MATHS

BOOKS - CENGAGE

ALGEBRAIC EXPRESSIONS AND POLYNOMIALS

Work Examples

1. Add 3x and 15 x.

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2. Add 4xy, 6xy, and 9xy.

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3. Add $3x + 6y$ and $4x + 5y$.

4. Add $4x^2 + 4x + 12$ and $2x^2 - 5x - 18$.

5. Subtract $2a + b$ from $4a + 3b$.

6. Subtract $8x^2 - 4x + 3$ from $9x^2 + 2x + 9$.

7. Subtract $x^2y + 3x^2y^2 - 4xy^2$ from $2x^2y - x^2y^2 - 3xy^2$.

8. Subtract the second expresson from the first :

$4m^2 - 6m + 12, 8m^2 - 3m - 9.$

9. Simplify the

$3x - (x - 5)$

10. Simplify the

$4y - (- 6 - 2y)$

11. Simplify the

$$p - (2p + 2)$$

12. Simplify the

$$(a + 2b) - (3b + 2c) + (2c - a)$$

13. Simplify the

$$(c + 2d) - (2c - d) - (c + 3d)$$

14. Simplify the

$$(-4)(-3x^2y)$$

15. Simplify the

$$\left(-2a^2\right)\left(-3a^2b\right)$$

16. Simplify the

$$\left(4x^2\right)\left(-3x^2y^2\right)$$

17. Simplify the

$$\left(5x^2y\right)\left(-4xy^3\right)$$

18. $\left(3x^2y\right)\left(-4xy^2\right)\left(-5x^3y^3\right)$

19. Simplify the using the distibutive law.

$2a(3a + b)$

20. Simplify the using the distibutive law.

$-3a(2a + 5b)$

21. Simplify the using the distibutive law.

$-4x(3y - 2xy)$

22. Simplify the using the distibutive law.

$$4x^2y(x^2 - 2y^2)$$

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23. Simplify the using the distibutive law.

$$-3ab(a^2 + ab - b^2)$$

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24. Simplify the using the distibutive law.

$$-5x^2y^2(3x^3 - 4x^2y^2 - 2y^3)$$

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25. Simplify the

$$(3x + 5y)(x - 2y)$$

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26. Simplify the

$$5p - (3 - 2p) + 8$$

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27. Simplify the

$$3x - 3[2(x - 2y) + 5x] + 8$$

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28. Simplify the

$$a - [3(a + 1) - 2(a - 4)] - 6a + 2$$

29. Simplify the

$$\frac{x^8 y^2}{x^3 y}$$

30. Simplify the

$$\frac{45a^3 b^2}{15a^2 b^4}$$

31. Simplify the

$$-\frac{36}{12} \frac{a^2}{a^3 b^2}$$

32. Simplify the

$$\frac{45x^2y^4}{18x^5y}$$

Examples

1. If $9x^2 + 6x^2 - 5x^2 + ax + b$ is a perfect square, then find the values of a and b and find the square root.

Worked Examples

1. Divide $2x^2 + 5x + 3 by 2x + 3$.

2. Divide $5x^3 - 12x^2 - 325byx - 5$.

3. Divide $x^4 - y^4byx^2 - y^2$.

4. Divide $\left(x^3 - 18\right)byx - 2$.

5. Find the cube of $3p + 4q$.

6. Simplify the fillowing

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

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7. Find the value of $x^3 + 18x^2 + 108x + 341$, when $x = -11$.

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8. Find the cube of $3x - 4y$.

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9. Find the value of

$$8a^3 - 27b^3 - 90ab, \quad \text{if} \quad 2a - 3b = 5.$$

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10. Find the common factor to both the terms of the expression $8x + 12y.$

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11. Find the comon factor in the expreson $x^2 + xy.$

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12. Factorise $8x + 8y.$

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13. Factorise $18x^2 - 6xy.$

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14. Factorise $4x(a - b) + 5y(a - b)$.

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15. Factorise $6x(x + 2y) + (x + 2y)$. Which is the largest factor common to both the terms ?

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16. $x^2 + 10x + 21$

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17. $x^2 + 11x + 28$

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18. $x^2 + 15x + 36$

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19. $a^2 - 15a + 50$

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20. $a^2 - 16a + 60$

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21. $a^2 + 2a - 63$

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22. $a^2 + 16a + 39$

23. $d^2 + 3d - 88$

24. Factorise:

$d^2 - d - 90$

25. $d^2 + 19d + 78$

26. Factors of $2x^2 + 7x + 3$ are

27. $6x^2 + 7x + 2$

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28. $8x^2 + 34x + 21$

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29. $21x^2 + 31xy + 4y^2$

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30. $16a^2 + 14ab + 3b^2$

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31. $3x^3 + 11xy + 6y^2$

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32. $2x^2 - 5x + 3$

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33. $6x^2 - 7x + 2$

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34. $8x^2 - 34x + 21$

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35. $16a^2 - 14ab + 3b^2$

36. $3x^2 - 11xy + 6y^2$

37. $6x^2 - 7x - 24$

38. $5a^2 + 7ab - 6b^2$

39. $2y^3 + 10y^2 - 48y$

40. $3x^5 + 9x^3 - 162x$

41. $24y^3 - 14xy^2 - 24xu^3$

42. $a^2(x + y) + 3a(x + y) - 10(x + y)$

43. $5a^3 - 50x^2 + 125x$

44. $18c^3 - 3x^2 - 3x$

45. $2a^2b^2 - 4ab^2 - 70b^2$

46. $35x^4y^2 - 32x^2y^2 + 5y^2$

47. $x^2 - (a - 2)^2$

48. $(2a - b)^2 - 4c^2$

49. $81 - (x - 3y)^2$

50. $a^4 - b^4$

51. $2a^3 - 32a$

52. $a^5 - a^3$

53. $ay(a + y)^2 - a^3 y^3$

54. $2x^5 - 6x^3 - 8x$

55. $a^3 + 1$

56. $x^3 + 8$

57. $8x^3 - 27$

58. $a^3b^3 + 27$

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59. $(a + 2b)^3 - (2a - b)^3$

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60. Find the HCF of $x^4y - xy^4, x^4y^4, xy^2(x^6 - y^6)$

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61. Find the LCM of $a^2 - b^2, 3a^2 - 3ab$.

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62. Find the LCM of $x^2 - 2x - 3, x^3 - 3x^2 - x + 3,$ and $x^2 - 6x + 9$

63. Find the LCM of

$$6a(a^3 - b^3), 9(a^3 - ab^2), 2(a^3 + 2ab^2 - 2ab^2b - b^3),$$

64. $m^4 + 9m^2n^2 + 81n^4$

65. $64a^4 + 1$

66. $a^4 + b^4 + c^4 - 2(a^2b^2 + b^2c^2 + c^2a^2)$

67. $p^4 + 4p^2 + 16$

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68. $x^4 + 8x^2y^2 + 144y^4$

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69. $81p^4 + 64q^3$

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70. $4a^4 + 3a^2b^2 + 9b^4$

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71. $3x^4 + 12y^4$

72. $x^8 + x^4 + 1$

73. $4x^4 + 1$

74. $a^3 + b^3 - c^3 + 3abc$

75. $8a^3 - 27b^3 - c^3 - 18abc$

76. $8p^3 - 1 - m^3 - 6m$

77. Find the remainder when $2x^2 + 8x - 10$ is divided by x -2 .

78. Find the remainder when $x^3 - 4x^2 + 5x - 1$ is divided by $2x + 1$.

79. Find whethr $x - 2$ is a factor of $x^3 - 4x^2 + 1$.

80. Verify that $x - 3$ is a factor of $x^2 - 2x - 3$ Find the other factor .

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1. Write 68 in completely factorised from.

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2. Write $91x^2y$ in completely factorised form.

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3. Write the in the exponential form.

$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

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4. Write the in the exponential form.

$$-5 \times 5 \times 5 \times 5 \times 5$$

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5. Write the in the exponential form.

$$17ppppqqqrr$$

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6. Write the in the exponential form.

29 sss b t t t u u u

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7. Write the in the exponential form.

$47x \times x \times x \times y \times y \times y \times z \times z \times z$

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8. Given the number of trms in ech of the expressions.

$$\frac{8}{a} - \frac{x}{y} + \frac{7}{c}$$

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9. Given the number of trms in ech of the expressions.

$-4m^2 - 7m^2n - 9n^2m + 12n^2$

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10. Given the number of trms in ech of the expressions.

$$\frac{p}{q} - r$$

11. Given the number of trms in ech of the expressions.

$$-1024x^4y^2z^6$$

12. Given the number of trms in ech of the expressions.

4 p p p r t u v

13. Add $08x$, $6xy$, $-3xy$, $9xy$.

14. Subtract $6a - ab + 3b$ from $7a + 3ab + 2b$.

15. Subtract $-27m - 50n - 60p$ from $-20m - 40n - 50p$.

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16. Add $20a^2bc - 14abc, \ -12a^2bc + 12abc + 14c, 18abc - 12c + 10$.

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17. Multiply $(4x + 3)(2x + 5)$

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18. Multiply $(x - y)(x^2 + xy + y^2)$.

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19. Simplify $(2a)\left(4a^2 - 5a\right)$.

20. Simplify $\left(p^2 - pq + 2q^2\right)(2pq)$.

21. Simplify $\dfrac{3}{2}xy\left(4x^2y - 6xy^2 - 8x^2y^2\right)$

22. Simplify $-7xy^2z\left(xyz - x^2yz = xyz^2\right)$.

23. Divide $45 - 18m$ by 9.

24. Divide $x - 2y$ by y, where $y \in 0$.

25. Expand $(3x - 1)^2$.

26. Expand $\left(5y - \dfrac{1}{5}\right)^2$

27. Expand $\left(\dfrac{x^2}{y} - \dfrac{y^2}{x}\right)^2$.

28. Find cube of (a) (a + 3) and (b) $\left(xy + \dfrac{1}{xy} \right)$

29.   Simplify

$(3a + 4b)^3 + (- 3a - 2b)^3 + 3(3a + 4b)^2 - (- 3a - 2b) + 3(3a + 4b)(-$

30. If $x + \dfrac{1}{x} = a,$ find the value of $x^3 + \dfrac{1}{x^3}$

31. If $a + b = 6$ and $ab = 8,$ find the value of $a^3 + b^3,$

32. Factorise the

$bc + bc^2$

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33. Factorise the

$20m^2n = 25m^2$

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34. Factorise the

$x^2(xy + 5) - 2y^2(xy + 5)$

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35. Factorise the

$(x + 2y - 3)(x + 2) + (x + 2y - 3)(3y + 1)$

36. Factorise the

$$\left(p^2 + q^2 + 8\right)(p + 7) + \left(p^2 + q^2 + 8\right)(q - 7)$$

37. Factorise the

$$4x^4 + 81y^4$$

38. Factorise the

$$x^4 - 23c^2 + 1$$

39. Examine whether the can be factorised. If so, factorise them.

$3x^2 + 8x + 4$

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40. Examine whether the can be factorised. If so, factorise them.

$18x^2 + 38x + 4$

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41. Examine whether the can be factorised. If so, factorise them.

$30p^2 + 85pq + 35q^2$

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42. Examine whether the can be factorised. If so, factorise them.

What is the remainder when $4x^2 - 7x + 2$ is divided by $x - 4$?

43. Examine whether the can be factorised. If so, factorise them.

What is the remainder when $4x^2 - 3x^2 + 5x - 3$ is divided by $2x + 1$?

44. Examine whether the can be factorised. If so, factorise them.

Is $x - 4$ a factor of $x^3 - 2x^2 + 3x + 1$?

Test Yourself Level 2

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

2. Find the square root of $16a^4 - 24a^3 - 7a^2 + 12a + 4$.

3. Find the square root of $4x^6 - 12x^4 + 20x^3 + 9x^2 - 30x + 25$.

4. Find the square root of $25x^6 - 60x^5 + 36x^4 + 70x^3 - 84x^2 + 49$ using undetermined coefficient and identities.

5. Find the square root of $36 - 12m - 59m^2 + 10m^3 + 25m^4$ using undertrmined coefficient and identities.

6. Factorise by grouping.

$$2a + 4b - ac - 2bc$$

7. Factorise by grouping.

$$x^2 + 2ax + a(2) - x - a$$

8. Factorise by grouping.

$$25 - y^2 - 9z^2 + 6yz$$

9. Factorise by grouping.

$$al - bl + bm + cm - cl - am$$

10. Resolve into factors.

$$27a^3 - b^3 + c^3 + 9abc.$$

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11. Resolve into factors.

$$(5a - 4b)^3 + (4b - 3c)^3 - (5a - 3c)^3.$$

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12. Find the HCF of the

$$9a^2b^2, \, 6a^2b^3$$

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13. Find the HCF of the

$$17pa^3y^4z, \ 34rxz^2, \ 51prxyz$$

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14. Find the HCF of the

$$6ra^2x^2y^4z, \ 15r^3xy^3z^4, \ 36ab^2x^4y^3, \ 12xyz$$

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15. Find the HCF of the

$$9x^2 - 1, \ 9x^2 + 6x + 1$$

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16. Find the HCF of the

$$x^6 - a^6, \ x^4 + a^2x^2 + a^4$$

17. Find the HCF of the

$$x^6 - a^6, \, x^4 + a^2 x^2 + a^4$$

18. Write the LCM of the

$$ax^2, \, bx^3$$

19. Write the LCM of the

$$19a^2 b^2 c, \, 51abc^3, \, 38a^4 b^2$$

20. Write the LCM of the

If the remainder obtained on dividing $x^2 - 5x + k$ by $x - 2$ is 3, what is the value of k ?

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21. Write the LCM of the

If 2x + 3 is a factor of $8x^3 - 4x^2 + 6x - k$, what shuld be the value of k ?

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22. Write the LCM of the

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

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Test Yourself Level 3

1. Divide $x^4 - 5x^2 + 6$ by $x^2 - 2$.

2. Divide $x^4 - 4x^3 - 12x + 10x^2 + 9$ by $x^2 - 2x + 3$.

3. Find the values of a and b if $x^4 - 4x^3 + 6x^2 + ax + b$ is a perfect square.

4. Find the values of a and b if $9x^4 - 30x^3 - 29x^2 + ax + b$ is a perfect square.

5. Find p, q and r if $x^6 - 8x^5 + 10x^4 - 20x^3 + px^2 + qx + rs$ is a perfect square.

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6. Find p, q and r if $x^6 - 8x^5 + 10x^4 + 28x^3 + px^2 + qx + rs$ is a perfect square.

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7. If $\left(lx^2 + mx + n\right)^2 = 9x^4 - 36x^3 + 9x^2 - 144x + 144,$ find l,m , and n.

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8. If $\left(ax^2 + bx + c\right)^2 = 4x^2 - 24x^5 + 72x^2 + dx + e,$ find a,b,c,d, and e .

9. For what values of a, b the expression $9x^4 + ax^3 + bx^2 - 56x + 49$ will be a perfect square ?

10. $16y^3 + 19y^2 - 6y$

11. $6a^2b - 12ab - 210b$

12. $24xy^3 + 14xy^2 - 24xy$

13. $5a^5 - 5a^4b + 10a^3b^2 - 10a^2b^3$

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14. $3x^2 \left(2x^2 - 5x - 7\right) + 6y^2 \left(2x^2 - 5x - 7\right)$

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15. $2a - \dfrac{1}{4a^2}$

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16. $x^6 - a^6$

▶ View Text Solution

17. $x^5 - 27x^2$

> ▶ View Text Solution

18. $9x^2 - \dfrac{8}{3x}$

> ▶ View Text Solution

19. $32x^3 - 4d^3$

> ▶ View Text Solution

20. Find the value of $x^3 + 18x^2 + 108x + 314,$ when $x = -6.$

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21. If $x + y = 7$ and $xy = 10,$ find the value of $x^3 + y^3.$

22. Find the value of $x^3 - y^3$ if $x - y = 5$, $xy = 14$.

23. Find all the factor of $3x^3 - 7x^2 - 2x + 8$.

24. Factorise $x^3 - 19x - 30$ by finding a factor by inspection

25. If $x + 2$ is a factor of the expression $(x + 1)^2 + (2x + k)^3$, then what is the value of k ?

26. $x^2 - 1$ is a factor of $x^3 + ax^2 - x + b$. When the expression is divided by x -2 , what is the remainder obtained ? Calculate the values of a and b.

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1. If $x - \dfrac{1}{x} = 2$ then the value of $x^2 + \dfrac{1}{x^2}$ is

A. 2

B. 4

C. 6

D. 8

Answer: C

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2. If $x + \dfrac{1}{x} = 2$ then the value of $x^3 + \dfrac{1}{x^3}$ is

A. 2

B. 4

C. 6

D. 12

Answer: A

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3. If $x = \sqrt{49}$ then the value of x is

A. 7

B. -7

C. ± 7

D. none of these

Answer: A

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4. If $a + b + c + d + e = 0$ then

$(a + e)^2 + (b + e)^2 + (c + e)^2 + (d + e)^2$ is equal to

A. $a^2 + b^2 + c^2 + d^2 + e^2$

B. $a^2 + b^2 + c^2 + d^2 + 5e^2$

C. $a^2 + b^2 + c^2 + d^2 + 4e^2$

D. none of these

Answer: D

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5. If $x + \dfrac{3}{x} = y + \dfrac{3}{y}$ such that $x \neq y$ then

A. $x = 3y$

B. $y = 3x$

C. $xyy = 3$

D. $xy = 9$

Answer: C

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6. If $b^2 + ac = c^2 - ab$ and $b + c \neq 0$ then

A. $a + b = c$

B. $a + c = b$

C. $a - b = c$

D. none of these

Answer: A

7. If $x^2 + \dfrac{1}{x^2} = 83$ then the value of $x - \dfrac{1}{x}$ is

A. 3

B. 9

C. 18

D. 6

Answer: B

8. If $x + \dfrac{1}{x} = 1$ then value of x^3 is

A. 1

B. -1

C. 2

D. -2

Answer: B

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9. If $x + \dfrac{1}{x} = -1$ then the value of x^3 is

A. 1

B. -1

C. 2

D. -2

Answer: A

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10. If $x^2 + \dfrac{1}{x^2} = 227$ then value of $x - \dfrac{1}{x}$ is

A. 15

B. 17

C. 25

D. 5

Answer: A

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11. If $x^3 - \dfrac{1}{x^3} = 140$ then value of $x^4 + \dfrac{1}{x^4}$ is

A. 729

B. 727

C. 784

D. 676

Answer: B

12. If $x + y = 5$ and $xy = 7$ then value of $x^3 + y^3$ is

A. 21

B. 25

C. 20

D. 27

Answer: C

13. If $x + y = 7$ and $xy = 6$ then value of $x^2 + y^2$ is

A. 37

B. 36

C. -36

D. -37

Answer: A

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14. If $a + b + c = 0$ then value of $\dfrac{a^2}{bc} + \dfrac{b^2}{ac} + \dfrac{c^2}{ab}$ is

A. 0

B. abc

C. -1

D. 3

Answer: D

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15. If $x^{1/3} + y^{1/3} + z^{1/3} = 0$ then value of $(x + y + z)^3$ is

A. 0

B. 3xyz

C. $x^3 + y^3 + z^3$

D. 27 xyz

Answer: D

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16. If $x^3 + y^2 + z^3 = 3xyz$ and $x + y + z \neq 0$ then which of the following is correct ?

A. $x = y = 2z$

B. $x = y = z$

C. $x + y - z = 0$

D. $x - y + z = 0$

Answer: B

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17. If $x^2 + y^2 + z^2 = xy + yz + zx$, where x, y and z are real numbers, then which of the following is correct ?

A. $x + y + z = 0$

B. $x = y = z$

C. $x + y = z$

D. none of these

Answer: B

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18. Which of the following is a polynomial ?

A. $x^3 + x^2 + 3$

B. $x^2 + 2x + 2\sin x$

C. both A and B

D. none of these

Answer: A

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19. Degree of the zero polynomial is

A. 0

B. 1

C. any real number

D. not defined

Answer: D

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20. Let $P(x) = a_0 x^n + a_1 x^{n-1} + \ldots + a_n (n \in N)$. Then degree of polynomial is $(a_n \neq 0)$

A. n

B. 1

C. not defined

D. either n or less than n

Answer: D

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21. Let P (x) and Q (x) be two polynomials of degree 5, then degree of P (x) + Q (x) si

A. always 5

B. always 10

C. may be less than 5

D. may be greater than 5

Answer: C

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22. $(x + y)(x^2 + y^2 - xy)(x^2 + y^2 + xy)(x - y)$ is equal to

A. $x^3 + y^3$

B. $x^2 - y^3$

C. $x^6 + y^6$

D. $x^6 - y^6$

Answer: D

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23. $\left(a - \dfrac{1}{a}\right)\left(a + \dfrac{1}{a}\right)\left(a^2 + \dfrac{1}{a^2}\right)$ is equal to

A. $a^3 - \dfrac{1}{a^3}$

B. $a^3 + \dfrac{1}{a^3}$

C. $a^4 + \dfrac{1}{a^4}$

D. $a^4 - \dfrac{1}{a^4}$

Answer: D

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24. $P(x) = 1 - \dfrac{1}{x}$ and $Q(x) = x^3 + x^2 + x$ then $P(x) \times Q(x)$ is

A. $x^3 + \dfrac{1}{x^3}$

B. $x^3 - \dfrac{1}{x^3}$

C. $x^3 - 1$

D. $x^3 + 1$

Answer: C

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25. $(2x + y)^3 - (x + 2y)^3 + 3(2x + y)(x + 2y)^2 - 3(x + y)^2(x + 2y)$

is equal to

A. $8(x - y)^3$

B. $(x - y)^3$

C. $8) y - x)^3$

D. $(y - x)^3$

Answer: B

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26. If $P = \sqrt{3}$ then value of $P^4 - 6P^2 + 10$ is

A. 0

B. 1

C. 2

D. -1

Answer: B

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27. If $x = 3$ and $y = \sqrt{3}$ then value of $x^2 + y^4 + 2xy^2$ is

A. 32

B. 33

C. 34

D. 36

Answer: D

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28. If $x = 3 + \sqrt{2}$ then value of

$x^4 - 12x^3 + 50x^2 - 84x + 49$ is

A. 0

B. 2

C. -1

D. 2

Answer: A

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29. The remainder when $x^4 - 4x^2 + 2x^2 + 4x + 1$ is dividing by $\left(x - 1 - \sqrt{2}\right)$ is

A. 1

B. 2

C. 0

D. -1

Answer: C

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30. Which of the following is not a factor of

$$\left(x^2 - 4x + 3\right)\left(x^3 + 2\right) - \left(x^2 - 4x + 3\right) ?$$

A. $(x - 3)$

B. $(x + 1)$

C. $\left(x^2 - x + 1\right)$

D. $\left(x^2 + x + 1\right)$

Answer: D

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31. The square root of $x^4 - 2x^2 + 1$

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

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

C. $x^2 + 1$

D. none of these

Answer: A

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32. The square root of $x^4 + 8x^3 + 22x^2 + 24x + 9$ is

A. $x^2 + 4x + 7$

B. $x^2 - 4x + 3$

C. $x^2 - 4x + 7$

D. $x^2 + 4x + 3$

Answer: D

---

33. Which of the following is ot a factor of $a^2 + b^2 - 2b - 8$?

A. $a - b + 2\sqrt{2}$

B. $a - b - 2\sqrt{2}$

C. $a + b - 2\sqrt{2}$

D. none of these

Answer: C

---

34. The HCF of $x^5 + 32$ and $x^2 + 4x + 4$ is

A. $(x + 2)$

B. $(x + 2)^2$

C. $(x + 4)$

D. none of these

Answer: A

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35. LCM of $(x + 1)$, $(x^2 - x + 1)$ and $(x - 1)(x^2 + x1)$ is

A. $x^6 + 1$

B. $x^6 - 1$

C. $x^3 - 1$

D. $x^3 + 1$

Answer: B

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36. LCM of $\dfrac{7}{2}a^2b$ and $\dfrac{3}{2}ab^2$ is

A. $\dfrac{21}{2}a^2b$

B. $21a^2b^2$

C. $\dfrac{21}{2}a^2b^2$

D. $21ab$

Answer: C

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37. If polynomial $x^2 + ax + b$ leaves remainders 2 and 3 when divided by

$(x - 1)$ and $(x - 2)$, respectively, then polynomial is

A. $x^2 + 3x - 2$

B. $x^2 - 2x + 3$

C. $x^2 + 2x - 3$

D. $x^2 - 3x + 2$

Answer: B

---

38. Which of the following is a factor of $1 + x + x^2 + x^3$?

A. $x - 1$

B. $x^2 - 1$

C. $x^2 + 1$

D. none of these

Answer: C

---

39. If $a + b + c = 7$ and $ab + bc + ca = 16$ then the value of $a^3 + b^3 + c^3 - 3abc$ is

A. 7

B. 16

C. 1/2

D. 23

Answer: A

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40. If area of a rectangle is $2x^2 + 13x + 15$ then measure of its side can

be

A. $2x + 3$

B. $x + 5$

C. both A and B

D. none of these

Answer: C

1. Find the value of f in $\dfrac{1}{f} = \dfrac{1}{u} + \dfrac{1}{v}$ wen u = 15 and v = 10.

A. -6

B. $1/6$

C. 6

D. $-\left(\dfrac{1}{6}\right)$

Answer: C

2. Factorize $a^2 - (b - c)^2$.

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

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

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

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

Answer: A

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3. Simplify $\dfrac{x^3 - 3x^2}{9x^2 - x^4}$

A. $\dfrac{1}{x + 3}$

B. $-\dfrac{1}{x + 3}$

C. $\dfrac{1}{3x + 3}$

D. $\dfrac{1}{3x - 3}$

Answer: B

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4. Find the HCF of $x^2 + (a - b)x - ab$, $x^2 - 2bx + b^2$, and $x^2 - b^2$.

A. $x - b$

B. $x^2 - b^2$

C. $(x + b)^2$

D. $(c - b)^2$

Answer: A

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5. Write $\dfrac{a^2 - b^2}{a^2 - 3ab + 2b^2}$ in the simplest form

A. $\dfrac{(a + b)^2}{(a - 2b)}$

B. $\dfrac{a + b}{a - 2b}$

C. $\dfrac{(a - b)}{(a - 2b)}$

D. $\dfrac{(a + b)}{(a + 2b)}$

Answer: B

6. Study the given statements.

Statement I: $\dfrac{a}{x+a} + \dfrac{b}{x-a} - \dfrac{c}{x^2-a^2} = \dfrac{a(x-a) + b(x+a) - c}{x^2-a^2}$

Statement II:

$$3abc - a^3 - b^3 - c^3 = \dfrac{1}{2}(a+b+c)\left[(a-b)^2 + (b-c)^2 + (c-a)^2\right]$$

Which of the following options holds ?

A. Both Statement I and Statement II are true.

B. Statement I is true and Statement II is false.

C. Statement I is false false and Statement II is true.

D. Both Statement I and Statement II are false.

Answer: B

7. Match the following

Column I		Column II	
(P)	If $x^3 + 18x^2 + 108x + 341 = 0$ then $x =$	(i)	7
(Q)	If $m = -19$ and $n = 23$ then the value of $25m^2 + 40mn + 16n^2$ is	(ii)	-11
(R)	If $x + \dfrac{1}{x} = 3$, then $x^2 + \dfrac{1}{x^2} =$	(iii)	27
(S)	If $x + y = 3$ and $xy = 0$, then $x^3 + y^3 =$	(iv)	9

A.
P	Q	R	S
iv	iii	ii	i

B.
P	Q	R	S
ii	iv	ii	iii

C.
P	Q	R	S
i	iv	ii	iii

D.
P	Q	R	S
ii	iv	i	ii

Answer: B

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8. State T for and F for false.

(i) $a^3 - b^3 = (a - b)^3$ if ab = 0

(ii) $\left(x + \dfrac{1}{x}\right)^2 - \left(x - \dfrac{1}{x}\right)^2 = 2$

(iii) The remainder when $15^2 - 26x + 8$ is divided by $3x - 4$ is 1.

A.
(i)	(ii)	(iii)
T	F	T

B.
(i)	(ii)	(iii)
T	T	F

C.
(i)	(ii)	(iii)
F	T	T

D.
(i)	(ii)	(iii)
T	F	F

Answer: D

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9. Fill in the blanks.

(i) When P (x) is divided by _____P_____ the remainder is P (a).

(ii)If P (a) = 0, then ___Q___ is a factor of P (x).

(iii) If p (-a) =0, then ___R___ is a factor of P (x).

A.
P	Q	R
$(x - a)$	$(x - a)$	$(x + a)$

B.
P	Q	R
$(x + a)$	$(x - a)$	$(x + a)$

C.

P	Q	R
$(x - a)$	$(x + a)$	$(x - a)$

D.

P	Q	R
$(x + a)$	$(x - a)$	$(x - a)$

Answer: B

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10. If $x = 2\left(t + \dfrac{1}{t}\right)$ and $y = 3\left(t - \dfrac{1}{t}\right)$, then $\dfrac{x^2}{4} - \dfrac{y^2}{9}$ is

A. 3

B. -4

C. 4

D. -3

Answer: C

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