - 5x + k$ such that $\alpha - \beta = 1$, then $k =$

(a) 2 (b) 3 (c) 4 (d) 6

37. If α, β and γ are the zeroes of the polynomial $px^3 - 5x + 9$ and $\alpha^3 + \beta^3 + \gamma^3 = 27$, then :

(a) $p = 0$ (b) $p = 1$ (c) $p = 2$ (d) $p = -1$

38. If α and β are the zeroes of the polynomial $p(x) = 2x^2 + 5x + k$ satisfying the relation $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$, then the value of k is :

(a) 1 (b) 2 (c) 3 (d) 4

39. The value of k such that $3x^2 + 2kx - k - 5$ has the sum of the zeores as half of their product is :

(a) $\frac{2}{3}$ (b) $\frac{5}{3}$ (c) $\frac{7}{3}$ (d) $\frac{8}{3}$

40. If the sum and the product of the zeroes of the polynomial $p(x) = 4x^2 - 27x + 3k^2$ are equal, then the value of k is :

(a) ± 2 (b) ± 3 (c) ± 5 (d) ± 1

41. If α, β are the zeroes of $x^2 - 6x + k$, then the value of k when $3\alpha + 2\beta = 20$ is :

(a) 13 (b) –14 (c) 15 (d) –16

42. If the degree of polynomial $p(x)$ is n, then the maximum number of zeroes it can have is :

(a) n (b) n^2 (c) n^3 (d) none of these

43. The value of k, if –4 is a zero of polynomial $x^2 - x - (2k + 2)$ is :

(a) 5 (b) 6 (c) 7 (d) 9

44. Zeroes of the polynomial $4x^2 - 9$ are :

(a) $\pm\frac{2}{3}$ (b) $\pm\frac{3}{2}$ (c) $\pm\frac{5}{2}$ (d) none of these

45. Sum of the zeroes of the polynomial $x^3 - 4x$ is :

(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 0 (d) $-\frac{3}{2}$

46. If p and q are the zeroes of $ax^2 - bx + c$, $a \neq 0$, then the value of $p + q$ is :

(a) $\frac{b}{a}$ (b) $\frac{c}{a}$ (c) $\frac{d}{a}$ (d) $-\frac{b}{a}$

47. If 2 and –3 are the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$, then the value of $a + b$ is :

(a) –5 (b) 0 (c) 6 (d) –6

48. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively, then $g(x)$ is :

(a) $x^2 + x - 1$ (b) $x^2 - x + 1$ (c) $x^2 + 2x - 2$ (d) $x^2 + 2x + 3$

49. If $p(x) = 3x^4 + 5x^3 - 7x^2 + 2x + 2$ is divided by $g(x) = x^2 + 3x + 1$, then reminder is :

(a) 1 (b) 0 (c) –1 (d) 2

50. If 1 is a zero of the polynomial $7x - x^3 - 6$, then other zeroes are :

(a) 1 and 2 (b) 2 and –3 (c) –3 and 2 (d) –2 and –3

II. FILL IN THE BLANKS

1. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is –1, then the product of other two zeroes is _____.

2. If two zeroes of the polynomial $p(x) = x^3 - 4x^2 - 3x + 12$ are $\sqrt{3}$ and $-\sqrt{3}$, then its third zero = _____.

3. If one zero of the polynomial $ax^2 + bx + c$ is double the other, then $2b^2$ = _____.

4. The value of p for which the polynomial $x^3 + 4x^2 - px + 8$ is exactly divisible by $(x - 2)$ is _____.

5. If $x^2 + x - 12$ divides $p(x) = x^3 + ax^2 + bx - 84$ exactly, then a and b are respectively _____ and _____.

6. On dividing the polynomial $p(x)$ by $g(x) = 4x^2 + 3x - 2$, the quotient $q(x) = 2x^2 + 2x - 1$ and remainder $r(x) = 14x - 10$, then $p(x)$ = _____.

7. If $(x + a)$ is a factor of two polynomials $x^2 + px + q$ and $x^2 + mx + n$, then $\frac{n-q}{m-p}$ = _____.

8. If 2 and –2 are the zeroes of the polynomial $p(x) = x^4 + 2x^3 - 7x^2 - 8x + 12$, then its other zeroes are _____.

9. If 1 is a zero of the polynomial $7x - x^3 - 6$, then its other zeroes are _____.

10. If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of $2x^2 - 5x - 3$, then the value of p and q are respectively _____ and _____.

11. If α and β are the zeroes of the polynomial $2x^2 + 7x + 5$, then $\alpha + \beta + \alpha\beta$ = _____.

12. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, then the remainder comes out to be $(ax + b)$, then $a + b$ = _____.

13. If α and β are the zeroes of the quadratic polynomial $p(x) = kx^2 + 4x + 4$ such that $\alpha^2 + \beta^2 = 24$, then the value of k = _____.

14. If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, then the value of k = _____.

15. If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - px + q$, then $\alpha^2 + \beta^2$ = _____.

III. VERY SHORT ANSWER QUESTIONS

1. What is the degree of a polynomial?

2. Write the quadratic polynomial with real co-efficients in standard form.

3. What is the zero of a polynomial?

4. What is the zero of the linear polynomial $ax - b$?

5. Graph of a quadratic polynomial may be a straight line. Is it true?

6. A cubic polynomial can have at most how many zeroes?

7. Find the sum of the zeroes of the polynomial $2x^2 - x + 4$.

8. What is the product of zeroes of the polynomial $y^2 - 5y - 3$?

9. Write the polynomial whose zeroes are – 1 and 2.

10. State division algorithm for polynomials.

ANSWERS

I. **Multiple Choice Questions :**

1. (*c*)	2. (*b*)	**3.** (*c*)	**4.** (*b*)	**5.** (*c*)	**6.** (*d*)	7. (*b*)	**8.** (*d*)	**9.** (*a*)
10. (*d*)	11. (*c*)	**12.** (*c*)	**13.** (*a*)	**14.** (*b*)	**15.** (*a*)	**16.** (*b*)	**17.** (*b*)	**18.** (*c*)
19. (*b*)	20. (*b*)	**21.** (*c*)	**22.** (*d*)	**23.** (*b*)	**24.** (*c*)	**25.** (*a*)	**26.** (*c*)	**27.** (*b*)
28. (*d*)	29. (*d*)	**30.** (*a*)	**31.** (*a*)	**32.** (*d*)	**33.** (*c*)	**34.** (*a*)	**35.** (*b*)	**36.** (*d*)
37. (*d*)	38. (*b*)	**39.** (*b*)	**40.** (*b*)	**41.** (*d*)	**42.** (*a*)	**43.** (*d*)	**44.** (*b*)	**45.** (*c*)
46. (*a*)	47. (*d*)	**48.** (*b*)	**49.** (*b*)	**50.** (*c*)				

II. **Fill in the Blanks :**

1. $b - a + 1$ **2.** 4 **3.** $9ac$ **4.** $p = 16$ **5.** 8, –5 **6.** $8x^4 + 14x^3 - 2x^2 + 7x - 8$

7. a **8.** 1, –3 **9.** –3, 2 **10.** –5, –6 **11.** –1 **12.** 9 **13.** –1, $\frac{2}{3}$ **14.** 6 **15.** $p^2 - 2q$

III. **Very Short Answer Questions :**

2. $ax^2 + bx + c$, $b \neq 0$ 4. $\frac{b}{a}$ **5.** no **6.** 3 **7.** $\frac{1}{2}$ **8.** –3 **9.** $x^2 - x - 2$