JSUNIL TUTORIAL
ACBSE Coaching for Mathematics and Science

POLYNOMIAL CLASS _ 9

REVISION EXERCISE

SECTION – A

Multiple Choice Questions (MCQs)   **(1 Mark each)**

1. Which of the following is quadratic polynomial
   (a) $x + 2$ (b) $x^2 + 2$ (c) $x^3 + 2$ (d) $2x + 2$ **Ans.** (b)

2. The zero of the polynomial $p(x) = 2x + 5$ is :
   (a) $\dfrac{2}{5}$ (b) $\dfrac{5}{2}$ (c) 0 (d) $-\dfrac{5}{2}$ **Ans.** (d)

3. If $x^{51} + 51$ is divided by $(x + 1)$ the remainder is :
   (a) 0 (b) 1 (c) 49 (d) 50 **Ans.** (d)

4. The remainder obtained when the polynomial $p(x)$ is divided by $(b - ax)$ is :
   (a) $p\left(\dfrac{-b}{a}\right)$ (b) $p\left(\dfrac{a}{b}\right)$ (c) $p\left(\dfrac{b}{a}\right)$ (d) $p\left(\dfrac{-a}{b}\right)$ **Ans.** (c)

5. $a^2 + b^2 + c^2 - ab - bc - ca$ equals :
   (a) $(a + b + c)^2$ (b) $(a - b - c)^2$ (c) $(a - b + c)^2$ (d) $\dfrac{1}{2}[(a - b)^2 + (b - c)^2 + (c - a)^2]$

   Ans. (d)

6. Which of the following is a binomial in y ?
   (a) $y^2 + \sqrt{2}$ (b) $y + \dfrac{1}{y} + 2$ (c) $\sqrt{y} + \sqrt{2}y$ (d) $y\sqrt{y} + 1$ **Ans.** (a)

7. Which of the following polynomials has -3 as a zero ?
   (a) $(x - 3)$ (b) $x^2 - 9$ (c) $x^2 - 3x$ (d) $x^2 + 3$ **Ans.** (b)

8. Which of the following is a trinomial in x ?
   (a) $3^3 + 1$ (b) $x^3 + x^2 + x$ (c) $x\sqrt{x} + \sqrt{x} + 1$ (d) $x^3 + 2x$ **Ans.** (b)

9. The value of the polynomial $x^2 - x - 1$ at $x = -1$ is :
   (a) -3 (b) 1 (c) -1 (d) 0 **Ans.** (b)

10. Which of the following is a polynomial in x ?
    (a) $x + \dfrac{1}{x}$ (b) $x^2 + \sqrt{x}$ (c) $x + \sqrt{2}x^2 + 1$ (d) $\sqrt{3}x + 1$ **Ans.** (c)

11. The remainder when $x^2 + 2x + 1$ is divided by $(x + 1)$ is
    (a) 4 (b) 0 (c) 1 (d) -2 **Ans.** (b)

12. The factors of $(2a - b)^3 + (b - 2c)^3 + 8(c - a)^3$ is :
    (a) $(2a - b)(b - 2c)(c - a)$ (b) $3(2a - b)(b - 2c)(c - a)$
    (c) $6(2a - b)(b - 2c)(c - a)$ (d) $2a \times b \times 2c$ **Ans.** (c)

13. In which of the following $(x + 2)$ is a factor ?
    (a) $4x^3 - 13x + 6$ (b) $x^3 - x^2 + x + 4$ (c) $4x^3 - 13x - 25$ (d) $-2x^3 + x^2 - 13x - 19$ **Ans.** (a)

14. One of the factors of $(x - 1) - (x^2 - 1)$ is:
    (a) $x^2 - 1$ (b) $x + 1$ (c) $x - 1$ (d) $x + 4$ **Ans.** (c)

15. The coefficient of x^2 in the product $(x - 1)(1 - 2x)$ is :
    (a) 3 (b) 3 (c) -2 (d) 1 **Ans.** (c)

16. The coefficient of x^2 in $(2 - 3x^2)(x^2 - 5)$ is
    (a) -17 (b) -10 (c) -3 (d) 17 **Ans.** (d)

17. If a polynomial $p(x)$ is divided by $x - a$ then remainder is
    (a) $f(0)$ (b) $f(a)$ (c) $f(-a)$ (d) $f(a) - f(0)$ **Ans.** (b)

18. The degree of the polynomial $2 - y^2 - y^3 + 2y^7$ is :

    (a) 2   (b) 7   (c) 0   (d) 3   **Ans. (b)**

19. Degree of zero polynomial is :

    (a) 0   (b) 1   (c) any natural number   (d) not defined   **Ans. (d)**

20. Degree of which of the following polynomial is zero :

    (a) x (b) 15   (c) x^2 (d) $x + \dfrac{1}{x}$ **Ans. (b)**

21. What is remainder when $x^3 - 2x^2 + x + 1$ is divided by $(x - 1)$?

    (a) 0   (b) −1   (c) 1   (d) 2   **Ans. (c)**

22. The coefficient of x^2 in $(3x + x^3)\left(x + \dfrac{1}{x}\right)$ is:

    (a) 3   (b) 1   (c) 4   (d) 2   **Ans. (c)**

23. Product of $\left(x - \dfrac{1}{x}\right)\left(x + \dfrac{1}{x}\right)\left(x^2 + \dfrac{1}{x^2}\right)$ is:

    (a) $x^4 + \dfrac{1}{x^4}$ (b) $x^3 + \dfrac{1}{x^3} - 2$ (c) $x^4 - \dfrac{1}{x^4}$ (d) $x^2 + \dfrac{1}{x^2} + 2$ **Ans. (c)**

24. If $\dfrac{x}{y} + \dfrac{y}{x} = -1$ $(x, y \neq 0)$, the value of $x^3 - y^3$ is :

    (a) 1   (b) −1   (c) $\dfrac{1}{2}$ (d) 0   **Ans. (d)**

25. $(1 + 3x)^3$ is a example of :

    (a) Monomial   (b) Binomial   (c) Trinomial   (d) None of these   **Ans. (d)**

26. If $p(x) = 2 + \dfrac{x}{2} + x^2 - \dfrac{x^3}{3}$ then $p(-1)$ is:

    (a) $\dfrac{15}{6}$ (b) $\dfrac{17}{6}$ (c) $\dfrac{1}{6}$ (d) $\dfrac{13}{6}$ **Ans. (b)**

27. Zero of the polynomial $p(x)$ where $p(x) = ax$, $a \neq 0$ is:

    (a) 1   (b) a (c) 0   (d) $\dfrac{1}{a}$ **Ans. (c)**

28. If $p(x) = 7 - 3x + 2x^2$ then value of $p(-2)$ is :

    (a) 12   (b) 31   (c) 21   (d) 22   **Ans. (c)**

29. If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x, the value of k is

    (a) 1   (b) P1   (c) 5   (d) 3   **Ans. (c)**

30. Zero of the polynomial $p(x) = cx + d$ is :

    (a) $-d$ (b) $-c$ (c) $\dfrac{-d}{c}$ (d) -7 **Ans. (c)**

31. Degree of the polynomial $p(x) = 4x^4 + 2x^3 + x^5 + 2x + 7$ is :

    (a) 7   (b) 4   (c) 5   (d) 3   **Ans. (c)**

SECTION – B

Very Short Answer Type Questions   **(2 Marks each)**

1. Without actually calculating the cubes, find the value of $75^3 - 25^3 - 50^3$.   **Ans. 281250**

2. Evaluate $(999)^3$.   **Ans. 997002999**

3. Check whether the polynomial $t + 1$ is a factor of $4t^3 + 4t^2 - t - 1$.   **Ans. Yes**

4. Check whether the polynomial $3x - 1$ is a factor of $9x^3 - 3x^2 + 3x - 1$.   **Ans. Yes**

5. Check whether $(x + 1)$ is a factor of $x^3 + x + x^2 + 1$.   **Ans. Yes**

6. Using factor theorem, show that $(2x + 1)$ is a factor of $2x^3 + 3x^2 - 11x - 6$.

7. Using factor theorem, show that $(x + 1)$ is a factor of $x^{19} + 1$.

8. Without actually calculations of the cubes, find the value of $30^3 + 20^3 - 50^3$.   **Ans. −90000**

POLYNOMIALS (Algebra)

9. Find the zeros of the polynomial $3x^2 + x - 2$. **Ans.** -1 and $\dfrac{2}{3}$

10. Factorize: $125x^3 + 27y^3$. **Ans.** $(5x + 3y)(25x^2 - 15xy + 9y^2)$

11. Factorize : $x^2 + 3\sqrt{3}x + 6$. **Ans.** $(x + 2\sqrt{3})(x + \sqrt{3})$

12. Factorize : $(x^4 + 4x^2 + 3)$. **Ans.** $(x^2 + 1)(x^2 + 3)$

13. If -1 is a zero of the polynomial $p(x) = ax^3 + x^2 + x + 4$, find the value of a : **Ans.** $a = 4$

14. Show that $y - 1$ is a factor of $y^{20} - 1$ and also of $y^{21} - 1$.

15. If $2x + 3y = 8$ and $xy = 4$ then find the value of $4x^2 + 9y^2$. **Ans.** 16

16. If $x^2 + \dfrac{1}{x^2} = 38$, then find the value of $\left(x - \dfrac{1}{x} \right)$. **Ans.** 6

17. Find the product of $\left(x - \dfrac{1}{x} \right), \left(x + \dfrac{1}{x} \right), \left(x^2 + \dfrac{1}{x^2} \right)$ and $\left(x^4 + \dfrac{1}{x^4} \right)$ **Ans.** $x^8 - \dfrac{1}{x^8}$

18. Factorise : $x^2 + \dfrac{x}{4} - \dfrac{1}{8}$. **Ans.** $\dfrac{1}{8}(2x + 1)(4x - 1)$

SECTION – C

Short Answer Type Questions (3 Marks each)

1. Factorise : $(x - y)^3 + (y - z)^3 + (z - x)^3$ **Ans.** $3(x - y)(y - z)(z - x)$

2. Factorise by splitting the middle term : $9(x - 2y)^2 - 4(x - 2y) - 13$ **Ans.** $\{9x - 18y - 13\}\{x - 2y + 1\}$

3. Find the remainder obtained on dividing $2x^4 - 3x^3 - 5x^2 + x + 1$ by $x - \dfrac{1}{2}$. **Ans.** Zero

4. Factorise : $8x^2y^3 - x^5$. **Ans.** $x^2(2y - x)(4y^2 + 2xy + x^2)$

5. Check whether $(p + 1)$ is a factor of $(p^{100} - 1)$ and $(p^{101} + 1)$. **Ans.** Yes

6. Find the remainder when $3x^3 - 4x^2 + 7x - 5$ is divided by $(x - 3)$ and $(x + 3)$ **Ans.** 61 and -143

7. If $p = 4 - q$, prove that $p^3 + q^3 + 12pq = 64$. **Ans.** Zero

8. If $a + b = 8$ and $a^2 + b^2 = 40$ find the value of $a^3 + b^3$ **Ans.** 224

9. If $2a = 3 + 2b$ prove that $8a^3 - 8b^3 - 36ab = 27$.

10. If $a - b = 7$, $a^2 + b^2 = 85$ find $a^3 - b^3$. **Ans.** 721

11. Factorise : $(2x - y - z)^3 + (2y - z - x)^3 + (2z - x - y)^3$. **Ans.** $3(2x - y - 2)(2y - z - x)(2z - x - y)$

12. If $a = 3 + b$, prove that $a^3 - b^3 - 9ab = 27$.

13. If $a + b = 11$, $a^2 + b^2 = 61$, find $a^3 + b^3$. **Ans.** 341

14. If $x^3 + ax^2 + bx + 6$ has $x - 2$ as a factor and leaves a remainder 3 when divided by $x - 3$, find the values of a and b. **Ans.** $a = -3$, $b = -1$

15. Find the value of $a^3 + b^3 + 6ab - 8$ when $a + b = 2$. **Ans.** Zero

16. If $x + y + z = 9$, then find the value of $(3 - x)^3 + (3 - y)^3 + (3 - z)^3 - 3(3 - x)(3 - y)(3 - z)$. **Ans.** Zero

17. If $x - 3$ is a factor of $x^2 - kx + 12$ then find the value of k. Also find the other factor for this value of k. **Ans.** $k = 7$, $(x - 4)$

18. Find the value of $x^3 + y^3 + 9xy - 27$ when $x - y = 3$. **Ans.** Zero

19. If $a + b + c = 6$ then find the value of $(2 - a)^3 + (2 - b)^3 + (2 - c)^3 - 3(3 - a)(2 - b)(2 - c)$. **Ans.** Zero

20. Find the values of p and q if the polynomial $x^4 + px^3 + 2x^2 - 3x + q$ is divisible by the polynomial $x^2 - 1$. **Ans.** $p = 3$, $q = -3$

21. Factorise : $x^2 + \dfrac{1}{x^2} + 2 - 2x - \dfrac{2}{x}$. **Ans.** $\left(x + \dfrac{1}{x} \right)\left(x + \dfrac{1}{x} - 2 \right)$

22. Factorise $9x^2 + y^2 + z^2 - 6xy + 2yz - 6zx$. Hence find its value if $x = 1$, $y = 2$ and $z = 1$. **Ans.** $(3x - y - z)^2$ and zero

23. If the polynomial $P(x) = x^4 - 2x^3 + 3x^2 - ax + 8$ is divided by $(x - 2)$, it leaves a remainder 10. Find the value of a. **Ans.** $a = 5$

POLYNOMIALS (Algebra)

24. Without finding the cubes, factorise and find the value of : $\left(\dfrac{1}{4}\right)^3 + \left(\dfrac{1}{3}\right)^3 - \left(\dfrac{7}{12}\right)^3$. **Ans.** $\dfrac{-7}{48}$

25. Using suitable identity evaluate $(-32)^3 + (18)^3 + (14)^3$. **Ans.** –24192

26. Factorize : $64a^3 - 27b^3 - 144a^2b + 108ab^2$. **Ans.** $(4a - 3b)^3$

27. Find the value of $x^3 + y^3 - 12xy + 64$ when $x + y = -4$. **Ans.** Zero

28. If $x = 2y + 6$ then find the value of $x^3 - 8y^3 - 36xy - 216$. **Ans.** Zero

29. Factorize : $27(x + y)^3 - 8(x - y)^3$. **Ans.** $(x + 5y)(19x^2 + 7y^2 + 10xy)$

30. Factorise : $x^3 + 6x^2 + 11x + 6$. **Ans.** $(x + 1)(x + 2)(x + 3)$

31. What are the possible expressions for the dimensions of the cuboid whose volume is given below ?
Volume $= 12ky^2 + 8ky - 20k$. **Ans.** $4k, (y - 1), (3y + 5)$

32. Factorize : $8a^3 - b^3 - 12a^2b + 6ab^2$ **Ans.** $(2a - b)^3$

33. If $x = \dfrac{-1}{3}$ is a zero of the polynomial $p(x) = 27x^3 - ax^2 - x + 3$ then find the value of a. **Ans.** $a = 21$

34. Factorize $(x - 3y^2)^3 + (3y - 7z)^3 + (7z - x)^3$. **Ans.** $3(x - 3y^2)(3y - 7z)(7z - x)$

35. Factorise: $(ax + by)^2 + (ay - bx)^2$. **Ans.** $(a^2 + b^2)(x^2 + y^2)$

36. If $x + \dfrac{1}{x} = 7$ then find the value of $x^3 + \dfrac{1}{x^3}$. **Ans.** 322

37. If $x - \dfrac{1}{x} = 3$ then find the value of $x^3 - \dfrac{1}{x^3}$. **Ans.** 36

SECTION – D

Long Answer Type Questions **(4 Marks each)**

1. If $x^2 + \dfrac{1}{x^2} = 51$, find x **Ans.** $\dfrac{\sqrt{53} + 7}{2}$

2. Find the values of m and n so that the polynomial $f(x) = x^3 - 6x^2 + mx - n$ is exactly divisible by $(x - 1)$ as well as $(x - 2)$. **Ans.** $m = 11, n = 6$

3. Find the value of 34×36 using suitable identity. **Ans.** 1224

4. Factorise $x^8 - y^8$. **Ans.** $(x - y)(x + y)(x^2 + y^2)(x^4 + y^4)$

5. Factorise : $27p^2 - \dfrac{1}{216} - \dfrac{9}{2}p^2 + \dfrac{1}{4}p$ **Ans.** $\left(3p - \dfrac{1}{6}\right)^3$

6. Verify:
(a) $x^3 + y^3 + z^3 - 3xyz = \dfrac{1}{2}(x + y + z)[(x - y)^2 + (y - y)^2 + (z - x)^2$
(b) Factorise : $64x^3 + 125y^3 - 64z^3 + 240xyz$. **Ans.** $(4x + 5y - 4z)[16x^2 + 25y^2 + 16z^2 - 20xy + 20yz + 16xz]$

7. Verify $x^3 + y^3 + z^3 - 3xyz = (x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$ and factor is $64x^3 + 125y^3 - 64z^3 + 240$.
Ans. $(4x + 5y - 4z)[16x^2 + 25y^2 + 16z^2 - 20xy + 20yz + 16xz]$

8. Given a polynomial $p(x) = x^2 - 5x + 4$.
(a) Find the value of the polynomial $p(x)$ at $x = 2$. **Ans.** –2
(b) Check whether x is a factor of $p(x)$. **Ans.** No
(c) Factorise $p(x)$. **Ans.** $(x - 4)(x - 1)$

9. Factorise : $(x^2 - 2x)^2 - 2(x^2 - 2x) - 3$. **Ans.** $(x - 1)^2(x + 1)(x - 3)$

10. If $p(x) = x^3 - ax^2 + bx + 3$ leaves a remainder –19 when divided by $(x + 2)$ and a remainder 17 when divided by $(x - 2)$, prove that $a + b = 6$.

11. Factorise : $2x^3 + 9x^2 + 10x + 3$. **Ans.** $(x + 1)(2x + 1)(x + 3)$

12. If both $(x - 2)$ and $(2x - 1)$ are factors of $ax^2 + 5x + b$, show that $a - b = 0$.

13. The polynomial $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $x - 4$ leave the same remainder in each case. Find the value of a. **Ans.** $a = 1$

14. The polynomials $p(x) = ax^3 + 4x^2 + 3x - 4$ and $q(x) = x^3 - 4x + a$ leave the same remainder when divided by $x - 3$. Find the remainder when $p(x)$ is divided by $(x - 2)$. **Ans.** $a = -1$, $p(2) = 10$

15. Factorise : $2x^3 - 3x^2 - 17x + 30$. **Ans.** $(x - 2)(x + 3)(2x - 5)$

16. The volume of a cube is given by the polynomial $p(x) = 8x^3 - 36x^2 + 54x - 27$
Find the possible expression for the sides of the cube. **Ans.** Length $= (2x - 3)$

17. The volume of a cube is given by the polynomial:
$p(x) = 27x^3 + 54x^2 + 36x + 8$.
Find the possible expression for the sides of the cube. **Ans.** $[3x + 2]$ units

18. Using factor theorem, factorise the polynomial : $x^4 + 3x^3 + 2x^2 - 3x - 3$ **Ans.** $(x - 1)(x + 1)(x^2 + 3x + 3)$

19. Factorise : $(x - a)^3 + (x - b)^3 + (x - c)^3 - 3(x - a)(x - b)(x - c)$. **Ans.** $(3x - a - b - c)(a^2 + b^2 + c^2 - ab - bc - ac)$

20. Without actual division, show that the polynomial $2x^4 - 5x^3 + 2x^2 - x + 2$ is exactly divisible by $x^2 - 3x + 2$.
Ans. $P(1) = 0$ and $P(2) = 0$

21. Factorize: $(x^2 - 3x)^2 - 8(x^2 - 3x) - 20$. **Ans.** $(x - 1)(x - 2)(x + 2)(x - 5)$

22. If $a + b + c = 9$ and $ab + bc + ca = 40$. Find the value of $a^2 + b^2 + c^2$. **Ans.** 1

23. Simplify : $\dfrac{(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3}{(a - b)^3 + (b - c)^3 + (c - a)^3}$. **Ans.** $(a + b)(b + c)(c + a)$

24. Without actual division, prove that $(2x^4 - 6x^3 + 3x^2 + 3x - 2)$ is exactly divisible by $(x^2 - 3x + 2)$.

25. If $a^2 + b^2 + c^2 = 250$ and $ab + bc + ac = 3$. Find the value of $a + b + c$. **Ans.** 16

26. If $a + b + c = 12$, $a^2 + b^2 + c^2 = 90$, find the value of $a^3 + b^3 + c^3 - 3abc$. **Ans.** 756

27. If $(x + y + z) = 0$, then prove that $(x^3 + y^3 + z^3) = 3xyz$.

28. The Polynomials $ax^3 - 3x^2 + 4$ and $3x^2 - 5x + a$ when divided by $(x - 2)$ leave the remainders p and q respectively. If $p - 2q = a$, find the value of a. **Ans.** $a = 2$

29. If $x + y + z = 1$, $xy + yz + zx = -1$ and $xyz = -1$ find the value of $x^3 + y^3 + z^3$. **Ans.** 1

30. Factorize : $ax^2 + (4a^2 - 3b)x - 12ab$. **Ans.** $(x + 4a)(ax - 3b)$

31. Find the value of $(x - a)^3 + (x - b)^3 + (x - c)^3 - 3(x - a)(x - b)(x - c)$, if $a + b + c = 3x$. **Ans.** Zero

32. Factorize $(x + 1)^3 - (x - 1)^3$. **Ans.** $2(3x^2 + 1)$

33. Factorize : $x^6 - 729$. **Ans.** $(x - 3)(x + 3)(x^2 + 3x + 9)(x^2 - 3x + 9)$

34. Prove that :
$2x^3 + 2y^3 + 2z^3 - 6xyz = (x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$ hence evaluate $2(7)^3 + 2(9)^3 + 2(13)^3 - 6(7)(9)(13)$.
Ans. 1624

35. Prove that $(x + y)^3 - (x - y)^3 - 6y(x^2 - y^2) = 8y^3$.

36. Using factor theorem show that $x^2 + 5x + 6$ is a factor of : $x^4 + 5x^3 + 9x^2 + 15x + 18$.

37. Factorize : $27a^3 + \dfrac{1}{64b^3} + \dfrac{27a^2}{4b} + \dfrac{9a}{16b^2}$. **Ans.** $\left[3a + \dfrac{1}{4b}\right]^3$

38. If x and y be two positive real numbers such that $8x^3 + 27y^3 = 730$ and $2x^2y + 3xy^2 = 15$ then evaluate $2x + 3y$. **Ans.** 10

39. Factorize : $2\sqrt{2}a^3 + 8b^3 - 27c^3 + 18\sqrt{2}abc$ **Ans.** $(\sqrt{2}a + 2b - 3c)(2a^2 + 4b^2 + 9c^2 - 2\sqrt{2}ab + 6bc + 3\sqrt{2}c)$

40. (i) Multiply $9x^2 + 25y^2 + 15xy + 12x - 20y + 16$ by $3x - 5y - 4$ using suitable identity.
Ans. $[27x^3 - 125y^3 - 64 - 180xy]$
(ii) Factorise: $a^2 + b^2 - 2(ab - ac + bc)$. **Ans.** $(a - b)(a - b + 2c)$

41. Factorise $a^7 + ab^6$. **Ans.** $a(a^2 + b^2)(a^4 - a^2b^2 + b^4)$

42. Find the value of 'a' if $(x - a)$ is a factor of $x^5 - a^2x^3 + 2x + a + 3$, hence factorise $x^2 - 2ax - 3$.
Ans. $a = -1$ and $(x + 3)(x - 1)$ are factors.

43. If $x - 2y = 11$ and $xy = 8$ find the value of $x^3 - 8y^3$. **Ans.** 1859

CHAPTER TEST : POLYNOMIALS

Time 1½ hrs   **M.M. 35**

Instructions

- No. 1 to 5 Carry 1 Mark each.
- No. 9 to 12 Carry 3 Marks each.
- No. 6 to 8 Carry 2 Marks each.
- No. 13 to 15 Carry 4 Marks each.

1. If $a + b + c = 0$, then find value of : $\dfrac{a+b}{c} + \dfrac{b+c}{a} + \dfrac{c+a}{b}$.

2. How many zeroes a constant polynomial have ?

3. Number zero cannot be a zero of any polynomial.   (T/F)

4. There are at most two distinct zeroes of a quadratic polynomial.   (T/F)

5. If $\dfrac{x}{y} + \dfrac{y}{x} = -1$, $x \neq 0$, $y \neq 0$, then find value of $x^3 - y^3$.

6. If $x^2 + \dfrac{1}{x^2} = 6$, then find value of $x^3 - \dfrac{1}{x^3}$

7. Factorize : $x^4 + x^2 + 1$.

8. Find the value of a, for which $(x^2 - ax + 1)$ is divisble by $(x - 1)$.

9. Give possible length, breadth and height of a cubid of volume $(125x^4 - 64y^3x)$.

10. If $(x + a)$ is a factor of polynomial : $x^2 + px + q$ and $x^2 + mx + n$, prove that $a = \dfrac{n-q}{m-p}$.

11. Find α and β if $(x + 1)$ and $(x + 2)$ are factors of $x^3 + 3x^2 - 2\alpha x + \beta$.

12. Without actual division, prove that : $2x^4 + x^3 - 14x^2 - 19x - 6$ is exactly divisible by $x^2 + 3x + 2$.

13. Factorize : $2x^3 - 3x^2 - 17x + 30$.

14. If $\sqrt{m} + \sqrt{n} - \sqrt{p} = 0$, then prove that $m + n - p = 4mn$.

15. Find the square root of : $x^4 - 6x^3 + 13x^2 - 12x + 4$.

ANSWERS

1. −3	**2.** None	**3.** F	**4.** T
5. Zero	**6.** 2	**7.** $(x^2 - x + 1)(x^2 + x + 1)$	**8.** 2
9. $x(5x - 4y)$, $(25x^2 + 20xy + 16y^2)$		**11.** $\alpha = -1$, $\beta = 0$	**13.** $(x - 2)(x + 3)(2x - 5)$
15. $x^2 - 3x + 2$			