

SECTION I

Very-Very Short Answer (1 Marks)

1. Write all the terms of the polynomial $x^3 - 4x^2 - 3x + 2$.
2. Find the value of m if $y + 2m$ is a factor of $y^5 - 4m^2y^3 + 2y + 2m + 3$.
3. If side of a square is $(x + 2y - z)$ units then the area of the square is _____.
4. Find remainder when the polynomial $(p^2 - p - 29)$ is divided by $(p - 6)$.
5. If $p + q + r = 9$ then find the value of $(3 - p)^3 + (3 - q)^3 + (3 - r)^3$.
6. The degree of the polynomial $\sqrt{5}$ is _____.
7. Find the value of $q(-6) - q(-5)$ if $q(x) = 4x + 1$.
8. A quadratic polynomial can be written as the product of _____ linear polynomials.
9. A cubic polynomial has _____ zeroes.
10. $(49)^3 - (30)^3 + \underline{\hspace{2cm}} = 3 \times 49 \times 30 \times 19$
11. Check whether $x = 3$ is a zero of the polynomial $x^3 - 3x + x - 3$.
12. Find the zero of the polynomial $7x + 1 = 0$.
13. Find the value of k if $x^2 + mx - 30 = (x - 5)(x + 6)$.
14. When a polynomial $q(x)$ is divided by $(x - 2)$ and the remainder $q(2) = 0$ then $(x - 2)$ is a _____ of the polynomial.
15. The degree of a zero polynomial is _____.
16. The polynomial $(x + a)(x - a)$ has _____ zeroes.
17. What is the value of polynomial $x^3 + 3x^2 + 1$ at $x = -1$.
18. A _____ polynomial has one and only one zero.
19. The coefficient of x in $x^3 + 4x^2 - 2x + 1$ is _____.
20. $x^3 - 64$ is a polynomial of degree _____ having _____ terms.
21. Express -7 as a polynomial of degree zero.
22. The constant polynomial has _____ term/s.
23. Write the coefficient of x for the polynomial $x^2 - 9$.
24. A quadratic polynomial can have atmost _____ terms.
25. The variable of the polynomial $x + b$ is _____.
26. Find $p(0)$ if $p(x) = x^3 - 2x^2 + x + 1$.

CASE-STUDY QUESTIONS

27. A tree plantation campaign is organised in a government school. Under this campaign, the students of class IX planted total $2x^3 + x^2 - 2x - 1$ trees. The total number of students in class IX are $(x+1)$ and each student planted equal number of trees. The trees are arranged in rows and columns. The number of rows are $(2x+1)$.
- (i) The number of trees planted by each student are
 (a) $x+2$ (b) $x+1$ (c) $(2x+1)(x+1)$ (d) $(2x+1)(x-1)$
 - (ii) If total 2079 trees are planted then the value of x is
 (a) 100 (b) 10 (c) 1000 (d) 20
 - (iii) The number of columns are
 (a) (x^2-1) (b) $(2x+1)$ (c) $(2x-1)$ (d) x^2+1
 - (iv) The third factor of the polynomial $2x^3 + x^2 - 2x - 1$ is
 (a) $(2x-1)$ (b) $(x+1)$ (c) $(2x+1)$ (d) $(x-1)$
 - (v) Which of the following is not a zero of $2x^3 + x^2 - 2x - 1$?
 (a) 1 (b) $\frac{1}{2}$ (c) -1 (d) $-\frac{1}{2}$
28. Mahesh wants to paint a wall of his room. He decides to paint the wall in two colours, pink and white, divided diagonally. The length and breadth of the wall are $(x+4)$ and $(3x+2)$ respectively. The diagonal of the wall is x^2+3x .
- (i) The area of the wall is _____ polynomial.
 (a) linear (b) quadratic (c) cubic (d) biquadratic
 - (ii) The area of the wall is
 (a) $(x+4)(3x+2)$ (b) $(x+4)+(3x+2)$
 (c) $(x+4)-(3x-2)$ (d) $(x+4) \div (3x+2)$
 - (iii) Mahesh wished to draw flowers in the squared area of the wall. For this the breadth should be reduced by
 (a) $2(x+3)$ (b) $(x-4)$ (c) $(3x+2)$ (d) $2(x-1)$
 - (iv) The zero of the polynomial $(x+4)$ is
 (a) 0 (b) 4 (c) -4 (d) $\frac{1}{4}$
 - (v) If $x=2$, the area to be painted pink is
 (a) 14 (b) 20 (c) 24 (d) 28

Very short Answer Question (2 Marks)

29. Check whether $q(x)$ is a multiple of $r(x)$ or not.
Where $q(x) = 2x^3 - 11x^2 - 4x + 5$, $r(x) = 2x + 1$
30. Show that $(x-5)$ is a factor of $x^3 - 3x^2 - 4x - 30$.
31. Evaluate by using suitable identity : $(997)^2$
32. Find the zeroes of the polynomial $p(x) = x(x-2)(x+3)$
33. Find the quotient when $3x^2 - 7x - 6$ is divided by $(x-3)$
34. Factorize $8x^3 + \sqrt{27} y^3$.
35. If $p(x) = x + 9$, then find $p(x) + p(-x)$
36. Find the product without multiplying directly 106×94 .
37. Find the value of $(351)^2 - (350)^2$.
38. Find the value of $(a+b)$ if $(x+2)(x-5) = x^2 + (a+b)x + ab$
39. The factors of $5x^2 - 18x + 9$ are $(ax+b)$ and $(x+b)$. Find the values of a and b .
40. Find $p(1) + p(-1) + p(10)$ if $p(x) = x^2 - 3x + 2$
41. Find $(x-y)^2$ if $\frac{x}{y} + \frac{y}{x} = 2$.
42. Find the value of k when $(-x^{140} - 2x^{151} + k)$ is divided by $(x+1)$.
43. Show that -1 is a zero of $3x^4 - x^3 + 3x - 1$.
44. Multiply $(x+1)(x-y)$.
45. Write the type of the polynomial $x^3 + 3x^2 + 1$ based on terms and degree.

Short Answer Type Questions**(3 Marks)**

46. Factorize : $64a^2 + 96ab + 36b^2$
47. Factorize : $x^3 + 6x^2 + 11x + 6$
48. If $x^2 + y^2 = 49$ and $x - y = 3$, then find the value of $x^3 - y^3$.
49. Simplify : $(5a-2b)(25a^2+10ab+4b^2) - (2a+5b)(4a^2-10ab+25b^2)$
50. Find the sum of remainders when $x^3 - 3x^2 + 4x - 4$ is divided by $(x-1)$ and $(x+2)$.
51. Find the product $\left(p - \frac{1}{p}\right) \left(p + \frac{1}{p}\right) \left(p^2 + \frac{1}{p^2}\right) \left(p^4 + \frac{1}{p^4}\right)$
52. Factorize : $7\sqrt{2}k^2 - 10k - 4\sqrt{2}$.
53. Simplify : $(3x-4y)^3 - (3x+4y)^3$

54. Using appropriate identity, expand $(2a)^3 + b^3 + (3c)^3 - 18abc$.
55. Simplify : $(x+y+z)^2 - (x-y-z)^2$.
56. Factorize : $125x^3 + 8y^3 + z^3 - 30xyz$.
57. $x+2$ is a factor of polynomial $ax^3 + bx^2 + x - 2$ and the remainder 4 is obtained on dividing this polynomial by $(x-2)$. Find the value of a and b .
58. If the polynomials $ax^3 + 4x^2 + 3x - 4$ & $x^3 - 4x + a$ leave the same remainder when divided by $(x-3)$, find the value of a .
59. If $\left(\frac{9}{10}\right)^3 - \left(\frac{2}{5}\right)^3 - \left(\frac{1}{2}\right)^3 = \frac{x}{50}$, find x
60. If $(x-3)$ and $\left(x - \frac{1}{3}\right)$ are factors of the polynomial $px^2 + 3x + r$, show that $p = r$.

Long Answer Type Questions

(5 Marks)

61. A literacy campaign was organised by Class IX girl students under NSS. Students made $(x-5)$ rows and $(3x-4)$ columns for the rally. Write the total number of students in the form of a polynomial.
62. i) Using identity, find the value of $(-7)^3 + (5)^3 + (2)^3$.
 ii) Find dimensions of cube whose volume is given by the expression $4x^2 + 14x + 6$.
63. Give possible expression for the length and breadth of each of the following rectangles if.
 i) Area = $(x^2 + 5\sqrt{5}x + 30)$ sq. unit.
 ii) Area = $(24x^2 - 26x - 8)$ sq. unit.
64. If $a + b + c = 0$, find the value of $\frac{(b+c)^2}{bc} + \frac{(c+a)^2}{ca} + \frac{(a+b)^2}{ab}$
65. Simplify : $\frac{(a^2-b^2)^3 + (b^2-c^2)^3 + (c^2-a^2)^3}{(a-b)^3 + (b-c)^3 + (c-a)^3}$
66. Factorize
 $(2a-b-c)^3 + (2b-c-a)^3 + (2c-a-b)^3$
67. If the polynomial $4x^3 - 16x^2 + ax + 7$ is exactly divisible by $x-1$, then find the value of a . Hence factorize the polynomial.

68. If $p, q, \& r$ are all non zero and $p+q+r=0$, prove that

$$\frac{p^2}{qr} + \frac{q^2}{rp} + \frac{r^2}{pq} = 3$$
69. Factorize: $9x^3 - 27x^2 - 100x + 300$
70. If $(x+4)$ is a factor of the polynomial $x^3 - x^2 - 14x + 24$, find the other factors.
71. If $\frac{x}{y} + \frac{y}{x} = -1$ where $x \neq 0, y \neq 0$ then find the value of $x^3 - y^3$.
72. Simplify:
$$\frac{155 \times 155 + 155 \times 55 + 55 \times 55}{155 \times 155 \times 155 - 55 \times 55 \times 55}$$

CHAPTER-2 POLYNOMIALS Hints & Answers

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|--|--|
| <p>1. $x^3, -4x^2, -3x, 2$</p> <p>2. $\frac{3}{2}$</p> <p>3. $(x+2y-z)^2$</p> <p>4. 1</p> <p>5. $3(3-p)(3-q)(3-r)$</p> <p>6. 0</p> <p>7. -4</p> <p>8. two</p> <p>9. three</p> <p>10. $(-19)^3$</p> <p>11. Not a zero</p> <p>12. $\frac{-1}{7}$</p> <p>13. $m = -11$</p> <p>14. Factor</p> <p>15. not defined</p> <p>16. two</p> <p>17. 3</p> <p>18. linear</p> <p>19. -2</p> <p>20. three, two</p> <p>21. $-7x^\circ$</p> <p>22. single</p> <p>23. zero</p> <p>24. three</p> <p>25. -b</p> | <p>26. 1</p> <p>27. (i) (d) $(2x+1)(x-1)$
(ii) (b) 10
(iii) (a) (x^2-1)
(iv) (d) $(x-1)$
(v) (d) $\frac{-1}{2}$</p> <p>28. (i) (b) quadratic
(ii) (a) $(x+4)(3x+2)$
(iii) (d) $2(x-1)$
(iv) (c) -4
(v) (c) 24</p> <p>29. Not a multiple</p> <p>30. Put $x=5$</p> <p>31. 994009</p> <p>32. 0, 2, -3</p> <p>33. $3x+2$</p> <p>34. $(2x+\sqrt{3}y)(4x^2-2\sqrt{3}xy+3y^2)$</p> <p>35. 18</p> <p>36. $(100+6)(100-6)=9964$</p> <p>37. 701</p> <p>38. -3</p> <p>39. $a=5, b=-3$</p> <p>40. 8</p> <p>41. 0</p> <p>42. $k=-1$</p> <p>44. $x^2+(1-y)x-y$</p> <p>45. Three terms - Trinomial
Degree 3- cubic</p> |
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46. $(8a + 6b)^2$
 47. $(x+1)(x+2)(x+3)$
 48. 207
 49. $117a^3 - 133b^3$
 50. - 34
 51. $p^8 - \frac{1}{p^8}$
 52. $(K - \sqrt{2})(7\sqrt{2}K + 4)$
 53. $-8y(16y^2 + 27x^2)$ or $-128y^3 - 216x^2y$
 54. $(2a+b+c)(4a^2 + b^2 + 9c^2 - 4ab - 2bc - 4ac)$
 55. $4xy + 4zx$
 56. $(5x + 2y + z)(25x^2 + 4y^2 + z^2 - 10xy - 2yz - 5zx)$
 57. $a = 0, b = 1$
 58. $a = -1$ Hint $p(3) = q(3)$
 59. $x = 27$ (Use $a+b+c = 0, a^3 + b^3 + c^3 = 3abc$)
 61. $3x^2 - 19x + 20$
 62. i) - 210
 ii) $2; (x + 3); (2x + 1)$
 63. i) $(x + 2\sqrt{5})(x + 3\sqrt{5})$
 ii) $(4x + 1), (6x - 8)$
 64. 3
 65. $(a+b)(b+c)(c+b)$
 66. $3(2a-b-c)(2b-c-a)(2c-a-b)$
 67. $a = 5, (x-1)(2x+1)(2x-7)$
 69. $(3x+10)(x-3)(3x-10)$
 70. $(x-3)(x-2)$
 71. 0
 72.
$$\frac{(155)^2 + (155 \times 55) + (55)^2}{(155)^3 - (55)^3} = \frac{(155)^3 - (55)^3}{(155-55)[(155)^3 - (55)^3]} = \frac{1}{100} = 0.01$$

Practice Test
POLYNOMIALS

Time : 50 Min.

M.M. 25

1. Is $(x^2)^{\frac{1}{2}} + 2\sqrt{5}a$ a polynomial? (1)
2. Show that $x = 1$ is a zero of the polynomial $3x^3 - 4x^2 + 8x - 7$. (1)
3. Find the value of the polynomial $2x+5$ at $x=-3$. (1)
4. Find the zeroes of the polynomial $x^2 - 4x + 3$ (2)
5. Evaluate 38×42 without multiplying directly (2)
6. If $x + y + z = 6$, $xy + yz + zx = 11$. Find the value of $x^2 + y^2 + z^2$. (2)
7. If $3x - 4$ is a factor of the polynomial $p(x) = 2x^3 - 11x^2 + kx - 20$, find the value k (3)
8. Factorise : $a^2 + b^2 + 2(ab + bc + ca)$ (3)
9. If $a + b + c = 0$ then find the value of $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab}$ (5)
10. Factorise $x^3 - 23x^2 + 142x - 120$ by using factor theorem. (5)