



MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

POLYNOMIALS

Solved Examples

1. Which of the following are polynomials :

(i)

$$3x^2 - 7x + 6 \quad (ii) x^2 - \sqrt{3}x + 4 \quad (iii) 3\sqrt{x} + 5 \quad (iv) 13 \quad (v) a +$$



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2. Find the degree of each of the following polynomials :

$$(i) 5x^2 - 2x + 1 \quad (ii) 1 - 5t + t^4 \quad (iii) 7 \quad (iv) x^4 - 3x^6 + 2$$



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3. Write : (i) a binomial of degree 50, (ii) a monomial of degree 10, (iii) a trinomial of degree 5, (iv) a constant polynomial.



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4. Write the degree of following polynomials :

$$(i) 4x + 7 \quad (ii) 4x^2 - 3x + 5 \quad (iii) 2x^2 - \frac{3}{2}x + 6$$



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5. Classify the following as linear, quadratic and cubic polynomials :

$$(i) 5x^3 + 3x^2 + 1 \quad (ii) 3x^2 + x \quad (iii) x + 1$$



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6. Find the coefficient of x^2 in the polynomial :

$$2x^3 - 3x^2 + 5x\left(1 - \frac{x}{2}\right) + 2x^2(x + 7) - 13$$



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7. Find the value of each of the following :

(i) $p(x) = 3x + 7$ at $x = 1$

(ii) $q(y) = y^3 - 3y^2 + \sqrt{3}$ at $y = 1$

(iii) $p(a) = a^4 + 6a^2 - 6a + 3$ at $a = m$



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8. Find a zero of the polynomial :

(i) $p(x) = 4x - 3$ (ii) $p(x) = 2x - 2$



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9. Check whether 2 and 0 are zeros of polynomial $x^3 - 4x$.



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10. Divide $p(x)$ by $g(x)$ and find the quotient $q(x)$ and remainder $r(x)$.

$$p(x) = x^4 + 2x^2 + 3, g(x) = x^2 + 1$$



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11. If $p(x) = x^5 + 4x^4 - 3x^2 + 1$ and $g(x) = x^2 + 2$, then divide $p(x)$ by $g(x)$ and find quotient $q(x)$ and remainder $r(x)$.



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12. If $g(x)=x+2$ and $p(x) = x^3 + 3x^2 + 5x - 1$, then divide $p(x)$ by $g(x)$ and find the quotient $q(x)$ and remainder $r(x)$.



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13. Check whether $x+2$ is a factor polynomial $x^3 + 8x^2 + 9x - 6$?



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14. Find the remainder when the polynomial $p(x) = x^4 - 3x^2 + 5x + 1$ is divided by $(x-2)$.



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15. Find the remainder when the polynomial $p(x) = x^3 - 3x^2 + 4x + 50$ is divided by $(x+3)$.

A. -13

B. -14

C. -15

D. -16

Answer: D



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16. Find the remainder when the polynomial $4x^4 + 3x^2 - 5x + 1$ is divided by $(2x-1)$.



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17. If the polynomial $ax^3 + 3x^2 - 3$ leaves the remainder 6 when divided by $x-4$, then find the value of a .



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18. Show that $(x-3)$ is a factor of the polynomial $x^3 + x^2 - 17x + 15$.



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19. Check whether $(2x-3)$ is a factor of the polynomial $2x^4 + 9x^2 - 11x - 30$?

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20. Find the value of 'k' if $x+3$, is a factor of the polynomial $x^4 - x^3 - 11x^2 - x + k$.

A. $k = -13$

B. $k = -12$

C. $k = -14$

D. $k = -15$

Answer: B

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21. Factorise $x^3 - 7x + 6$.



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22. Factorise $x^3 + 6x^2 + 11x + 6$.



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23. Factorise : $x^5 + y^5$



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24. Find the values of a and b so that $2x^3 + ax^2 + bx - 14$ has (x-1) and (x+2) are its factors.



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25. What must be added to $x^4 + 2x^3 - 2x^2 - 2x - 1$ to obtain a polynomial which is exactly divisible by $(x^2 + 2x - 3)$?

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26. If $p(x)^4 - 2x^3 + 3x^2 - ax + b$ be a polynomial such that when it is divided by $x-1$ and $x+1$, remainders are respectively 5 and 19. Determine the remainder when $p(x)$ is divided by $x-2$.

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27. If $x^2 + 2x - 5$ is a factor of $x^4 - 2x^3 + px^2 + qx - 35$, then find the value of $p^2 - q$.

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28. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, the remainder comes out to be $(x-a)$. Find k and a .

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29. When $x^5 - 5x^4 + 9x^3 - 6x^2 - 16x + 13$ is divided by $x^2 - 3x + a$, then quotient and remainders are $x^3 - 2x^2 + x + 1$ and $-15x + 11$ respectively. Find the value of a .

A. 2

B. 1

C. 3

D. 4

Answer: A



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30. Factorise $x^3 + 2x^2 + x$.



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31. Factorise $a(x-y)-b(x-y)$.



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32. Factorise $p^2x^2 + c^2x^2 - ac^2 - ap^2$.



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33. Factorise $ax+ay+az+bx+by+bz$.



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34. Factorise $x^2 - \left(a + \frac{1}{a}\right)x + 1$.



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35. Factorise $a^2 - 9b^2$.

A. $(a+3b)(a+3b)$

B. $(a+3b)(a-3b)$

C. $(a-3b)(a-3b)$

D. $(a+5b)(a-3b)$

Answer: B



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36. Factorise $x^2 - (y - z)^2$.

A. $(x + y - z)(x + y + z)$

B. $(x + y - z)(x - y - z)$

C. $(x - y - z)(x - y + z)$

D. $(x + y - z)(x - y + z)$

Answer: D



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37. Factorise $x^2 - 6x - y^2 + 9$.

A. $(x+y-3)(x-y+3)$

B. $(x+y-3)(x-y-3)$

C. $(x-y-3)(x-y-3)$

D. $(x+y+3)(x-y-3)$

Answer: B

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38. Factorise $16x^4 - 81y^4$.

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39. Factorise $x^2 + \frac{1}{x^2} - 3$.

A. $\left(x - \frac{1}{x} + a\right)\left(x + \frac{1}{x} - 1\right)$

B. $\left(x + \frac{1}{x} + a\right)\left(x - \frac{1}{x} - 1\right)$

C. $\left(x - \frac{1}{x} + a\right)\left(x - \frac{1}{x} + 1\right)$

D. $\left(x - \frac{1}{x} + a\right)\left(x - \frac{1}{x} - 1\right)$

Answer: D



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40. Factorise $x^2 + 9x + 20$.

A. $(x + 4)(x + 4)$

B. $(x + 5)(x + 4)$

C. $(x + 5)(x - 4)$

D. $(x - 5)(x + 4)$

Answer: B



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41. Factorise $x^2 - 21x + 108$.

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42. Factorise $x^2 + 5x - 24$.

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43. Factorise $(2x + 3y)^2 + 14(2x + 3y)(3x - y) - 32(3x - y)^2$.

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44. Factorise $4x^2 + 12x + 5$.

A. $(2x + 5)(2x - 1)$

B. $(2x + 5)(2x + 1)$

C. $(x + 5)(2x + 1)$

D. $(2x + 5)(x + 1)$

Answer: B



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45. Factorise $99x^2 - 202xy + 99y^2$.



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46. Factorise $18x^3 - 27x^2 - 35x$.



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47. Factorise $\sqrt{3}x^2 + 10x + 3\sqrt{3}$

A. $(x + 3\sqrt{3})(\sqrt{3}x - 1)$

B. $(x - 3\sqrt{3})(\sqrt{3}x - 1)$

C. $(x + 3\sqrt{3})(\sqrt{3}x + 1)$

D. $(x - 3\sqrt{3})(\sqrt{3}x + 1)$

Answer: C

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48. Factorise $x^2 + 6\sqrt{6}x + 48$.

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49. Factorise : $(2x^2 + 5x)(2x^2 + 5x - 19) + 84$

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50. Factorise : $x^4 + 3x^2 - 28$

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51. Evaluate : (i) $(a + 6b)^2$ (ii) $(3x - 4y)^2$ (iii) $(2a - b + c)^2$



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52. Using identities find the values of the following :

(a) 102^2 (b) 48^2



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53. Find the product using appropriate identities

(i) $(x+5)(x+5)$ (ii) $(x+4)(x-4)$ (iii) $(x+5)(x+3)$ (iv) $(x-5)(x+3)$



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54. Factorise : (i) $36x^2 + 60xy + 25y^2$ (ii) $\frac{49}{9}x^2 - \frac{35}{6}xy + \frac{25}{16}y^2$



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55. Expand : (i) $(4a - 5b)^3$ (ii) $(a + 2b)^3$

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56. Evaluate : $15^3 + 10^3 - 25^3$

A. -11350

B. -11550

C. -11250

D. -11200

Answer: C

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57. Find the product

$$(2a - 3b - 2c)(4a^2 + 9b^2 + 4c^2 + 6ab - 6bc + 4ca).$$

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58. Factorise : (a) $x^4 + 4x^2 + 16$ (ii) $x^4 + 4$

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59. Factorise : (a) $x^6 + y^6$ (b) $x^6 - y^6$

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60. Factorise : $27x^3 + 8y^3 + 8z^3 - 36xyz$

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61. Factorise : (i) $125a^3 + \frac{1}{8}$ (ii) $8a^3 - 27b^3$

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62. If $a+b+c=2$, $ab+bc+ca=-1$ and $abc=-1$ and $abc=-2$, find the value of $a^3 + b^3 + c^3$.

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63. If $a^2 + b^2 + c^2 = 154$ and $ab + bc + ca = -5$, find $a+b+c$.

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64. If $abx^2 = (a - b)^2(x + 1)$, then find the value of $1 + \frac{4}{x} + \frac{4}{x^2}$ in terms of a and b .

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65. Find the square root of $(2x^2 - 7x - 15)(2x^2 - 24x + 70)(2x^2 - 11x - 21)$.

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66. Find the square root of $(2x + 7)(x^2 - 9)(2x - 5) + 9$.



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Problems From Ncert Exemplar

1. Find the value of the polynomial $5x - 4x^2 + 3$ at :

(i) $x = 0$

(ii) $x = -1$

(iii) $x = 2$



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2. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by :

(i) $x + 1$

(ii) $x - \frac{1}{2}$

(iii) x

(iv) $x + \pi$

(v) $5 + 2x$



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3. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $x-a$.



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4. Find the value of k , if $x-1$ is a factor of $p(x)$ in each of the following cases

:

(i) $p(x) = x^2 + x + k$

(ii) $p(x) = 2x^2 + kx + \sqrt{2}$

(iii) $p(x) = kx^2 - \sqrt{2}x + 1$

(iv) $p(x) = kx^2 - 3x + k$



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5. Factorise the following using appropriate identities :

(i) $9x^2 + 6xy + y^2$

(ii) $4y^2 - 4y + 1$

(iii) $x^2 - \frac{y^2}{100}$



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6. Give possible expressions for the length and breadth of each of the following rectangles, in which their areas are given :

(i) area = $25a^2 - 35a + 12$

(ii) area = $35y^2 + 13y - 12$



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7. What are possible expressions for the dimensions of the cuboids whose volumes are given below ?

(i) volume = $3x^2 - 12x$

(ii) volume = $12ky^2 + 8ky - 20k$



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8. Factorise the following :

(i) $4x^2 + 20x + 25$

(ii) $9y^2 - 66yz + 121z^2$

(iii) $\left(2x + \frac{1}{3}\right)$



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9. Without finding the cubes, factorise :

$$(x - 2y)^3 + (2y - 3z)^3 + (3z - x)^3$$



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10. Find the value of :

(i) $x^3 + y^3 - 12xy + 64$, when $x+y=-4$

(ii) $x^3 - 8y^3 - 36xy - 216$, when $x=2y+6$



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11. Factorise the following

(i) $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24xz$

(ii) $25x^2 + 16y^2 + 4z^2 - 40xy + 16yz - 20xz$

(iii) $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24xz$



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12. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.



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13. Simplify $(2x - 5y)^3 - (2x + 5y)^3$.

A. $120x^2y - 250y^3$

B. $120x^2y + 250y^3$

C. $-120x^2y - 250y^3$

D. can not determine its value

Answer: C



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14. Multiply $x^2 + 4y^2 + z^2 + 2xy + xz - 2yz$ by $(-z+x-2y)$



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15. If a, b, c are all non-zero and $a + b + c = 0$, then $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = ?$

A. 1

B. 2

C. 3

D. 4

Answer: C



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16. Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)(b + c)(c + a)$.



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17. If $a+b+c=5$ and $ab+bc+ca=10$, then prove that $a^3 + b^3 + c^3 - 3abc = -25$.

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18. The polynomial $p(x) = x^4 - 2x^3 - ax + 3a - 7$ when divided by $x+1$ leaves remainder 19. Also, find the remainder when $p(x)$ is divided by $x+2$.

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Exercise 2 A

1. Which of the following are polynomials ?

- (i) $x^2 - 3x + 1$ (ii) $x^2 + 5x + 2$ (iii) $x - \frac{1}{y}$ (iv) $x^7 + 8$ (v) x^5
(vi) $\sqrt{2}x^2 + x - 1$ (vii) $(3x - 1)(x + 5)$ (viii) $\left(x - \frac{3}{x}\right)(x + 2)$ (ix) $x + \frac{1}{\sqrt{x}} + 2$

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2. Separate monomial, binomial and trinomial from the following :

(i) $2x - 3$ (ii) $3x^2$ (iii) $5x^2 - 8x + 1$ (iv) $(2x + 3)^2$ (v) $-5x +$

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3. Find the degree of each of the following polynomials :

(i) $3x^4 - x^2 + 8$ (ii) $y^2 - 5y + 7$ (iii) $3x + 4$ (iv) 3
(v) $x - 2x^2 + 5x^7$ (vi) $2y^2 - 5y^6 + 1$ (vii) $x^3 - 1$ (viii) $3x + 5x^5$

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4. Write the coefficients of :

(i) x^2 in $3x^3 - 5x^2 - 5x + 6$ (ii) x^3 in $7x^4 + 5x^3 + 3x + 7$ (iii) x^2 in

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5. Give an example of :

(i) monomial of degree 19 (ii) binomial of degree 16 (iii) trinomial of degree 5

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6. Classify the following as linear quadratic and cubic polynomial :

(i) $x^3 + x^2 + 3$ (ii) $x^2 + 5$ (iii) $x^3 - x$ (iv) $3x$ (v) $x + 3$

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7. Give an example of a polynomial which is neither monomial, nor binomial nor trinomial and nor any multinomial.

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8. If the degree of a polynomial AB is 15 and the degree of polynomial A is 5, then find the degree of polynomial B.



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Exercise 2 B

1. If $p(x) = x^3 + 2x^2 + x$ find :

(i) $p(0)$ (ii) $p(2)$



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2. If $p(y) = y^3 + y^2 + y + 1$ find :

(i) $y(1)$ (ii) $y(-1)$



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3. If $p(x) = 4x^2 - 3x + 6$ find :

(i) $p(4)$ (ii) $p(-5)$



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4. Find the zero of the polynomial :

(i) $p(x) = x - 3$ (ii) $q(x) = 3x - 4$ (iii) $p(x) = 4x - 7$ (iv) $q(x)$

(v) $p(x) = 4x$ (vi) $p(x) = \frac{3}{2}x - 1$



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5. Verify that

(i) 3 is a zero of the polynomial $x-5$.

(ii) -2 is a zero of the polynomial $x+2$.

(iii) $\frac{7}{3}$ is a zero of the polynomial $3x-7$.

(iv) 2 and 3 are zeros of the polynomial $(x-2)(x-3)$.

(v) $\frac{13}{2}$ and -3 are zeros of the polynomial $2x^2 - 7x - 39$.



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Exercise 2 C

1. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^4 + 1, \quad g(x) = x - 1$$

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2. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^3 + 3x^2 + 2x + 1, \quad g(x) = x + 2$$

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3. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^4 + 4x^2 + 2,$$

$$g(x) = x^2 + 1$$



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4. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^3 - 7x^2 - 6x + 1, \quad g(x) = x - 3$$



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5. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^4 + 6x^3 - 4x^2 + 2x + 1, \quad g(x) = x^2 + 3x - 1$$



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6. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = 3x^3 - 4x^2 + 2x + 5, \quad g(x) = x + 3$$



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7. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^3 + 6x^2 - 1, \quad g(x) = x^2 + 2$$



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8. Divide $p(x)$ by $g(x)$ in each of the following questions and find the quotient $q(x)$ and remainder $r(x)$:

$$p(x) = x^6 - 1, \quad g(x) = x^2 + 1$$



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9. In each of the following cases (Q.9-12), find whether $g(x)$ is a factor of $p(x)$:

$$p(x) = x^2 - 5x + 6, \quad g(x) = x - 2$$



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10. In each of the following cases (Q.9-12), find whether $g(x)$ is a factor of

$p(x)$:

$$p(x) = x^3 - x^2 + x - 1, \quad g(x) = x - 1$$



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11. In each of the following cases (Q.9-12), find whether $g(x)$ is a factor of

$p(x)$:

$$p(x) = 3x^3 + 5x^2 - 7x - 1, \quad g(x) = x - 1$$



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12. In each of the following cases (Q.9-12), find whether $g(x)$ is a factor of

$p(x)$:

$$p(x) = x^4 + 3x^2 - 4, \quad g(x) = x + 2$$



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13. Using remainder theorem, find the remainder when :

(i) $x^3 + 5x^2 - 3$ is divided by $(x - 1)$ (ii) $x^4 - 3x^2 + 2$ is divided by

$(x-2)$

(iii) $2x^3 + 3x^2 - 5x + 2$ is divided by

$(x + 3)$ (iv) $x^3 + 2x^2 - x + 1$ is divided by $(x+2)$

(v) $x^3 + 3x^2 - 5x + 4$ is divided by

$(2x - 1)$ (vi) $3x^3 + 6x^2 - 15x + 2$ is divided by $(3x-1)$



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14. Show that :

(i) $x-5$, is factor of $x^2 - 11x + 30$ (ii) $(x + 2)$, is a factor of

$x^2 + 3x + 2$

(iii) $x-3$, is a factor of $2x^3 + 7x^2 - 24x - 45$ (iv) $3x - 2$, is a factor of

$3x^3 + x^2 - 20x + 12$

(v) $x-1$, is a factor of $x^3 - 10x^2 + 23x - 14$ (vi) $x - 2$, is a factor of $x^3 - 3x^2 - x + 6$

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15. Polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $(x - 4)$ leave the same remainder. Find the value of a .

A. 4

B. 3

C. 2

D. 1

Answer: D

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16. Find the value of 'k' if :

(i) $x+5$, is a factor of $2x^3 + kx^2 - 11x - 30$ (ii) $2x - 1$, is a factor of $2x^3 - 7x^2 + 11x - 7 + k$



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17. Using factor theorem; factorize the polynomial $x^3 - 6x^2 + 11x - 6$



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18. If $x^2 + 2x + 3$ is a factor of $x^4 + 3px^2 + 2q$, then find the value of $p+q$?



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19. What should be subtracted from $p(x) = 6x^4 + 7x^3 + 26x^2 - 25x + 25$ so that the resulting polynomial

is exactly divisible by $g(x) = 3x^2 - x + 4$.

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20. When a polynomial $f(x)$ is divisible by $x-3$ and $x+6$, the respective remainders are 7 and 22. What is the remainder when $f(x)$ is divided by $(x-3)(x+6)$?

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21. Evaluate :
$$\frac{(0.35)^3 + (0.41)^3 - (0.76)^3}{9(0.35)(0.41)(0.76)}$$

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22. Evaluate : $(x^{1/3} + y^{1/3})(x^{2/3} - x^{1/3}y^{1/3} + y^{2/3})$, when $x = 4\frac{5}{7}$ and $y = 5\frac{2}{7}$.

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23. Evaluate : $x^3 + 3x - 13$, if $x = \sqrt[3]{7 + 5\sqrt{2}} - \frac{1}{\sqrt[3]{7 + 5\sqrt{2}}}$

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24. Find the greatest value of x , which satisfies the system of equations :

$$x^3 + y^3 = 35, x^2y + xy^2 = 30.$$

A. 5

B. 4

C. 3

D. 2

Answer: C

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1. Factorise the following polynomials :

(i) $x^3 + x^2$ (ii) $a^3bc + ab^3c - abc^3$ (iii) $ab(x + y) + bx(x + y)$

(iv) $32(x + y)^2 + 2(x + y)$ (v) $x(x - y) - z(y - x)$ (vi) $(1 - x) - (x$

(vii) $7(x + y)^3 + 14(x + y)^2 + 28(x + y)$



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2. Factorise the following expressions :

(i) $ax - ay + bx - by$ (ii) $x^2 - x - ax + a$ (iii) $x^4 + x^3 + x^2 + x$

(iv) $16(a + b)^2 - 4a - 4b$ (v) $x^2 + \frac{1}{x^2} + 2 - 3x - \frac{3}{x}$ (vi) $x^2 - \left(\frac{a}{b} + \right.$

(vii) $x^2 + \left(a - \frac{1}{a}\right)x - 1$ (viii) $ab(x^2 + y^2 + xy(a^2 + b^2))$ (ix) $(ax +$



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3. Factorise the following :

(i) $9a^2 - b^2$ (ii) $81x^3 - x$ (iii) $x^3 - 49xy^2$ (iv) $a^2 - (b - c)^2$

(v) $(x - y)^3 - x + y$ (vi) $x^2y^2 + 1 - x^2 - y^2$ (vii) $25(a + b)^2 - 49(a -$

(ix) $x^8 - 256$ (x) $x^8 - 81y^8$



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4. Factorise the following :

(i) $x^2 + 7x + 12$ (ii) $x^2 + 18x + 45$ (iii) $x^2 - 7x + 12$ (iv) $x^2 - 25$



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5. Factorise the following : (i) $2x^2 + 9x + 9$ (ii) $2x^2 + 9x - 5$



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Exercise 2 E

1. Use direct method to evaluate the following product :

(i) $(x + 8)(x + 3)$ (ii) $(x - 8)(x + 2)$ (iii) $(x - 3)(x - 5)$



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2. Use direct method to evaluate :

$$(i)(x + y)(x - y) \quad (ii)(4 + x)(4 - x) \quad (iii)(2x - 1)(2x + 1) \quad (iv)$$
$$(v)\left(\frac{x}{2} - \frac{y}{2}\right)\left(\frac{x}{2} + \frac{y}{3}\right) \quad (vi)(x + y)(x - y)(x^2 + y^2).$$

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3. Evaluate without multiplying directly :

$$(i)33 \times 27 \quad (ii)103 \times 97 \quad (iii)9.8 \times 10.2.$$

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4. Expand :

$$(i)(3a - 5b)^2 \quad (ii)\left(a + \frac{1}{a}\right)^2 \quad (iii)\left(2x - \frac{a}{2x}\right)^2.$$

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5. Expand :

(i) $(a + b - c)^2$ (ii) $(a - 2b - 5c)^2$ (iii) $(3a - 2b - 5c)^2$ (iv) $(2x +$

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6. Evaluate using formula :

(i) $(188)^2$ (ii) $(9.4)^2$ (iii) $(10.9)^2$

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7. (i) If $a^2 + b^2 + c^2 = 20$ and $a + b + c = 0$, find $ab + bc + ac$.

(ii) If $a^2 + b^2 + c^2 = 250$ and $ab + bc + ca = 3$, find $a + b + c$.

(iii) If $a+b+c=11$ and $ab+bc+ca=25$, then find the value of $a^3 + b^3 + c^3 - 3abc$.

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8. Expand :

(i) $(2x + 3y)^3$ (ii) $(5y - 3x)^3$ (iii) $(2a + 3b)^3$.

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9. Evaluate $(2x - 3y + 5)^3$.

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10. If $a+2b=5$, then show that $a^3 + 8b^3 + 30ab = 125$.

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11. If $2x - 3y = 10$ and $xy = 16$, find the value of $8x^3 - 27y^3$.

A. 3000

B. 3200

C. 3880

Answer: C[Watch Video Solution](#)**12. Evaluate :**

$$(i)(98)^3 \quad (ii)(598)^3 \quad (iii)(1003)^3$$

[View Text Solution](#)**13. Factorise :**

$$(i) 4a^2 + 9b^2 + 16c^2 + 12ab - 24bc - 16ca$$

$$(ii) \frac{4}{9}x^2 + \frac{9}{16}y^2 + \frac{16}{25}z^2 - xy - \frac{6}{5}yz + \frac{16}{15}zx$$

$$(iii) 2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz$$

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14. Verify :

$$(i) x^3 + y^3 = (x + y)(x^2 - xy + y^2) \quad (ii) x^3 - y^3 = (x - y)(x^2 + xy + y^2)$$



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15. Factorise :

$$(i) 9a^3 - 27b^3 \quad (ii) a^3 - 343 \quad (iii) a^3 - \frac{27}{a^3} \quad (iv) 1 + 8a^3 \quad (v) (a + b)^3 - a^3 - b^3$$



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16. Find the product :

$$(i) (x + 3)(x^2 - 3x + 9) \quad (ii) (7 + 5b)(49 - 35b + 25b^2)$$
$$(iii) \left(5a + \frac{1}{2}\right) \left(25a^2 - \frac{5a}{2} + \frac{1}{4}\right) \quad (iv) (a + b - 2)[a^2 + b^2 + 2ab + 2(a + b) + 2]$$



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17. Factorise :

$$(i) a^3 + 27b^3 + 8c^3 - 18abc \quad (ii) 2\sqrt{2}a^3 + 8b^3 - 27c^3 + 18\sqrt{2}abc$$

$$(iii) x^3 + y^3 - 12xy + 64 \quad (iv) 125 - 8x^3 - 27y^3 = 90xy.$$



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18. Find the product :

$$(i) (a + 2b + 4c)(a^2 + 4b^2 + 16c^2 - 2ab - 8bc - 4ca)$$

$$(ii) (3x - 5y - 4)(9x^2 + 25y^2 + 15xy + 12x - 20y + 16)$$

$$(iii) (2 - 3b - 7c)(4 + 9b^2 + 49c^2 + 6b - 21bc + 14c)$$

$$(iv) (\sqrt{2}a + 2\sqrt{2}b + c)(2a^2 + 8b^2 + c^2 - 4ab - 2\sqrt{2}bc - \sqrt{2}ac)$$



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19. Factorise :

$$(i) (x - y)^3 + (y - z)^3 + (z - x)^3$$

$$(ii) (x - 2y)^3 + (2y - 4z)^3 + (4z - x)^3$$

$$(iv) (3\sqrt{2}a - 5\sqrt{3}b)^3 + (5\sqrt{3}b - 7\sqrt{5}c)^3 + (7\sqrt{5}c - 3\sqrt{2}a)^3.$$

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20. Without actually calculating the cube find the value of the following :

(i) $(-9)^3 + (4)^3 + (5)^3$ (ii) $(-18)^3 + (9)^3 + (9)^3$ (iii) $(16)^3 + (1)^3$

(iv) $(8)^3 + (3)^3 + (-11)^3$.

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21. Verify that

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z) \left[(x - y)^2 + (y - z)^2 + (z - x)^2 \right]$$

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22. If $x + y + z = 0$ show that $x^3 + y^3 + z^3 = 3xyz$.

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1. Evaluate $\left(\frac{5x}{3} - \frac{y}{2}\right)^2$.

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2. Evaluate without calculating 52^2 .

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3. Using properties find $(x+3)(x-4)$.

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4. Evaluate $(a + 2b)^3$.

A. $a^3 + 6a^2b + 12ab^2 + 8b^3$

B. $a^3 - 6a^2b - 12ab^2 + 8b^3$

C. $a^3 - 6a^2b + 12ab^2 - 8b^3$

D. None of These

Answer: A

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5. Evaluate $(14)^3 + (-8)^3 + (-6)^3$.

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6. Expand $\left(x - 3y + \frac{z}{2}\right)^2$.

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7. Factorise $a^3 - (b - c)^3$.

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8. if $a + b + c = 9$ and $ab + bc + ca = 26$, find $a^2 + b^2 + c^2$.



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9. Factorise $a^6 - b^6$.



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10. Factorise $(a + b)^3 - a - b$.

A. $(a + b)(a + b + 1)(a - b - 1)$

B. $(a + b)(a + b + 1)(a + b - 1)$

C. $(a + b)(a - b + 1)(a + b - 1)$

D. $(a - b)(a + b + 1)(a + b - 1)$

Answer: B



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Revision Exercise Short Answer Questions

1. Evaluate $\left(\frac{2}{3}x - \frac{3}{4}y + \frac{4}{5}z\right)^2$.

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2. Evaluate $\left(\frac{a}{2b} + \frac{2b}{a}\right)^2 - \left(\frac{a}{2b} - \frac{2b}{a}\right)^2 - 4$.

A. 3

B. 2

C. 1

D. 0

Answer: D

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3. If $a + b + c = p$ and $ab + bc + ac = q$, find $a^2 + b^2 + c^2$.

A. $p - 2q$

B. $p^2 - q$

C. $p^2 - 2q$

D. $p^2 + 2q$

Answer: C

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4. Evaluate $(2x - 3y + 5)^3$.

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5. If $a + b + c = 0$ then prove that $a^3 + b^3 + c^3 = 3abc$

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6. If $a + \frac{1}{a} = p$, show that $a^3 + \frac{1}{a^3} = p(p^2 - 3)$.

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7. If $x^3 + y^3 + z^3 = 3xyz$ and $x+y+z=0$, find the value of

$$\frac{(x+y)^2}{xy} = \frac{(y+z)^2}{yz} + \frac{(z+x)^2}{zx}$$

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8. If $3x - \frac{4}{x} = 4$, find $27x^3 - \frac{64}{x^3}$

A. 28

B. 208

C. 138

D. 200

Answer: B

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9. Evaluate $0.54 \times 0.54 \times 0.46 \times 0.46$ using identities.

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10. Simplify $(4a + 2b)^3 + (4a - 2b)^3$.

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11. Find the product $(7a - 5b)(49a^2 + 35ab + 25b^2)$.

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12. If $a + b = 7$ and $ab = 12$ find the value of $a^2 - ab + b^2$.

A. 13

B. 37

C. 15

D. 50

Answer: A

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13. If $x=4$ and $y=1$, find the value of $\left(\frac{x}{2} - \frac{y}{3}\right)\left(\frac{x^2}{4} + \frac{xy}{6} + \frac{y^2}{9}\right)$.

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14. Simplify $\frac{(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3}{(a - b)^3 + (b - c)^3 + (c - a)^3}$

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15. If $a+b+c=9$ and $ab+bc+ca=35$, find the value of $a^3 + b^3 + c^3 - 3abc$.

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16. Factorize: $3\sqrt{3}a^3 - b^3 - 5\sqrt{5}c^3 - 3\sqrt{15}abc$



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