2. EQUATIONS

TYPES OF EQUATIONS

1. Linear equations with one variable: Here, maximum degree of variable is 1.

   E.g. 3x+5=10

2. Linear equations with two variables: Here, maximum degree of variable is 1.

   E.g. 3x+5y=10

3. Quadratic equations: Here, maximum degree of variable is 2.

   E.g. $2x^2 + 5x - 12 = 0$

4. Cubic equation: Here, maximum degree of variable is 3.

   E.g. $2x^3 + 8x - 12 = 0$

QUADRATIC EQUATION

Quadratic equation is in following form - $ax^2 + bx + c = 0$

Roots (α, β) → $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

PROPERTIES OF ROOTS

- $α + β = -b/a$

- $α \cdot β = c/a$

- $α^2 + β^2 = (α + β)^2 - 2αβ$

- $(α - β)^2 = α^2 + β^2 - 2αβ$

- $\alpha^3 + \beta^3 = (\alpha + \beta)(\alpha^2 + \beta^2 - \alpha\beta)$

- $\alpha^3 - \beta^3 = (\alpha - \beta)(\alpha^2 + \beta^2 + \alpha\beta)$

Formation of quadratic equation from when roots are given:

$(x - \alpha)(x - \beta) = 0$

$x^2 - (\alpha + \beta)x + \alpha \cdot \beta = 0$

EQUATION OF A STRAIGHT LINE

Steps to find equation of a straight line:

- Assume equation as y=mx+c

- Find value of slope(m) by appropriate method

- Put value of m & for finding value of c, put value of x & y from any point which is lying on given line. And get c

- Put value of c.

METHODS OF CALCULATING SLOPE (m)

- If two points(x1,y1) & (x2,y2) of a line are given then m = $\dfrac{y_2 - y_1}{x_2 - x_1}$

- If equation is in the form ax+by+c=0 then m = $\dfrac{-a}{b}$

PARALLEL & PERPENDICULAR LINES

- For parallel lines, slopes are same i.e. $m_1 = m_2$

- For perpendicular lines, $m_1 \times m_2 = -1$

OTHER USEFUL PROPERTIES

Distance formula →

Distance between two points or length of a line is given by-

d = ℓ = $\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$

➢   For concurrent lines,   point of intersection is same.

➢   For collinear points, $x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) = 0$

➢   For point of intersection, solve two equations simultaneously

➢   For x – intercept,   put y = 0

For y – intercept,   put x = 0

PROBLEMS

❖ **BASIC PROBLEMS:**

1. The equation -7x +1 =5 -3x will be satisfied for x equal to

   a. 2

   b. -1

   c. 1

   d. None of these

2. The root of the equation 3x+10 =2 (x+15) is

   a. 20   b. 10

   c. 2   d. None of these

3. The solution of the equation (p+2) (p-3) +(p+3) (p+4) =p(2p- 5) is

   a. 6   b. 7

   c. -7   d. None of these

4. The equation $\frac{12x+1}{4} = \frac{15x-1}{5} + \frac{2x-5}{3x-1}$ is true for

   a. x = 1   b. x = 2

   c. x = 5   d. x = 7

5. the solution of the sets of equations 3x +4y = 7 , 4x – y = 3 is

   a. (1,1)   b.(1,-1)   c. (2,1)   d. (1,-2)

6. the pair satisfying the equation x + 5y = 36 , $\frac{x+y}{x-y} = \frac{5}{3}$ is given by

   a. (16 , 4) b. (4 , 16) c.(4 , 8) d. None of these

7. solve for x & y : x – 3y = 20 + y – 2x = 0 the values x & y are given as

    a. x = 4 , y = 12   b. x = 12 , y = 4

    c. x = 5 , y = 4   d. none of these

8. the simultaneously equation 7x – 3y = 31 , 9x – 5y = 41 have solution given by

    a. (- 4 , - 1)   b. (- 1 , 4)

    c. (4 , - 1)   d. (3 , 7)

9. 1.5x + 2.4y = 1.8 , 2.5 (x + 1) = 7y have solution as

    a. (0.5 , 0.4)   b. (0.4 , 0.5)

    c. $\left(\dfrac{1}{2}, \dfrac{2}{5}\right)$ d. (2 , 5)

10. the values of x & y satisfying the equation 1.5x + 3.6y = 2.1 , 2.5 (x + 1) = 6y are

    a. (0.2 , 0.5)   b. (0.5 , 0.2)

    c. (2 , 5)   d. (-2 , -5)

11. the values of x & y satisfying the equation $\dfrac{x}{5}+\dfrac{y}{6}+1=\dfrac{x}{6}+\dfrac{y}{5}=28$ are

    a. (6 , 9)   b. (9 , 6)

    c. (60 , 90)   d. (90 , 60)

12. 2x + 3y + 4z = 0 , x + 2y – 5z = 0 , 10x + 16y – 6z = 0 are satisfy by the value given by

    a. (0 , 0 , 0)   b. (1 , -1 , 1)

    c. (3 , 2, -1)   d. (1 , 0 , 2)

13. On solving $\sqrt{\dfrac{x}{1-x}}+\sqrt{\dfrac{1-x}{x}}=2\dfrac{1}{6}$, we get one value of x as

    a. $\dfrac{4}{13}$ b. $\dfrac{1}{13}$ c. $\dfrac{2}{13}$ d. $\dfrac{3}{13}$

14.   Solve for x, $\sqrt{2x-6} + \sqrt{x+4} = 5$

  a. 5   b. 6   c. 11   d. None

❖ **WORD PROBLEMS:**

15. The sum of the digit of two digit number is 10 . If 18 be subtracted from it the digits

   in the resulting number will be equal the number is

   a. 37   b.73   c. 75   d. None of these

16. The product of two number is 3200 & then quotient when the larger number is divided

   by the smaller is 2 the number are

   a. (16,200) b. (160,20) c. (60,30)   d.(80,40)

17. A two digit number is such that the product of the digit is 8 when 18 is added to the

   number the digit are reversed the number is

   a. 18   b. 24

   c. 42   d. 81

18. The sum of two number is 8 & the sum of their square is 34 the number are .

   a. (7, 10)   b. (4, 4)

   c. (3, 5)   d. (2 , 6)

19.   the difference of two positive integers is 3 & the sum of their square is 89 the

   integers are

   a. (7 , 4)   b. (5 , 8)   c. (3 , 6)   d.(2 , 5)

20.   divided 50 into two parts such that the sum of their reciprocals is $\dfrac{1}{12}$ the number is

   a. (24 , 26)   b.(28 , 20)   c.(27 , 23)   d. (20 , 30)

21. If a no. is divided in 2 parts such that their difference is 5 and Thrice the 1st no. is greater than twice the 2nd no. by 25. Then no. is,

a. 20   b. 25   c.28   d.none

22. Two number are in ratio 2 : 3. If 5 be subtracted from each, then they are in ratio 3 : 5. Then numbers are,

a. 16, 24   b. 4, 6

c. 2, 3   d. 20, 30

23. Ratio of selling price of 2 books is 4 : 3 and ratio of their cost price is 6 : 5. Both books had a loss of Rs. 20. Then their cost price are,

a. 40, 30   b.120, 100   c.60, 50   d.40, 60

24. 3 chocolate cost same as 5 toffees and also same as 7 coffees. What is the ratio of cost of coffee : toffee : chocolate.

a. 35 : 21 : 35   b. 15 : 21 : 35   c.36 : 28 : 48   d.18 : 20 : 42

25. a number exceed it's positive square root by 12 then the number is

a. 9   b. 16 c. 25   d. 36

26. A two digit numbers is four times the sum & three times the product of its digits find the numbers

a. 42 b.32   c.24 d.23

27. Divide 78 into 2 parts such that their product is 1512

a. 42,36   b.22,11   c. 2,31 d. None

28..the sum of a number & it's positive square root is 6/25 find the numbers
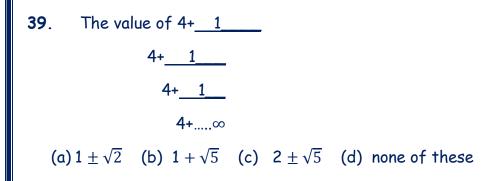
a. 1/5   b. 1/25 c. 1/15 d. 1/35

29. a two digit number is such that the product of digits is 14 when 45 is added to the number, then the digits interchange their places find he numbers

a. 72   b.27   c.86   d.68

30.   A man sells 6 radios and 4 televisions for Rs. 18,480. If 14 radios and 2 televisions are sold for the same amount, what is the price of a televisions ?

   a) Rs. 1,848   b) Rs. 840   c) Rs. 1,680   d) Rs. 3,360

31.   If area and perimeter of a rectangle is 6000 cm^2 and 340 cm respectively, then the length of rectangle is :

   a) 140   b) 120   c) 170   d) 200.

32.   If the length of a rectangle is 5 cm more than the breadth and if the perimeter of the rectangle is 40 cm, then the length & breadth of the rectangle will be :

   a) 7.5 cm, 2.5 cm   c) 12.5 cm, 7.5 cm

   b) 10 cm, 5 cm   d) 15.5 cm, 10.5 cm

33. The sides of an equilateral triangle are shortened by 12 units, 13 units and 14 units respectively and a right angled triangle is formed. The side of the equilateral triangle is:

   a) 17 units   c) 15 units

   b) 16 units   d) 18 units.

34.   Area of a rectangular garden is 8000 square metres. Ratio in length and breadth is 5:4. A path of uniform width, runs all round the inside of the garden. If the parth occupies 3200 m^2, what is its width ?

   a) 12m   b) 6m   c) 10m   d) 4m

35.   A man went to the Reserve bank of India with Rs. 1,000. He asked the cashier to give him Rs. 5 and Rs. 10 notes only in return. The man got 175 notes in all. Find how many notes of Rs. 5 and Rs. 10 did he receive ?
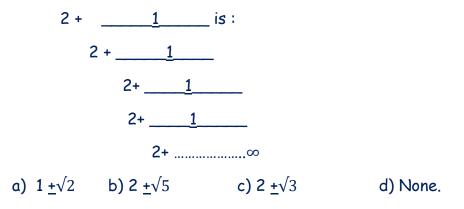
a) $(25, 150)$ c) $(150, 25)$

b) $(40, 110)$ d) None.

❖ PROBLEMS OF QUADRATIC EQUATION:

36. Root of the quadratic equation $5x^2-6x+1 =0$

a) $-5, -1/5$ b) $5, 1/5$ c) $1, 1/5$ d) none

37. Roots of the equation $3x^2 – 2x -5 =0$

a) $-5/3 , 1$ b) $5/3 , -1$ c) $5/3 , 1$ d) none

38. If one root of a equation is $2 + \sqrt{5}$, then the quadratic equation is :

a) $X^2 + 4x – 1 = 0$ c) $x^2 + 4x + 1 = 0$

b) $X^2 – 4x – 1 = 0$ d) $x^2 – 4x + 1 = 0$

39. The value of $4+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{4+.....\infty}}}$

(a) $1 \pm \sqrt{2}$ (b) $1 + \sqrt{5}$ (c) $2 \pm \sqrt{5}$ (d) none of these

40. The value of :

$2 + \cfrac{1}{2 + \cfrac{1}{2+ \cfrac{1}{2+ \cfrac{1}{2+ ....\infty}}}}$ is :

a) $1 \pm\sqrt{2}$ b) $2 \pm\sqrt{5}$ c) $2 \pm\sqrt{3}$ d) None.

41. The value of $\sqrt{6 + \sqrt{6 + \sqrt{6 + \cdots \infty}}}$ is :

    a. -3   b. 2   c. 3   d. 4

42. The value of $\sqrt{8 + \sqrt{8 + \sqrt{8 + \cdots \infty}}}$ is :

    b. -3   b. 2   c. 3   d. none

43. If $(2+\sqrt{3})$ is a root of a quadratic equation $x^2 + px + q = 0$ then find the value of p and q.

    a) (4, - 1)   c) (-4, 1)

    b) (4, 1)   d) (2, 3)

❖ **PROBLEMS OF NATURE OF ROOTS :**

44. Roots of the equation $3x^2 - 10x + 7 = 0$ are

    a. Real, unequal   b. non real , unequal   c. real, equal   d. none

45. Roots of the equation $x^2 - 10x + 25 = 0$ are

    a. Real, unequal   b. non real , unequal   c. real, equal   d. none

46. Roots of the equation $3x^2 - 5x + 7 = 0$ are

    a. Real, unequal   b. non real , unequal   c. real, equal   d. none

47. Roots of the equation $3x^2 - 5x - 7 = 0$ are

    a. Real, unequal   b. non real , unequal   c. real, equal   d. none

48. Find value of p for which $3x^2 + 6x + p = 0$ has equal roots

    a. 2   b. 3   c. 4   d. none

49. Find value of p for which $4x^2 + 8px + p = 0$ has equal roots

    a. 2   b. 3   c. 4   d. none

50. Find the values of m for which the equation $(m+1) x^2 + 2(m+2) x + m = 0$

have equal roots

a. - 0.5   b. -4/3   c. 1   d. None of the above

51. Roots of equation $3x^2 - 7x + p = 0$ are real then

a. P < 49/12   b. p > 49/12

c. p=49/12   d. both a & c

52. Find the positive value of k for which the equations : $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will have real roots :

a) 12   b) 16   c) 18   d) 22.

❖ **PROBLEMS OF PROPERTIES OF ROOTS:**

53. If α & β are Roots of the equation $x^2 - 10x + 25 = 0$. Then α + β is

a. 10   b. 20   c. 5   d. none

54. If α & β are Roots of the equation $x^2 - 10x + 25 = 0$. Then $\alpha^2 + \beta^2$ is

a. 10   b. 20   c. 50   d. none

55. If α & β are Roots of the equation $2x^2 - 8x + 25 = 0$. Then α + β is

a. 10   b. 20   c. 4   d. none

56. If α & β are Roots of the equation $x^2 - 8x + 12 = 0$. Then $\alpha^3 + \beta^3$ is

a. 208   b. 224   c. 5   d. none

57. If α & β are Roots of the equation $x^2 - 8x + 15 = 0$. Then $\alpha^3 - \beta^3$ is

a. 98   b. 117   c. 5   d. none

58. If α & β are Roots of the equation $x^2 - 7x + 12 = 0$. Then $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is

   a. 25   b. 25/12   c. 5   d. none

59. The equation $x^2 - (p+4)x + 2p + 5 = 0$ has equal roots the value of p will be.

   (a) ± 1 (b) 2   (c) ± 2 (d) - 2

60. If p and q are the roots of $x^2 + x + 1 = 0$ then the value of $p^3 + q^3$ becomes

   (a) 2   (b) - 2   (c) 4   (d) - 4

61. If one root of $5x^2 + 13x + p = 0$ be reciprocal of the other then the value of p is

   (a) – 5   (b) 5   (c) 1 / 5   (d) - 1 / 5

62. Roots of the equation $3x^2 - 14x + k = 0$ will be reciprocal of each other if :

   a) K = - 3   c) k = 3

   b) K = 0   d) k = 14.

63. If roots of equation $2x^2 - 4x + P = 0$ are reciprocals of each other. Then P = ?

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

64. One root of the equation :

   $X^2 - 2(5 + m)x + 3(7 + m) = 0$ is reciprocal of the other. Find the value of M.

   a) – 7   b) 7   c) -20/3   d) 20/3

❖ **PROBLEMS OF PARALLEL & PERPENDICULAR LINES:**

65. The lines 3x+4y+10=0 and 4x-3y+5=0 are _____

   a) Parellel   c) Bisect each other

   b) Perpendicular to each other   d) Concide with each other.

66.   Line joining (-8, 3) & (2, 1) and line joining (6, 0) & (11, -1) are

   a. perpendicular   b. parallel

   c. concurrent   d. intersecting to each other at angle 45^0

67.   The line joining (-1,4) and (2, -2) and the line joining (1,2) and (2, k) are parallel to each

   other for the following value of k :

   a) 1   b) 0   c) – 4   d) 3

68.   The line joining (-1,1) and (2, -2) and the line joining (1,2) and (2, k) are perpendicular

   to each other for the following value of k :

   b) 1   b) 0   c) – 1   d) 3

❖ **PROBLEMS OF STRAIGHT LINE:**

69.   A straight line of x = 15 is :

   a) Parallel to Y axis   c) A diagonal line.

   b) Parallel to x axis   d) Passes through origin.

70.   The equation of the straight line passing though the points (-5, 2) and (6,-4) is

   a. 5x -2y -29 = 0 b. 5x -2y +29 = 0   c. 6x + 11y + 8 = 0   d. none

71.   The equation of the straight line passing though the points (7, 3) and (9, 8) is

   b. 11x + 6y + 8 = 0 b.5 x -2 y -29 = 0   c. 6x + 11y + 8 = 0   d. none

72.   The point of intersection of the lines 2x – 5y = 6 and x + y = 3 is :

   a) (0, 3)   b) (3, 0)   c) (3, 3)   d) (0, 0)

73.   The equation of line joining the point (3,5) to the point of intersection of the lines 4x

   + y – 1 = 0 and 7x – 3y – 35 = 0 is

   a. 2x – y = 1   b. 3x + y = 19   c. 12x – y – 31 = 0   d. none

74. The equation of the straight line through the point of intersection of $x + 2y – 5 = 0$ and $x – 3y – 7 = 0$ and passing through the point $(1,0)$ is :

a) $X + 12y = 1$

c) $x – 12y = 11$

b) $X – 12y = 1$

d) None.

75. Find the equation of the line joining the point $(3, 5)$ with the point of intersection $2x + 3y – 5 = 0$ and $3x + 5y – 7 = 0$:

a) $6x + y + 23 = 0$

c) $6x + 2y + 14 = 0$

b) $6x + y – 23 = 0$

d) $2x + 5y + 5 = 0$

76. Find the equation of the line passing through the point $(1, 1)$ and parallel to the line $3x + 5y + 17 = 0$:

a) $3x + 5y + 8 = 0$

c) $5x + 3y + 8 = 0$

b) $5x + 3y + 8 = 0$

d) $3x + 5y – 8 = 0$

77. The equation of the line through $(-1,3)$ and parallel to the line joining $(6,3)$ and $(2,-3)$ is

a. $3x – 2y + 9 = 0$ b. $x + 2y – 7 = 0$ c. $x + Y – 7 = 0$ d. none

78. Find the equation of the line passing through the point $(1, 1)$ and perpendicular to the line $3x + 5y + 17 = 0$:

a) $3x + 5y + 8 = 0$

c) $5x - 3y -2 = 0$

b) $5x + 3y + 8 = 0$

d) $3x + 5y – 8 = 0$

79. A straight line passes through the point $(3,2)$. Find the equation of the straight line.

a) $x + y = 1$

c) $x + y = 5$

b) $x + y = 3$

d) $x + y = 2$

80. The equation of a line which is perpendicular to $5x - 2y = 7$ and passes through the mid-point of the line joining (2,7) and (-4,1) is :

a) $2x - 5y - 18 = 0$

c) $2x + 5y - 18 = 0$

b) $2x + 5y + 18 = 0$

d) None of these.

❖ **APPLICATIONS of STRAIGHT LINE:**

81. The total cost curve of the number of copies of a particular photograph is liner. The total cost of 5 an 8 copies of a photograph are Rs. 80 and Rs. 116 respectively. The total cot for 10 copies of the photograph will be

(a) Rs. 100   (b) Rs. 120   (c) Rs. 130   (d) Rs. 140

82. A factory products 300 units and 900 unit at a total cost of Rs. 6800 /- and Rs. 10400 /- respectively. The liner equation of the total cost line is

(a) $y=6x+1,000$ (b) $y=5x+5,000$ (c) $y=6x+5,000$ (d) none

83. A factory produces 200 bulbs for a total cost of Rs. 800/- and 400 bulbs for Rs. 1200/-. The equation of the total cost line is

(a) $2x-y+100=0$ (b) $2x+y+400=0$ (c) $2x-y+400=0$ (d) none

84. If in above question, the factory intends to produce 1000 bulbs the total cost would be Rs. _____

(a) Rs. 2400   (b) 1200   (c)   1300   (d) 1100

85. If an investment of Rs. 1000 and 100 yield an income of Rs. 90 Rs. 20 respectively for earning Rs. 50 investment of Rs. ____ will be required.

(a) less than Rs. 500   (b) over Rs. 500   (c) Rs. 485   (d)   Rs. 486

86. A firm produces 50 units of a product for Rs. 320 and 80 units for Rs. 380. Considering the cost curve to be a straight-line he cost of producing 110 units to be estimated as

(a) 400   (b) 420   (c)   440   (d) none of these.

❖ **PROBLEMS OF DISTANCE FORMULA:**

87. Find length of the line joining the points (2,5) & (6, 8)

a. 4   b. 5   c. 8   d. none

88. A right angled triangle is formed by the straight line 4x + 3y = 12 with the axes. Then length of perpendicular from the origin to the hypotenuse is

(a) 3.5 units   (b) 2.4 units   (c) 4.2 units   (d) none of these

89. The distance from the origin to the point of intersection of two straight lines having equations 3x – 2y = 6 and 3x + 2y = 18 is

(a) 3 units   (b) 5 units   (c) 4 units   (d)   2 units

90. Triangle joining the points (3, 4) (5, 4) (5,6) is

a. Isosceles   b. right angled   c . both a & b   d. none

91. Triangle joining the points (3, 4) (8, 5) (13,6) is

a. Isosceles   b. right angled   c . both a & b   d. none

92. The point (-3, 4) (2, 4) and (1, 2) are the vertices of a triangle which is

(a) right angled (b) isosceles   (c)   equilateral (d)   other

93. The point (2, 3) (-5, 2) and (-6, -9) are the vertices of a triangle which is

(a) right angled (b) isosceles   (c)   equilateral (d)   other

94. The point (2, 3) (-5, 2) and (-4, -9) are the vertices of a triangle which is

(a) right angled (b) isosceles   (c)   equilateral (d)   other

95.   The point (2, 7) (5, 3) and (-2, 4) are the vertices of a triangle which is

(a) right angled   (b) isosceles   (c)   equilateral   (d) isosceles & right angled

96.   The point (1, -1) $(-\sqrt{3}, -\sqrt{3})$ and (-1, 1) are the vertices of a triangle which is

(a) right angled   (b) isosceles   (c)   equilateral   (d) other

97.   The point (2, -1) (-2, 3) (3, 4) and (-3, -2) are the vertices of a

(a) Square   (b) rhombus   (c) parallelogram   (d) rectangle

98.   The point (2, -2) (-1, 1) (8, 4) and (5, 7) are the vertices of a

(a) Square   (b) rhombus   (c) parallelogram   (d) rectangle

99.   The point (2, 1) (3, 3) (5, 2) and (6, 4) are the vertices of a

(a) Square   (b) rhombus   (c) parallelogram   (d) rectangle

100.   Triangle joining the points (5, 2) (7, 4) (5,11) is

a. Isosceles   b. right angled   c . both a & b   d. none

❖ **OTHER PROBLEMS OF LINE:**

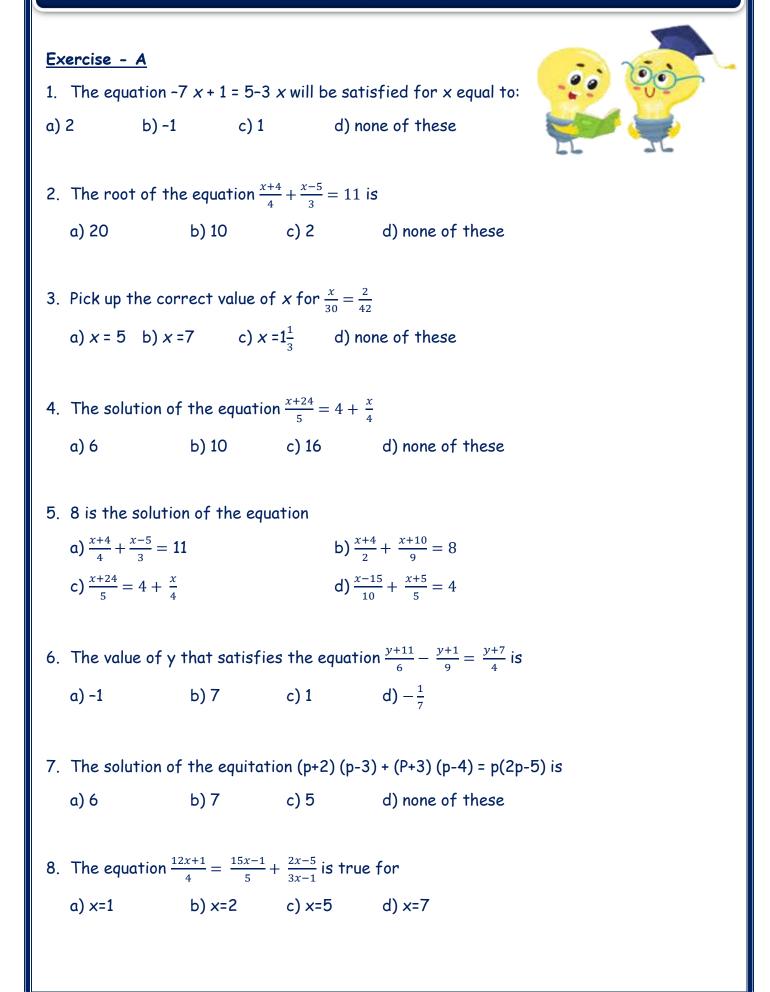**101.**   The area of a triangle with vertices (1, 3) (5, 6) and (-3, 4) in terms of square units is

(a) 5   (b) 3   (c) 8   (d) 13

102.   The area of a triangle with vertices (0, 0) (1, 2) and (-1, 2) is

(a) 2   (b) 3   (c) 1   (d) none

103.   The area of the triangle bounded by the lines 4x + 3y + 8 = 0 x - y + 2 = 0 and

9x – 2y – 17 = 0 is

(a) 18   (b) 17.5   (c) 17   (d) none

104. The area of a triangle with vertices (4, 5) (1, -1) and (2, 1) is

(a) 0   (b) 1   (c)   -1   (d)   none

105. The area of a triangle with vertices (-3, 16) (3, -1) and (1, 4) is

(a) 0   (b) 1   (c)   -1   (d)   none

106. The area of a triangle with vertices (-1, 1) (3, -2) and (-5, 4) is

(a) 0   (b) 1   (c)   -1   (d)   none

TEST YOUR SKILLS WITH ICAI

Exercise - A

1. The equation $-7x + 1 = 5-3x$ will be satisfied for x equal to:

a) 2   b) –1   c) 1   d) none of these

2. The root of the equation $\frac{x+4}{4} + \frac{x-5}{3} = 11$ is

a) 20   b) 10   c) 2   d) none of these

3. Pick up the correct value of x for $\frac{x}{30} = \frac{2}{42}$

a) $x = 5$ b) $x = 7$ c) $x = 1\frac{1}{3}$ d) none of these

4. The solution of the equation $\frac{x+24}{5} = 4 + \frac{x}{4}$

a) 6   b) 10   c) 16   d) none of these

5. 8 is the solution of the equation

a) $\frac{x+4}{4} + \frac{x-5}{3} = 11$ b) $\frac{x+4}{2} + \frac{x+10}{9} = 8$

c) $\frac{x+24}{5} = 4 + \frac{x}{4}$ d) $\frac{x-15}{10} + \frac{x+5}{5} = 4$

6. The value of y that satisfies the equation $\frac{y+11}{6} - \frac{y+1}{9} = \frac{y+7}{4}$ is

a) –1   b) 7   c) 1   d) $-\frac{1}{7}$

7. The solution of the equitation $(p+2)(p-3) + (P+3)(p-4) = p(2p-5)$ is

a) 6   b) 7   c) 5   d) none of these

8. The equation $\frac{12x+1}{4} = \frac{15x-1}{5} + \frac{2x-5}{3x-1}$ is true for

a) $x=1$ b) $x=2$ c) $x=5$ d) $x=7$

9. Pick up the correct value x for which $\frac{x}{0.5} - \frac{1}{0.05} + \frac{x}{0.005} - \frac{1}{0.0005} = 0$

   a) x=0   b) x=1   c) x=10   d) none of these

Exercise - B

1. The sum of two numbers is 52 and their difference is 2. The numbers are

   a) 17 and 15   b) 12 and 10   c) 27 and 25   d) none of these

2. The diagonal of a rectangle is 5 cm and one of at sides is 4 cm. Its area is

   a) 20 sq.cm.   b) 12 sq.cm.   c) 10 sq.cm.   d) none of these

3. Divide 56 into two parts such that three times the first part exceeds one third of the second by 48. The parts are.

   a) (20,36)   b) (25,31)   c) (24,32)   d) none of these

4. The sum of the digits of a two digit number is 10. If 18 be subtracted from it the digits in the resulting number will be equal. The number is

   a) 37   b) 73   c) 75   d) none of these

5. The fourth part of a number exceeds the sixth part by 4. The number is

   a) 84   b) 44   c) 48   d) none of these

6. Ten years ago the age of a father was four times of his son. Ten years hence the age of the father will be twice that of his son. The present ages of the father and the son are

   a) (50,20)   b) (60,20)   c) (55,25)   d) none of these

7. The product of two numbers is 3200 and the quotient when the larger number is divided by the smaller is 2.The numbers are

   a) (16,200)   b) (160,20)   c) (60,30)   d) (80,40)

8. The denominator of a fraction exceeds the numerator by 2. If 5 be added to the numerator the fraction increases by unity. The fraction is.

   a)$\frac{5}{7}$ b)$\frac{1}{3}$ c)$\frac{7}{9}$ d)$\frac{3}{5}$

9. Three persons Mr. Roy, Mr. Paul and Mr. Singh together have Rs. 51. Mr. Paul has Rs. 4 less than Mr. Roy and Mr. Singh has got Rs. 5 less than Mr. Roy. They have the money as.

   a) (Rs. 20, Rs. 16, Rs. 15)   b) (Rs. 15, Rs. 20, Rs. 16)

   c) (Rs. 25, Rs. 11, Rs. 15)   d) none of these

10. A number consists of two digits. The digits in the ten's place is 3 times the digit in the unit's place. If 54 is subtracted from the number the digits are reversed. The number is

   a) 39   b) 92   c) 93   d) 94

11. One student is asked to divide a half of a number by 6 and other half by 4 and then to add the two quantities. Instead of doing so the student divides the given number by 5. If the answer is 4 short of the correct answer then the number was

   a) 320   b) 400   c) 480   d) none of these.

12. If a number of which the half is greater than $\frac{1}{5}$ th of the number by 15 then the number is

   a) 50   b) 40   c) 80   d) none of these

Exercise - C

1. The solution of the set of equations $3x + 4y = 7$, $4x - y = 3$ is

   a) (1, –1)   b) (1, 1)   c) (2, 1)   d) (1, –2)

2. the value of x and y satisfying the equations $\frac{x}{2} + \frac{y}{3} = 2, x + 2y = 8$ are given by the pair.

   a) (3, 2)   b) (–2, –3)   c) (2, 3)   d) none of these

3. $\frac{x}{p} + \frac{y}{q} = 2, x + y = p + q$ are satisfied by the Values given by the pair.

a) (x=p, y=q)   b) (xq, y=p)   c) (x=1, y=1)   d) none of these

4. The solution for the pair of equations $\frac{1}{16x} + \frac{1}{15y} = \frac{9}{20}, \frac{1}{20x} - \frac{1}{27y} = \frac{4}{45}$ is given by

   a) $\left(\frac{1}{4}, \frac{1}{3}\right)$ b) $\left(\frac{1}{3}, \frac{1}{4}\right)$ c) $(3, 4)$ d) $(4, 3)$

5. Solve for x and y : $\frac{4}{x} - \frac{5}{y} = \frac{x+y}{xy} + \frac{3}{10}$ and 3xy = 10 (y-x)

   a) (5, 2) b) (-2, -5)   c) (2, -5)   d) (2, 5)

6. The pair satisfying the equations $x + 5y = 36, \frac{x+y}{x-y} = \frac{5}{3}$ is given by

   a) (16, 4) b) (4, 16)   c) (4, 8)   d) none of these.

7. Solve for x and y : x–3y = 0, x+2y = 20.

   a) x=4, y=12   b) x=12, y=4   c) x=5, y=4   d) none of these

8. The simultaneous equations 7x–3y = 31, 9x–5y = 41 have solutions given by

   a) (–4, –1)   b) (–1, 4)   c) (4, –1)   d) (3, 7)

9. 1.5x + 2.4 y = 1.8, 2.5(x+1) = 7y have solutions as

   a) (0.5,0.4)   b) (0.4, 0.5)   c) $\left(\frac{1}{2}, \frac{2}{5}\right)$ d) (2,5)

10. The values of x and y satisfying the equations $\frac{3}{x+y} + \frac{2}{x-y} = 3, \frac{2}{x+y} + \frac{3}{x-y} = 3\frac{2}{3}$ are given by

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

Exercise - D

1. 1.5x + 3.6y = 2.1, 2.5 (x+1) = 6y

   a) (0.2, 0.5)   b) (0.5, 0.2)   c) (2, 5)   d) (-2, -5)

2. $\frac{x}{5} + \frac{y}{6} + 1 = \frac{x}{6} + \frac{y}{5} = 28$

   a) (6, 9)   b) (9, 6)   c) (60, 90)   d) (90, 60)

3. $\frac{x}{4} = \frac{y}{3} = \frac{z}{2}$; $7x + 8y + 5z = 62$

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

4. $\frac{xy}{x+y} = 20, \frac{yz}{y+z} = 40, \frac{zx}{z+x} = 24$

   a) (120, 60, 30) b) (60, 30, 120)   c) (30, 120, 60)   d) (30, 60, 120)

5. $2x + 3y + 4z = 0$, $x + 2y - 5z = 0$, $10x + 16y - 6z = 0$

   a) (0,0,0)   b) (1, -1, 1)   c) (3, 2, -1)   d) (1, 0, 2)

6. $\frac{1}{3}(x + y) + 2z = 21, 3x - \frac{1}{2}(y + z) = 65, x + \frac{1}{2}(x + y - z) = 38$

   a) (4,9,5)   b) (2,9,5)   c) (24, 9, 5)   d) (5, 24, 9)

7. $\frac{4}{x} - \frac{5}{y} = \frac{x+y}{xy} + \frac{3}{10}$ $3xy = 10(y - x)$

   a) (2, 5)   b) (5, 2)   c) (2, 7)   d) (3, 4)

8. $\frac{x}{0.01} + \frac{y+0.03}{0.05} = \frac{y}{0.02} + \frac{x+0.03}{0.04} = 2$

   a) (1, 2)   b) (0.1, 0.2)   c) (0.01, 0.02)   d) (0.02, 0.01)

9. $\frac{xy}{y-x} = 110, \frac{yz}{z-y} = 132, \frac{zx}{z+x} = \frac{60}{11}$

a) (12, 11, 10)   b) (10, 11, 12)   c) (11, 10, 12)   d) (12, 10, 11)

10. $3x - 4y + 70z = 0$, $2x + 3y - 10z = 0$, $x + 2y + 3z = 13$

   a) (1, 3, 7)   b) (1, 7, 3)   c) (2, 4, 3)   d) (-10, 10, 1)

Exercise - E

1. Monthly incomes of two persons are in the ratio 4 : 5 and their monthly expenses are in the ratio 7 : 9. If each saves Rs. 50 per month find their monthly incomes.

   a) (500, 400)   b) (400, 500)   c) (300, 600)   d) (350, 550)

2. Find the fraction which is equal to 1/2 when both its numerator and denominator are increased by 2. It is equal to 3/4 when both are incresed by 12.

    a) 3/8   b) 5/8   c) 2/8   d) 2/3

3. The age of a person is twice the sum of the ages of his two sons and five years ago his age was thrice the sum of their ages. Find his present age.

    a) 60 years   b) 52 years   c) 51 years   d) 50 years

4. A number between 10 and 100 is five times the sum of its digits. If 9 be added to it the digits are reversed find the number.

    a) 54   b) 53   c) 45   d) 55

5. The wages of 8 men and 6 boys amount to Rs. 33. If 4 men earn Rs. 4.50 more than 5 boys determine the wages of each man and boy.

    a) (Rs. 1.50, Rs. 3)   b) (Rs. 3, Rs. 1.50)

    c) (Rs. 2.50, Rs. 2)   d) (Rs. 2, Rs. 2.50)

6. A number consisting of two digits is four times the sum of its digits and if 27 be added to it the digits are reversed. The number is :

    a) 63   b) 35   c) 36   d) 60

7. Of two numbers, 1/5th of the greater is equal to 1/3rd of the smaller and their sum is 16. The numbers are:

    a) (6, 10)   b) (9, 7)   c) (12, 4)   d) (11, 5)

8. y is older than x by 7 years 15 years back x's age was 3/4 of y's age. Their present ages are:

    a) (x=36, y=43)   b) (x=50, y=43)

    c) (x=43, y=50)   d) (x=40, y=47)

9. The sum of the digits in a three digit number is 12. If the digits are reversed the number is increased by 495 but reversing only of the ten's and unit digits in ceases the number by 36. The number is

   a) 327   b) 372   c) 237   d) 273

10. Two numbers are such that twice the greater number exceeds twice the smaller one by 18 and 1/3 of the smaller and 1/5 of the greater number are together 21. The numbers are :

    a) (36, 45)   b) (45, 36)   c) (50, 41)   d) (55, 46)

11. The demand and supply equations for a certain commodity are 4q + 7p = 17 and $p = \frac{q}{3} + \frac{7}{4}$. respectively where p is the market price and q is the quantity then the equilibrium price and quantity are:

    a)$2,\frac{3}{4}$ b) $3,\frac{1}{2}$ c)$5,\frac{3}{5}$ d) None of these

Exercise - F

1. If the roots of the equation 2x2 + 8x – m3 = 0 are equal then value of m is

   a) – 3   b) – 1   c) 1   d) – 2

2. If 22x + 3 – 32. 2x + 1 = 0 then values of x are

   a) 0, 1   b) 1, 2   c) 0, 3   d) 0, – 3

3. The values of $4 + \cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{4+\cdots\cdots\infty}}}$

   a) $1\pm\sqrt{2}$ b) 2+ $\sqrt{5}$ c) $2\pm\sqrt{5}$ d) none of these

4. if aβ be the roots of the equation $2x^2 - 4x - 3 = 0$ the value of $\propto^2 + \beta^2$ is

   a)5   b)7   c)3   d) -4

5. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum

of the squares of their reciprocals then $\frac{b^2}{ac} + \frac{bc}{a^2}$ is equal to

a)2   b) -2   c)1   d) -1

6. The equation $x^2 - (p+4)x + 2p + 5 = 0$ has equal roots the values of p will be.

a) ± 1   b) 2   c) ± 2   d) –2

7. The roots of the equation $x^2 + (2p-1)x + p^2 = 0$ are real if.

a) p≥1   b)p≤4   c)p≥1/4   d)p≤1/4

8. if x=m is one of the solutions of the equation $2x^2 + 5x - m = 0$ the possible values of m

are

a) (0,2)   b) (0,-2)   c) (0,1)   d) (1,-1)

9. If p and q are the roots of $x^2 + 2x + 1 = 0$ then the value of $p^3 + q^3$ becomes

a) 2   b) -2   c) 4   d) -4

10. If L+M+N= 0 and L,M,N are rationals the roots of equation $(M + N - L)x^2 +$

$(N + L - M)x + (L + M - N) = 0$ are

a) real and irrational   b) real and rational

c) imaginary and equal   d) real and equal

11. If a and β are the roots of $x^2 = x - 1$ then value of $\frac{\alpha^2}{\beta} - \frac{\beta^2}{\alpha}$ is

a)$2\sqrt{5}$ b) $\sqrt{5}$ c) $3\sqrt{5}$ d)-$2\sqrt{5}$

12. If p ≠ q and p² = 5p – 3 and q² = 5q- 3 the equation having roots as $\frac{p}{q}$ and $\frac{q}{p}$ is

a) $x^2 - 19x + 3 = 0$ b) $3x^2 - 19x - 3 = 0$

c) $3x^2 - 19x + 3 = 0$ d) $3x^2 + 19x + 3 = 0$

13. If one rot of $5x^2 + 13x + p = 0$ be reciprocal of the other then the value of p is

a) -5   b) 5   c) 1/5   d) -1/5

Exercise - G

1. A solution of the quadratic equation $(a + b - 2c)x^2 + (2a - b - c)x + (c + a - 2b) = 0$ is

a) x=1   b) x= -1   c) x=2   d) x=-2

2. If the root of the equation $x^2 - 8x + m = 0$ exceeds the other by 4 then the value of m is

a) m=10   b) m= 11   c) m=9   d) m=12

3. The values of x in the equation $7(x + 2p)^2 + 5p^2 = 35xp + 117p^2$ are

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

4. The solutions of the equation $\frac{6x}{x+1} + \frac{6(x+1)}{x} = 13$ are

a) (2,3)   b)(3,-2)   c) (-2,-3)   d) (2,-3)

5.   The satisfying values of x for the equation $\frac{1}{x+p+q} = \frac{1}{x} + \frac{1}{p} + \frac{1}{q}$ are

a) (p, q)   b) (-p, -q)   c) (p, -p)   d) (-p, q)

6.   The values of x for the equation $x^2 + 9x + 18 = 6 - 4x$ are

a) (1, 12)   b) (-1, -12)   c) (1, -12)   d) (-1, 12)

7.   The values of x satisfying the equation $\sqrt{(2x^2 + 5x - 2)} - \sqrt{2x^2 + 5x - 9)} = 1$ are

a) (2, -9/2)   b) (4, -9)   c) (2, 9/2)   d) (-2, 9/2)

8.   The solution of the equation $3x^2 - 17x + 24 = 0$ are

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

9.   The equation $\frac{3(3x^2+15)}{6} + 2x^2 + 9 = \frac{2x^2+96}{7} + 6$ Has got the solution as

a) (1, 1)   b) (1/2, –1)   c) (1, –1)   d) (2, –1)

10.   The equation $\left(\frac{l-m}{2}\right) x^2 - \left(\frac{l+m}{2}\right) x + m = 0$ has got two values of x is satisfy the equation

   Given as

   a) $1, \frac{2m}{l-m}$ b) $1, \frac{m}{l-m}$ c) $1, \frac{2l}{l-m}$ d) $1, \frac{1}{l-m}$

Exercise - H

1.   The sum of two numbers is 8 and the sum of their squares is 34. Taking one number as x form an equation in x and hence find the numbers. The numbers are

   a) (7, 10)   b) (4, 4)   c) (3, 5)   d) (2, 6)

2.   The difference of two positive integers is 3 and the sum of their squares is 89. Taking the smaller integer as x form a quadratic equation and solve it to find the integers. The integers are

   a) (7, 4)   b) (5, 8)   c) (3, 6)   d) (2, 5)

3.   Five times of a positive whole number is 3 less than twice the square of the number. The number is

   a) 3   b) 4   c) –3   d) 2

4.   The area of a rectangular field is 2000 sq.m and its perimeter is 180m. Form a quadratic equation by taking the length of the field as x and solve it to find the length and breadth of the field. The length and breadth are

   a) (205m, 80m)   b) (50m, 40m)   c) (60m, 50m)   d) none

5.   Two squares have sides p cm and (p + 5) cms. The sum of their squares is 625 sq. cm. The sides of the squares are

   a) (10 cm, 30 cm)   b) (12 cm, 25 cm)

   c) 15 cm, 20 cm)   d) none of these

6. Divide 50 into two parts such that the sum of their reciprocals is 1/12. The numbers are

    a) (24, 26)   b) (28, 22)   c) (27, 23)   d) (20, 30)

7. There are two consecutive numbers such that the difference of their reciprocals is 1/240. The numbers are

    a) (15, 16)   b) (17, 18)   c) (13, 14)   d) (12, 13)

8. The hypotenuse of a right–angled triangle is 20cm. The difference between its other two sides be 4cm. The sides are

    a) (11cm, 15cm) b) (12cm, 16cm)   c) (20cm, 24cm)   d) none of these

9. The sum of two numbers is 45 and the mean proportional between them is 18. The numbers are

    a) (15, 30)   b) (32, 13)   c) (36, 9)   d) (25, 20)

10. The sides of an equilateral triangle are shortened by 12 units 13 units and 14 units respectively and a right angle triangle is formed. The side of the equilateral triangle is

    a) 17 units   b) 16 units   c) 15 units   d) 18 units

11. A distributor of apple Juice has 5000 bottle in the store that it wishes to distribute in a month. From experience it is known that demand D (in number of bottles) is given by $D = -2000p^2 + 2000p + 17000$. The price per bottle that will result zero inventory is

    a) Rs. 3   b) Rs. 5   c) Rs. 2   d) none of these.

12. The sum of two irrational numbers multiplied by the larger one is 70 and their difference is multiplied by the smaller one is 12; the two numbers are

a) $3\sqrt{2}, 2\sqrt{3}$ b) $5\sqrt{2}, 3\sqrt{5}$ c) $2\sqrt{2}, 5\sqrt{2}$ d) none of these.

Exercise - I

1. The solution of the cubic equation $x^3 - 6x^2 + 11x - 6 + 0$ is given by the triplet:

    a. a) (–1, 1 –2)   b) (1, 2, 3)   c) (–2, 2, 3)   d) (0, 4, –5)

2. The cubic equation $x^3 + 2x^2 - x - 2 = 0$ has 3 roots namely.

    a. a) (1, –1, 2)   b) (–1, 1, –2)   c) (–1, 2, –2)   d) (1, 2, 2)

3. x, $x - 4$, $x + 5$ are the factors of the left–hand side of the equation.

    a. a) $x^3 + 2x^2 - x - 2 = 0$ b) $x^3 + x^2 - 20x = 0$

    b. c) $x^3 - 3x^2 - 4x - 12 = 0$ d) $x^3 - 6x^2 + 11x - 6 = 0$

4. The equation $3x^3 + 5x^2 = 3x + 5$ has got 3 roots and hence the factors of the left-hand side of the equation $3x^3 + 5x^2 - 3x - 5 = 0$ are

  a) $x - 1$, $x - 2$, $x - 5/3$ b) $x - 1$, $x +1$, $3x + 5$

  c) $x + 1$, $x - 1$, $3x - 5$ d) $x - 1$, $x + 1$, $x - 2$

5. The roots of the equation $x^3 + 7x^2 - 21x - 27 = 0$ are

  a) (– 3, – 9, – 1) b) (3, – 9, – 1)   c) (3, 9, 1)   d) (– 3, 9, 1)

6. The roots of $x^3 + x^2 - x - 1 = 0$ are

  a) (– 1, – 1, 1)   b) (1, 1, – 1)   c) (– 1, – 1, – 1)   d) (1, 1, 1)

7. The satisfying value of $x^3 + x^2 - 20x = 0$ are

  a) (1, 4, – 5)   b) (2, 4, – 5)   c) (0, – 4, 5)   d) (0, 4, – 5)

8. The roots of the cubic equation $x^3 + 7x^2 - 21x - 27 = 0$ are

  a) (–3, –9, –1)   b) (3, –9, –1)   c) (3, 9, 1)   d) (–3, 9, 1)

9. If $4x^3 + 8x^2 - x - 2 = 0$ then value of (2x+3) is given by

  a) 4, –1, 2   b) –4, 2, 1   c) 2, –4, –1   d) none of these.

10. The rational root of the equation $2x^3 - x^2 - 4x + 2 = 0$ is

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

Exercise - J

1. The equation of line joining the point (3, 5) to the point of intersection of the lines $4x + y$ – 1 = 0 and $7x – 3y – 35 = 0$ is

    a) $2x – y = 1$ b) $3x + 2y = 19$ c) $12x – y – 31 = 0$ d) none of these.

2. The equation of the straight line passing through the points (–5, 2) and (6, –4) is

    a) $11x+6y+8 = 0$ b) $x+y+4 = 0$ c) $6x+11y+8 = 0$ d) none of these

3. The equation of the line through (–1, 3) and parallel to the line joining (6, 3) and (2, –3) is

    a) $3x–2y+9 = 0$ b) $3x+2y–7 = 0$ c) $x+y–7 = 0$ d) none of these

4. The equation of a straight line passing through the point (–2, 3) and making intercepts of equal length on the ones is

    a) $2x+y+1 = 0$ b) $x–y+5$ c) $x–y+5 = 0$ d) $x+y-1=0$

5. If the lines $3x – 4y – 13 = 0$, $8x – 11y – 33 = 0$ and $2x – 3y + \lambda = 0$ are concurrent then value of λ is

    a) 11   b) 5   c) –7   d) none of these

6. The total cost curve of the number of copies of a particular photograph is linear. The total cost of 5 and 8 copies of a photograph are Rs.80 and Rs.116 respectively. The total cost for 10 copies of the photograph will be

    a) Rs. 100   b) Rs. 120   c) Rs. 120   d) Rs. 140

7. A firm produces 50 units of a product for Rs.320 and 80 units for Rs.380.Considering the cost curve to be a straight–line the cost of producing 110 units to be estimated as

    a) 400   b) 420   c) 440   d) none of these

8. The total cost curve of the number of copies photograph is linear The total cost of 5 and 10 copies of a photographs are Rs.80 and 120 respectively. Then the total cost for 10 copies of the photographs is

    a) Rs. 140   b) 160   c) 150   d) Rs. 120

Exercise - K

1. A right angled triangle is formed by the straight line $4x+3y=12$ with the axes. Then length of perpendicular from the origin to the hypotenuse is

    a) 3.5 units   b) 2.4 units   c) 4.2 units   d) none of these

2. The distance from the origin to the point of intersection of two straight lines having equations $3x-2y=6$ and $3x+2y=18$ is

    a)3 units   b) 5 units   c) 4 units   d) 2 units

3. The point of intersection between the straight lines $3x + 2y = 6$ and $3x - y = 12$ lie in

    a) 1st quadrant   b) 2nd quadrant   c) 3rd quadrant   d) 4th quadrant

ANSWERS

Exercise (A)

1. (b) 2. (a) 3. (c) 4. (c) 5. (b) 6. (d) 7. (a) 8. (d)
9. (c)

Exercise (B)

1. (c) 2. (b) 3. (a) 4. (b) 5. (c) 6. (a) 7. (d) 8. (d)
9. (a) 10. (c) 11. (c) 12. (a)

Exercise (C)

1. (b) 2. (c) 3. (a) 4. (a) 5. (d) 6. (a) 7. (b) 8. (c)
9. (b) 10. (d)

Exercise (D)

1. (a) 2. (c) 3. (a) 4. (d) 5. (a) 6. (c) 7. (a) 8. (c)
9. (b) 10. (d)

Exercise (E)

1. (b) 2. (a) 3. (d) 4. (c) 5. (b) 6. (c) 7. (a) 8. (a)
9. (c) 10. (b) 11. (a)

Exercise (F)

1. (d) 2. (d) 3. (b) 4. (b) 5. (a) 6. (c) 7. (d) 8. (b)
9. (a) 10. (b) 11. (d) 12. (c) 13. (d)

Exercise (G)

1. (b) 2. (d) 3. (a) 4. (d) 5. (b) 6. (b) 7. (a) 8. (c)
9. (c) 10. (a)

Exercise (H)

1. (c) 2. (b) 3. (a) 4. (b) 5. (c) 6. (d) 7. (a) 8. (b)
9. (c) 10. (a) 11. (a) 12. (c)

Exercise (I)

1. (c) 2. (b) 3. (b) 4. (b) 5. (b) 6. (a) 7. (d) 8. (b)
9. (a) 10. (c)

My Working Space