MATHS

BOOKS - NDA PREVIOUS YEARS

CARTESIAN COORDINATE SYSTEM AND STRAIGHT LINE

Maths

1. the lines $(p + 2q)x + (p - 3q)y = p - q$ for different values of $p \& q$ passes trough the

fixed point is:

A. $\left(\dfrac{3}{2}, \dfrac{5}{2} \right)$

B. $\left(\dfrac{2}{5}, \dfrac{2}{5} \right)$

C. $\left(\dfrac{3}{5}, \dfrac{3}{5} \right)$

D. $\left(\dfrac{2}{5}, \dfrac{3}{5} \right)$

Answer: D

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2. The angle between the lines $y = \left(2 - \sqrt{3}\right)x + 5$ and $y = \left(2 + \sqrt{3}\right)x - 7$ is

A. 60°

B. 45°

C. 30°

D. 15°

Answer: A

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3. What is the image of the point $(2, 3)$ in the line $y = -x$?

A. $(-3, -2)$

B. $(-3, 2)$

C. $(-2, -3)$

D. $(3, 2)$

Answer: B

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4. The middle point of A (1, 2) and B (x, Y) is C (2, 4). If BD is perpendicular to AB such that CD=3 unit, then what is the length BD ?

A. $2\sqrt{2}$ unit

B. 2 unit

C. 3 unit

D. $3\sqrt{2}$ unit

Answer: A

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5. If the points A(1, 2), B(2, 4) and C(3, a) are collinear, what is the length BC ?

A. $\sqrt{2}$ unit

B. $\sqrt{3}$ unit

C. $\sqrt{5}$ unit

D. 5 unit

Answer: C

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6. What is the acute angle between the lines

$$Ax + By = A + B \qquad \text{and}$$

$$A(x - y) + B(x + y) = 2B\ ?$$

A. 45°

B. $\tan^{-1}\left(\dfrac{A}{\sqrt{A^2 + B^2}}\right)$

C.

D. 60°

Answer: A

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7. If p be the length of the perpendicular from the origin on the straight line $x + 2by = 2p$ .then what is the value of b?

A. $\dfrac{1}{p}$

B. p

C. $\dfrac{1}{2}$

D. $\dfrac{\sqrt{3}}{2}$

Answer: D

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8. In what ratio does the line $y - x + 2 = 0$ cut the line joining (3, -1) and (8, 9) ?

A. $2 : 3$

B. $3 : 2$

C. $3 : -2$

D. $1 : 2$

Answer: A

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9. The points (2, -2), (8, 4), (4, 6) and (-1, 1) in order are the vertices of which one of the following quadrilaterals ?

A. Square

B. Rhombus

C. Rectangle (but not square)

D. Trapezium

Answer: D

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10. If p be the length of the perpendicular from the origin on the straight line $ax + by = p$ and $b = \dfrac{\sqrt{3}}{2}$, then what is the angle between the perpendicular and the positive direction of x-axis ?

A. $30°$

B. $45°$

C. $60°$

D. $90°$

Answer: C

11. The straight line $ax + by + c = 0$ and the coordinate axes form an isosceles triangle under which one of the following consitions ?

A. $|a| = |b|$

B. $|a| = |c|$

C. $|b| = |c|$

D. none of these

Answer: A

12. The coordinates of P and Q are (-3, 4) and (2, 1), respectively. If PQ is extended to R such that $PR = 2QR,$ then what are the coordinates of R ?

    A. (3, 7)

    B. (2, 4)

    C. $\left(-\dfrac{1}{2}, \dfrac{5}{2} \right)$

    D. (7, -2)

Answer: D

13. The point on the line 2x-3y = 5 which is equidistant from (1,2) and (3,4) is

A. (7, 3)

B. (4, 1)

C. (1, -1)

D. (-2, -3)

Answer: B

14. The following question consist of two stateements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statement carafully and select the answer.

Assertion (A) : If two triangles with vertices $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ and $(a_1, b_1), (a_2, b_2), (a_3, b_3)$ satisfy the relation

Reason (R) : For the given triangles satisfying the above relation impolies that the triangles have equal area.

A. Both A and R are individually true, and R is the correct explanation of A.

B. Both A and R are individually true but R is not the correct explanation of A.

C. A is true but R is false.
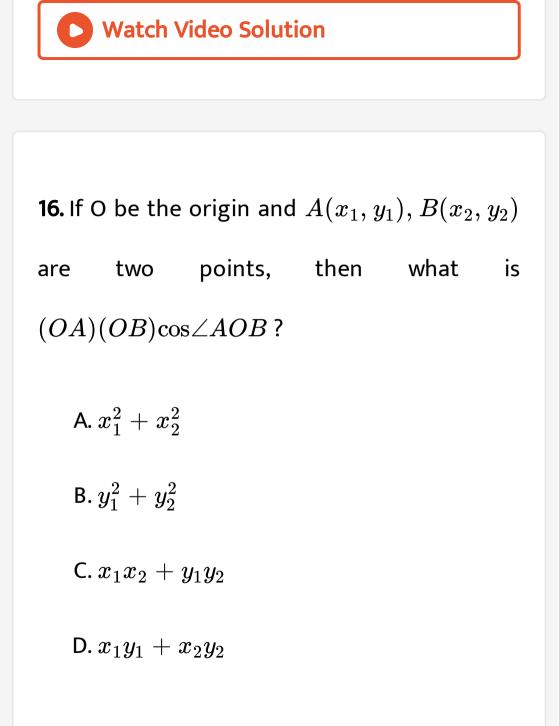
D. A is false but R is true.

Answer: A

15. If A(2, 3), B(1, 4), C(0 - 2) and D (x, y) are the vertices of a parallelogram, then what is the value of (x, y) ?

    A. (1, -3)

    B. (2, 4)

    C. (1, 1)

    D. (0, 0)

Answer: A

16. If O be the origin and $A(x_1, y_1)$, $B(x_2, y_2)$ are two points, then what is $(OA)(OB)\cos\angle AOB$?

A. $x_1^2 + x_2^2$

B. $y_1^2 + y_2^2$

C. $x_1 x_2 + y_1 y_2$

D. $x_1 y_1 + x_2 y_2$

Answer: C

17. The numerical value of the perimeter of a square exceeds that of its area by 4. what is the side of the square ?

A. 1 unit

B. 2 unit

C. 3 unit

D. 4 unit

Answer: B

18. If (a, b), (c, d) and (a-c, b-d) are collinear, then which one of the following is correct ?
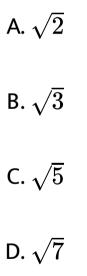
A. $bc - ad = 0$

B. $ab - cd = 0$

C. $bc + ad = 0$

D. $ab + cd = 0$

Answer: A

19. The point of intersection of the two lines

$2x + 3y + 4 = 0$ and $4x + 3y + 2 = 0$ is at a

distance d from origin. What is the value of d ?

A. $\sqrt{2}$

B. $\sqrt{3}$

C. $\sqrt{5}$

D. $\sqrt{7}$

Answer: C

20. The line through the points $(4, 3)$ and $(2, 5)$ cuts off intercepts of length λ and μ on the axes. Which one of the following is correct ?

A. $\lambda > \mu$

B. $\lambda < \mu$

C. $\lambda > -\mu$

D. $\lambda = \mu$

Answer: D

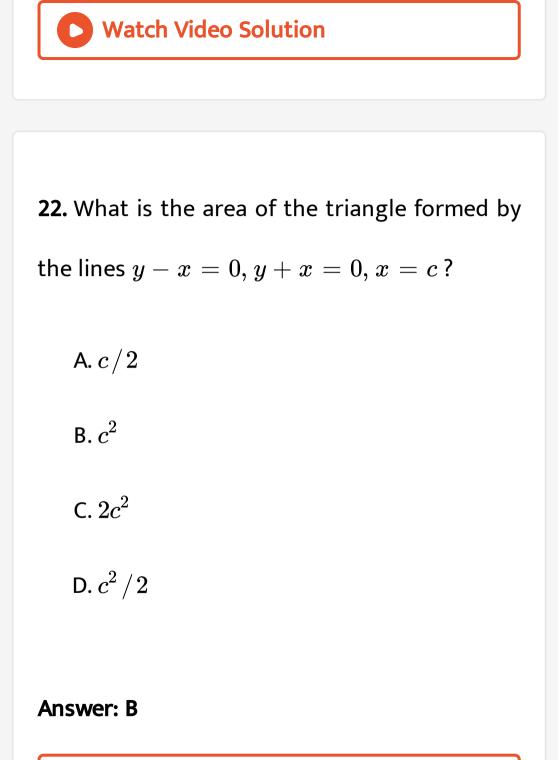**21.** What is the locus of a point which is equidistant from the points $(a + b, a - b)$ and $(b - a, a + b)$?

    A. $bx - ay = 0$

    B. $bx + ay = 0$

    C. $-ax + by = 0$

    D. $ax + by = 0$

Answer: C

22. What is the area of the triangle formed by the lines $y - x = 0, y + x = 0, x = c$?

A. $c/2$

B. c^2

C. $2c^2$

D. $c^2/2$

Answer: B

23. What is the foot of the perpendicular from the point (2, 3) on the line $x + y - 11 = 0$?

A. (1, 10)

B. (5, 6)

C. (6, 5)

D. (7, 4)

Answer: B

24. Consider the following statements :

1. The equation to a straight line parallel to the axis of x is $y = d$, where d is a constant.

2. The equation to the axis of x is $x = 0$.

Which of the statement (s) given above is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A

25. What is the product of the perpendiculars from the two points $\left(\pm \sqrt{b^2 - a^2}, 0 \right)$ to the line $ax \cos \phi + by \sin \phi = ab$?

A. a^2

B. b^2

C. ab

D. a/b

Answer: A

26. The middle point of the segment of the straight line joining the points (p, q) and $(q, -p)$ is $\left(\frac{r}{2}, \frac{s}{2}\right)$. What is the length of the segment?

A. $\left[\left(s^2 + r^2\right)^{1/2}\right]/2$

B. $\left[\left(s^2 + r^2\right)^{1/2}\right]/4$

C. $\left(s^2 + r^2\right)^{1/2}$

D. $s + r$

Answer: C

27. What is the locus of a point which is equidistant from the point $(m + n, n - m)$ and the point $(m - n, n + m)$?

A. $mx = ny$

B. $nx = -my$

C. $nx = my$

D. $mx = -ny$

Answer: C

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28. Let O (0, 0, 0), P(3, 4, 5), (m, n, r) and R (1, 1, 1) be the vertices of a parallelogram taken in order. What is the value of $m + n + r$?

A. 6

B. 12

C. 15

D. More than 15

Answer: C

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29. What is the image of the point (1, 2) on the

line $3x + 4y - 1 = 0$?

A. $\left(-\dfrac{7}{5}, -\dfrac{6}{5} \right)$

B. $\left(\dfrac{7}{8}, \dfrac{1}{2}\right)$

C. $\left(\dfrac{7}{8}, -\dfrac{1}{2}\right)$

D. $\left(-\dfrac{7}{5}, \dfrac{1}{2}\right)$

Answer: A

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30. In what ratio do the coordinate axes divide the line segment joining (-2,5) and (3,-4) .

A. $8x + 5y + 20 = 0$

B. $5x + 8y - 7 = 0$

C. $8x - 5y + 60 = 0$

D. $5x - 8y + 57 = 0$

Answer: C

31. What is the equation on the straight line joining the origin to the point of intersection of the lines $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$?

A. $x + y = 0$

B. $x + y + 1 = 0$

C. $x - y = 0$

D. $x + y + 2 = 0$

Answer: C

32. If the straight lines $x - 2y = 0$ and $kx + y = 1$ intersects at the point $\left(1, \dfrac{1}{2}\right)$

then what is the value of k?

A. 1

B. 2

C. $1/2$

D. $-1/2$

Answer: C

33. What is the maximum number of straight lines that can be drawn with any four points in a plane such that each line contains at least two of these points ?

A. 2

B. 4

C. 6

D. 12

Answer: C

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34. A square is drawn by joining mid pint of the sides of a square. Another square is drawn inside the second square in the same way and the process is continued in definitely. If the side of the first square is 16 cm, then what is the sum of the areas of all the squares ?

    A. 256 sq cm

    B. 512 sq cm

    C. 1024 sq cm

D. 512/3 sq cm

Answer: B

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35. What is the slope of the line perpendicular to the line $\dfrac{x}{4} + \dfrac{y}{3} = 1$?

A. $\dfrac{3}{4}$

B. $-\dfrac{3}{4}$

C. $-\dfrac{4}{3}$

D. $\dfrac{4}{3}$

Answer: D

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36. If the area of a triangle with vertices $(-3, 0), (3, 0)$ and $(0, 0$ is 9 sq. units. Then the value of k will be

A. 3

B. 6

C. 9

D. 12

Answer: A

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37. The locus of a point which is equidistant

from the x – axis and the y – axis is

A. $x \pm y = 0$

B. $x + 2y = 0$

C. $2x + y = 0$

D. none of these

Answer: A

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38. What is the equation of the line joining the origin with the point of intersection of the lines $4x + 3y = 12$ and $3x + 4y = 12$?

A. $x + y = 1$

B. $x - y = 1$

C. $3y = 4x$

D. $x = y$

Answer: D

39. If the sum of the squares of the distances of the point (x, y) from the points (a, 0) and (-a, 0) is $2b^2$, then which one of the following is correct ?

A. $x^2 + a^2 = b^2 + y^2$

B. $x^2 + a^2 = 2b^2 - y^2$

C. $x^2 - a^2 = b^2 + y^2$

D. $x^2 + a^2 = b^2 - y^2$

Answer: D

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40. The line $mx + ny = 1$ passes through the points $(1, 2)$ and $(2, 1)$. What is the value of m ?

A. 1

B. 3

C. $\dfrac{1}{2}$

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

Answer: D

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41. What is the equation of the line passing through (2, -3) and parallel to Y-axis

A. $Y = -3$

B. $Y = 2$

C. $X = 2$

D. $X = -3$

Answer: C

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42. What is the locus of the point which is at distance 8 units to the left of Y-axis ?

A. $X = 8$

B. $Y = 8$

C. $X = -8$

D. $Y = -8$

Answer: C

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43. Two straight lines $x - 3y - 2 = 0$ and

$2x - 6y - 6 = 0$

A. never intersect

B. intersect at a single point

C. intersect at infinite number of points

D. intersect at more than one point (but finite number of points)

Answer: A

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44. If $(a, 0)$, $(0, b)$ and $(1, 1)$ are collinear, what is $(a + b - ab)$ equal to ?

A. 2

B. 1

C. 0

D. -1

Answer: C

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45. What is the foot of the perpendicular from the point $(2, 3)$ on the line $x + y - 11 = 0$?

A. $(2, 9)$

B. $(5, 6)$

C. $(-5, 6)$

D. $(6, 5)$

Answer: B

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46. Write the number of diagonals of an n-sided polygon.

A. $\dfrac{n(n-1)}{2}$

B. $\dfrac{n(n-3)}{2}$

C. $n^2 - n$

D. $\dfrac{n(n+1)}{2}$

Answer: B

47. If (p,q) is a point on x-axis, which is equidistant from (1,2) and (2,3). Find p and q :

A. $p = 0, q = 4$

B. $p = 4, q = 0$

C. $p = 3/2, q = 0$

D. $p = 1, q = 0$

Answer: B

48. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then show that $\dfrac{1}{p^2} = \dfrac{1}{a^2} + \dfrac{1}{b^2}$.

A. $\dfrac{1}{p^2} = \dfrac{1}{a^2} + \dfrac{1}{b^2}$

B. $\dfrac{1}{p^2} = \dfrac{1}{a^2} - \dfrac{1}{b^2}$

C. $\dfrac{1}{p} = \dfrac{1}{a} + \dfrac{1}{b}$

D. $\dfrac{1}{p} = \dfrac{1}{a} - \dfrac{1}{b}$

Answer: A

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49. Prove that the line $x + 2y - 9 = 0$ and $2x + 4y + 5 = 0$ are parallel.

A. 2

B. -1

C. 1

D. 0

Answer: A

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50. Find the equation of a line parallel to the x-axis ata distance of

(i) 4 units above it (ii) 5 units below it.

    A. $x = 5$

    B. $x = -5$

    C. $y = 5$

    D. $y = -5$

Answer: D

51. What is the equation of line passing through $(0, 1)$ and making an angle with the Y-axis equal to the inclination of the line $x - y = 4$ with X-axis?

A. $y = x + 1$

B. $x = y + 1$

C. $2x = y + 2$

D. None of the above

Answer: A

52. what is the perimeter of the triangle with vertices

$A(-4, 2)$, $B(0, -1)$ and $C(3, 3)$?

    A. $7 + 3\sqrt{2}$

    B. $10 + 5\sqrt{2}$

    C. $11 + 6\sqrt{2}$

    D. $5 + \sqrt{2}$

Answer: B

53. If the mid point between the points $(a + b, a - b)$ and $(- a, b)$ lies on the line $ax + by = k$, what is k equal to ?

A. a/b

B. $a + b$

C. ab

D. $a - b$

Answer: C

54. The acute angle which the perpendicular from origin on the line $7x - 3y = 4$ makes with the x-axis is

A. zero

B. positive but not $\pi/4$

C. negative

D. $\pi/4$

Answer: C

55. What is the distance between the lines $3x + 4y = 9$ and $6x + 8y = 18$?

A. 0

B. 3 units

C. 9 units

D. 18 units

Answer: A

56. What is the perpendicular distance of the point (x, y) from x-axis ?

A. x

B. y

C. |x|

D. |y|

Answer: D

57. Find the equation of a line passing through the origin and making an angle of $120°$ with the positive direction of the x-axis.

    A. first quadrant

    B. second quadrant

    C. third quadrant

    D. fourth quadrant

Answer: C

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58. The locus of a point equidistant from three

collinear points is

    A. a straight line

    B. a pair of points

    C. a point

    D. the null set

Answer: D

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59. The equation to the locus of a point which is always equidistant from the points (1, 0) and (0, -2) is :

A. $2x + 4y + 3 = 0$

B. $4x + 2y + 3 = 0$

C. $2x + 4y - 3 = 0$

D. $4x + 2y - 3 = 0$

Answer: A

60. The points (5, 1), (1, -1) and (11, 4) are :

A. collinear

B. vertices of right angled triangle

C. vertices of equilateral triangle

D. vertices of an isosceles triangle

Answer: A

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61. What is the perpendicular distance between the parallel lines $3x + 4y = 9$ and $9x + 12y + 28 = 0$?

A. $\dfrac{7}{3}$ units

B. $\dfrac{8}{3}$ units

C. $\dfrac{10}{3}$ units

D. $\dfrac{11}{3}$ units

Answer: D

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62. Let p, q, r, s be the distances from origin of the points (2, 6), (3, 4), (4, 5) and (-2, 5) respectively. Which one of the following is a whole number ?

A. p

B. q

C. r

D. s

Answer: B

63. From the point (4, 3) a perpendicular is dropped on the x-axis well as on the y-axis. If the lengths of perpendiculars are p, q respectively, then which one of the following is correct ?

A. $p = q$

B. $3p = 4q$

C. $4p = 3q$

D. $p + q = 5$

Answer: C

64. The line $y = 0$ divides the line joining the points (3, -5) and (-4, 7) in the ratio :

A. $3 : 4$

B. $4 : 5$

C. $5 : 7$

D. $7 : 9$

Answer: C

65. The equation of a straight line which makes an angle $45°$ with the x-axis with y-intercept 101 units is :

A. $10x + 101y = 1$

B. $101x + y = 1$

C. $x + y - 101 = 0$

D. $x - y + 101 = 0$

Answer: D

66. Prove that the points $A(2, 4)$, $B(2, 6)$ and $C(2 + \sqrt{3}, 5)$ are the vertices of an equilateral triangle.

A. 6

B. 5

C. -3

D. 1

Answer: B

67. what is the equation of a straight line which passes through $(3, 4)$ and sum of whose x and y intercepts is 14 ?

A. $4x + 3y = 24$

B. $x + y = 14$

C. $4x - 3y = 0$

D. $3x + 4y = 25$

Answer: A

68. The point whose abscissa is equal to its ordinate and which is equidistant from $A(-1, 0)$ and $B(0, 5)$ is

A. $(1, 1)$

B. $(2, 2)$

C. $(-2, -2)$

D. $(3, 3)$

Answer: B

69. What is the area of the triangle whose vertices are $(3, 0), (0, 4)$ and $(3, 4)$?

A. 6 sq. unit

B. 7.5 sq. unit

C. 9 sq. unit

D. 12 sq. unit

Answer: A

70. A straight line passes through the points $(5, 0)$ and $(0, 3)$. The length of perpendicular from the point $(4, 4)$ on the line is

A. $\dfrac{\sqrt{17}}{2}$

B. $\sqrt{\dfrac{17}{2}}$

C. $\dfrac{15}{\sqrt{34}}$

D. $\dfrac{17}{2}$

Answer: B

71. What is the inclination of the line $\sqrt{3}x - y - 1 = 0$?

   A. $30°$

   B. $60°$

   C. $135°$

   D. $150°$

Answer: B

72. Two straight line paths are represented by the equation $2x - y = 2$ and $-4x + 2y = 6.$ Then the paths will

    A. cross each other at one point

    B. not cross each other

    C. cross each other at two points

D. cross each other at infinitely many points

Answer: B

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73. For what value of k, the equations $3x - y = 8$ and $9x - ky = 24$ will have infinitely many solutions ?

A. 6

B. 5

C. 3

D. 1

Answer: C

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74. What is the area of the triangle bounded by the side $x = 0$, $y = 0$ and $x + y = 2$?

A. 1 square unit

B. 2 square unit

C. 4 square unit

D. 8 square unit

Answer: B

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75. If the three vertices of the parallelogram ABCD are $A(1, a), B(3, a), C(2, b),$ then D is equal to

A. $(3, b)$

B. $(6, b)$

C. $(0, b)$

D. $(5, b)$

Answer: C

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76. What is the equation of the line which passes through $(4, -5)$ and is perpendicular to $3x + 4y + 5 = 0$?

A. $4x - 3y - 31 = 0$

B. $3x - 4y - 41 = 0$

C. $4x + 3y - 1 = 0$

D. $3x + 4y + 8 = 0$

Answer: A

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77. For what value of k are the two straight lines $3x + 4y = 1$ and $4x + 3y + 2k = 0$ equidistant from the point $(1, 1)$?

A. $\dfrac{1}{2}$

B. 2

C. -2

D. $-\dfrac{1}{2}$

Answer: D

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78. A points P moves such that its distances from $(1, 2)$ and $(-2, 3)$ are equal. Then, the locus of P is

A. straight line

B. Parabola

C. ellipse

D. hyperbola

Answer: A

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79. The locus of a point which is equidistant from the $x -$ axis and the $y -$ axis is

A. $y = 2x$

B. $x = 2y$

C. $y = \pm x$

D. $2y + x = 0$

Answer: C

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80. What angle does the line joining the

points $(5, 2)$ and $(6, -15)$ subtend on $(0, 0)$

?

A. $\dfrac{\pi}{6}$

B. $\dfrac{\pi}{4}$

C. $\dfrac{\pi}{2}$

D. $\dfrac{3\pi}{4}$

Answer: C

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81. The length of latus rectum of the ellipse

$4x^2 + 9y^2 = 36$ is

A. $\dfrac{4}{3}$

B. $\dfrac{8}{3}$

C. 6

D. 12

Answer: B

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82. What is the equation to the straight line passing through$(5, \ -2)$ and $(-4, 7)$?

A. $5x - 2y = 4$

B. $-4x + 7y = 9$

C. $x + y = 3$

D. $x - y = -1$

Answer: C

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83. What is the angle between the lines $x + y = 1$ and $x - y = 1$?

A. $\dfrac{\pi}{6}$

B. $\dfrac{\pi}{4}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{\pi}{2}$

Answer: D

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84. The centroid of the triangle with vertices

$(2, 3), (-2, -5)$ and $(3, 5)$ is at

A. (1, 1)

B. (2, -1)

C. (1, -1)

D. (1, 2)

Answer: A

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85. The equation of the line, the reciprocals of whose intercepts on the axis are m and n, is given by

A. $nx + my = mn$

B. $mx + ny = 1$

C. $mx + ny = mn$

D. $mx - ny = 1$

Answer: B

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86. Consider the following points :

1. (0, 5) 2. (2, -1)

3. (3, -4)

Which of the above lie on the line $3x + y = 5$ and at a distance $\sqrt{10}$ from (1, 2) ?

A. 1 only

B. 2 only

C. 1 and 2 only

D. 1, 2 and 3

Answer: C

87. What is the equation of the line through $(1, 2)$ so that the segment of the line intercepted between the axis is bisected at this point ?

A. $2x - y = 4$

B. $2x - y + 4 = 0$

C. $2x + y = 4$

D. $2x + y + 4 = 0$

Answer: C

88. What is the equation of straight line passing through the point $(4, 3)$ and making equal intercepts on the coordinate axes ?

A. $x + y = 7$

B. $3x + 4y = 7$

C. $x - y = 1$

D. None of these

Answer: A

89. A (3, 4) and B(5, -2) are two points and P is a point such that $PA = PB$. If the area of triangle PAB is 10 square unit, what are the coordinates of P ?

A. (1, 0) only

B. (7, 2) only

C. (1, 0) or (7, 2)

D. Neither (1, 0) nor (7, 2)

Answer: C

90. Which of the following is correct in respect of the equations $\dfrac{x-1}{2} = \dfrac{y-2}{3}$ and $2x + 3y = 5$?

A. They represent two lines which are parallel.

B. They represent two lines which are perpendicular.

C. They represent two lines which are neither parallel nor perpendicular.

D. The first equation does not represent a line.

Answer: B

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91. Consider the triangle ABC with vertices $A(-2, 3), B(2, 1)$ and $C(1, 2)$. What is the circumcentre of the triangle ABC?
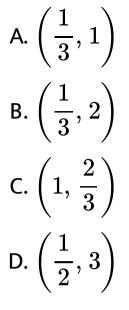
A. (-2, -2)

B. (2, 2)

C. (-2, 2)

D. (2, -2)

Answer: A

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92. Consider the triangle ABC with vertices $A(-2, 3)$, $B(2, 1)$ and $C(1, 2)$. What is the circumcentre of the triangle ABC?

A. $\left(\dfrac{1}{3}, 1\right)$

B. $\left(\dfrac{1}{3}, 2\right)$

C. $\left(1, \dfrac{2}{3}\right)$

D. $\left(\dfrac{1}{2}, 3\right)$

Answer: B

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93. Consider the $\triangle ABC$ with vertices $A(-2, 3), B(2, 1)$ and $C(1, 2).$ what is the

foot of the altitude from the vertex A of the triangle ABC?

A. (1, 4)

B. (-1, 3)

C. (-2, 4)

D. (-1, 4)

Answer: D

94. A line passes through the point $(2, 2)$ and is perpendicular to the line $3x + y = 3,$ then its y-intercept is

A. $\dfrac{3}{4}$

B. $\dfrac{4}{3}$

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

D. 3

Answer: B

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95. The perpendicular distance between the straight lines $6x + 8y + 15 = 0$ and $3x + 4y + 9 = 0$ is

A. $\dfrac{3}{2}$ units

B. $\dfrac{3}{10}$ unit

C. $\dfrac{3}{4}$ unit

D. $\dfrac{2}{7}$ unit

Answer: B

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96. The length of perpendicular from the origin to a line is 5 units and the line makes an angle $120°$ with the positive direction of x-axis. The equation of the line is

A. $x + \sqrt{3}y = 5$

B. $\sqrt{3}x + y = 10$

C. $\sqrt{3}x - y = 10$

D. None of these

Answer: B

97. What is the equation on the straight line joining the origin to the point of intersection of the lines $\dfrac{x}{a} + \dfrac{y}{b} = 1$ and $\dfrac{x}{b} + \dfrac{y}{a} = 1$?

A. $x - y = 0$

B. $x + y = 0$

C. $x = 0$

D. $y = 0$

Answer: A

98. If a line is perpendicular to the line $5x - y = 0$ and forms a triangle with coordinate axes of area 5 sq. units, then its equation is :
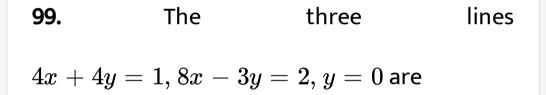
A. $x + 5y \pm 5\sqrt{2} = 0$

B. $x - 5y \pm 5\sqrt{2} = 0$

C. $5x + y \pm 5\sqrt{2} = 0$

D. $5x - y \pm 5\sqrt{2} = 0$

Answer: A

99. The three lines

$4x + 4y = 1, 8x - 3y = 2, y = 0$ are

A. the sides of an isosceles triangle

B. concurrent

C. mutually perpendicular

D. the sides of an equilateral triangle

100. If the point $3x + 4y - 24 = 0$ intersects the X-axis at the point A and the Y-axis at the point B, then the incentre of the triangle OAB, where O is the origin, is

A. $(2, 3)$

B. $(3, 3)$

C. $(4, 3)$

D. None of the above

Answer: C

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101. The product of y the perpendiculars from the two points $(\pm 4, 0)$ to the line $3x \cos \phi + 5y \sin \phi = 15$ is

A. 25

B. 16

C. 9

D. 8

Answer: C

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102. The angle between the lines

$2x = 3y = -z$ and $6x = -y = -4z$ is

(A) 0^0 (B) 90^0 (C) 45^0 (D) 30^0

A. are perpendicular

B. are parallel

C. intersect at an angle $45°$

D. intersect at an angle $60°$

Answer: A

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103. Two straight lines passing through the point A(3, 2) cut the line $2y = x + 3$ and x-axis perpendicularly at P and Q respectively. The equation of the line PQ is

A. $7x + y - 21 = 0$

B. $x + 7y + 21 = 0$

C. $2x + y - 8 = 0$

D. $x + 2y + 8 = 0$

Answer: A

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104. A straight line intersect x and y axes at P

and Q respectively. If (3, 5) is the middle point

of PQ, then what is the area of the triangle OPQ ?

A. 12 square units

B. 15 square units

C. 20 square units

D. 30 square units

Answer: D

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105. Consider the lines $y = 3x$, $y = 6x$ and $y = 9$

What is the area of the triangle formed by these lines ?

A. $\dfrac{27}{4}$ square units

B. $\dfrac{27}{2}$ square units

C. $\dfrac{19}{4}$ square units

D. $\dfrac{19}{2}$ square units

Answer: A

106. Consider the lines $y = 3x, y = 6x$ and

$y = 9$

The centroid of the triangle is at which one of

the following points ?

A. $(3, 6)$

B. $\left(\dfrac{3}{2}, 6\right)$

C. $(3, 3)$

D. $\left(\dfrac{3}{2}, 9\right)$

Answer: B

107. For the next two (2) items that follow

Consider the curves y l x 1 and Ix 2 For What

is/are the point (s) of intersection of the

curves? (a) 2, 3) only (b) (2, 1) only (c) (2, 3) and

(2, 1) (d) Neither (2,3)nor (2,1) 33 What is the

area of the region bounded by the curves and

4 axis (a) 3 square units (b) 4 square units (d)

6 square units (c) 5 square units

A. (-2, 3) only

B. (2, 1) only

C. (-2, 3) and (2, 1)

D. Neither (-2, 3) nor (2, 1)

Answer: C

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108. For the next two (2) items that follow

Consider the curves y l x 1 and Ix 2 For What

is/are the point (s) of intersection of the

curves? (a) 2, 3) only (b) (2, 1) only (c) (2, 3) and (2, 1) (d) Neither (2,3)nor (2,1) 33 What is the area of the region bounded by the curves and 4 axis (a) 3 square units (b) 4 square units (d) 6 square units (c) 5 square units

A. 3 square units

B. 4 square units

C. 5 square units

D. 6 square units

Answer: C

109. Consider the two lines $x + y + 1 = 0$ and $3x + 2y + 1 = 0$

What is the equation of the line passing through the point of intersection of the given lines and parallel to x-axis ?

A. $y + 1 = 0$

B. $y - 1 = 0$

C. $y - 2 = 0$

D. $y + 2 = 0$

Answer: D

110. Consider the two lines $x + y + 1 = 0$ and

$3x + 2y + 1 = 0$

What is the equation of the line passing

through the point of intersection of the given

lines and parallel to y-axis ?

    A. $x + 1 = 0$

    B. $x - 1 = 0$

C. $x - 2 = 0$

D. $x + 2 = 0$

Answer: B

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111. Consider a parallelogram whose vertices are A (1, 2), B (4, y), C (x, 6) and D (3, 5) taken in order.

What is the value of $AC^2 - BD^2$?

A. 25

B. 30

C. 36

D. 40

Answer: C

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112. Consider a parallelogram whose vertices are A (1, 2), B (4, y), C (x, 6) and D (3, 5) taken in order.

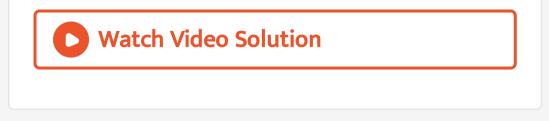What is the point of intersection of the diagonals ?

A. $\left(\dfrac{7}{2}, 4\right)$

B. $(3, 4)$

C. $\left(\dfrac{7}{2}, 5\right)$

D. $(3, 5)$

Answer: A

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113. Consider a parallelogram whose vertices are A (1, 2), B (4, y), C (x, 6) and D (3, 5) taken in order.

What is the area of the parallelogram ?

A. $\dfrac{7}{2}$ square units

B. 4 square units

C. $\dfrac{11}{2}$ square units

D. 7 square units

Answer: D

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114. (a, 2b) is the mid-point of the line segment joining the points (10, -6) and (k, 4). If $a - 2b = 7$, then what is the value of k ?

A. 2

B. 3

C. 4

D. 5

Answer: A

115. An equilateral triangle has one vertex at $(0, 0)$ and another at $(3, \sqrt{3})$. What are the coordinates of the third vertex ?

    A. $(0, 2\sqrt{3})$ only

    B. $(3, \sqrt{3})$ only

    C. $(0, 2\sqrt{3})$ or $(3, -\sqrt{3})$

    D. Neither $(0, 2\sqrt{3})n$ or $(3, -\sqrt{3})$

Answer: C

116. What is the equation of the straight line which passes through the point of intersection of the straight lines $x + 2y = 5$ and $3x + 7y = 17$ and is perpendicular to the straight line $3x + 4y = 10$?

    A. $4x + 3y + 2 = 0$

    B. $4x - y + 2 = 0$

    C. $4x - 3y - 2 = 0$

D. $4x - 3y + 2 = 0$

Answer: D

117. If (a, b) is at unit distance from the line $8x + 6y + 1 = 0$, then which of the following conditions are correct ?

1. $3a - 4b - 4 = 0$

2. $8a + 6b + 11 = 0$

3. $8a + 6b - 9 = 0$

Select the correct answer using the code given

below :

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

Answer: B

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118. A straight line cuts off an intercept of 2 units on the positive direction of x-axis and passes through the point (-3, 5). What is the foot of the perpendicular drawn from the point (3, 3) on this line ?
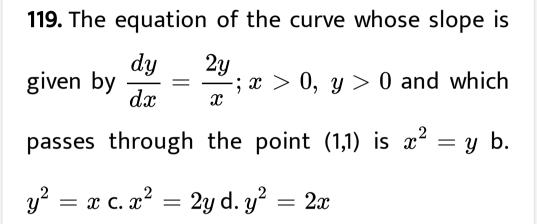
A. (1, 3)

B. (2, 0)

C. (0, 2)

D. (1, 1)

Answer: D

119. The equation of the curve whose slope is given by $\dfrac{dy}{dx} = \dfrac{2y}{x}$; $x > 0$, $y > 0$ and which passes through the point (1,1) is $x^2 = y$ b. $y^2 = x$ c. $x^2 = 2y$ d. $y^2 = 2x$

A. Circle

B. Parabola

C. Ellipse

D. hyperbola

Answer: B

120. 21. If a vertex of a triangle is (1, 1) and the midpoints of two sides of the triangle through this vertex are (-1, 2) and (3, 2), then the centroid of the triangle is

A. $\left(-\dfrac{1}{3}, \dfrac{7}{3} \right)$

B. $\left(-1, \dfrac{7}{3} \right)$

C. $\left(\dfrac{1}{3}, \dfrac{7}{3} \right)$

D. $\left(1, \dfrac{7}{3}\right)$

Answer: D

121. Find the incentre of the triangle with vertices $(1, \sqrt{3})$, $(0, 0)$ and $(2, 0)$

A. $\left(1, \dfrac{\sqrt{3}}{2}\right)$

B. $\left(\dfrac{2}{3}, \dfrac{1}{\sqrt{3}}\right)$

C. $\left(\dfrac{2}{3}, \dfrac{\sqrt{3}}{2}\right)$

D. $\left(1, \dfrac{1}{\sqrt{3}} \right)$

Answer: D

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122. Three consecutive vertices of a parallelogram are (-2,-1), (1,0) and (4,3). Find the fourth vertex

A. (1, 2)

B. (1, 0)

C. (0, 0)

D. (1, -1)

Answer: A

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123. What is the ratio in which the point $C\left(-\dfrac{2}{7}, -\dfrac{20}{7}\right)$ divides the line joining the points $A(-2, -2)$ and $B(2, -4)$?

A. $1 : 3$

B. $3:4$

C. $1:2$

D. $2:3$

Answer: B

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124. What is the equation of the straight line parallel to $2x + 3y + 1 = 0$ and passes through the point (-1, 2) ?

A. $2x + 3y - 4 = 0$

B. $2x + 3y - 5 = 0$

C. $x + y - 1 = 0$

D. $3x - 2y + 7 = 0$

Answer: A

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125. If the centroid of the triangle formed by

$(7, \ x), \ (y, \ -6)$ and $(9, \ 10)$ is at $(6, \ 3)$,

then $(x, y) = $ $(4, 5)$ (b) $(5, 4)$ (c)

$(-5, -2)$ (d) $(5, 2)$

A. $5, 2$

B. $2, 5$

C. $1, 0$

D. $0, 0$

Answer: A

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126. The points (a, b), (0, 0), (-a, -b) and $\left(ab, b^2 \right)$

are

    A. the vertices of a parallelogram

    B. the vertices of a rectangle

    C. the vertices of a square

    D. collinear

Answer: B

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127. The distance of the point $(1, 3)$ from the line $2x + 3y = 6$, measured parallel to the line $4x + y = 4$, is

A. $\dfrac{5}{\sqrt{13}}$ units

B. $\dfrac{3}{\sqrt{17}}$ unit

C. $\sqrt{17}$ units

D. $\dfrac{\sqrt{17}}{2}$ units

Answer: D

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128. The equation of a straight line which cuts off an intercept of 5 units on negative direction of y-axis and makes an angle of $120°$ with the positive direction of x-axis is

A. $y + \sqrt{3}x + 5 = 0$

B. $y - \sqrt{3}x + 5 = 0$

C. $y + \sqrt{3}x - 5 = 0$

D. $y - \sqrt{3}x - 5 = 0$

Answer: A

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129. The equation of the line passing through the point (2, 3) and the point of intersection of lines $2x - 3y + 7 = 0$ and $7x + 4y + 2 = 0$ is

A. $21x + 46y - 180 = 0$

B. $21x - 46y + 96 = 0$

C. $46x + 21y + 155 = 0$

D. $46x - 21y - 29 = 0$

Answer: B

130. What is the distance between the points which divide the line segment joining $(4, 3)$ and $(5, 7)$ internally and externally in the ratio $2:3$?

A. $\dfrac{12\sqrt{17}}{5}$

B. $\dfrac{13\sqrt{17}}{5}$

C. $\dfrac{\sqrt{17}}{5}$

D. $\dfrac{6\sqrt{17}}{5}$

Answer: A

131. Equation to the straight line cutting off an intercept 2 from negative direction of the axis of y and inclined at $30°$ to the positive direction of axis of x is :

A. $x - 2\sqrt{3}y - 3\sqrt{2} = 0$

B. $x + 2\sqrt{3}y - 3\sqrt{2} = 0$

C. $x + \sqrt{3}y - 2\sqrt{3} = 0$

D. $x - \sqrt{3}y - 2\sqrt{3} = 0$

Answer: D

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132. What is the equation of the line passing through the point of intersection of the lines

$x + 2y - 3 = 0$ and $2x - y + 5 = 0$ and

parallel to the line $y - x + 10 = 0$?

A. $7x - 7y + 18 = 0$

B. $5x - 7y + 18 = 0$

C. $5x - 5y + 18 = 0$

D. $x - y + 5 = 0$

Answer: C

133. Consider the following statements :

1. The length p of the perpendicular from the origin to the line $ax + by = c$ satisfies the relation $p^2 = \dfrac{c^2}{a^2 + b^2}$

The length p of the pependicular from the origin to the line $\dfrac{x}{a} + \dfrac{y}{b} = 1$ satisfies the relation $\dfrac{1}{p^2} = \dfrac{1}{a^2} + \dfrac{1}{b^2}$.

3. The length p of the perpendicular from the origin to the line $y = mx + c$ satisfies the relation $\dfrac{1}{p^2} = \dfrac{1 + m^2 + c^2}{c^2}$

Which of the above is/are correct ?

   A. 1, 2 and 3

   B. 1 only

   C. 1 and 2 only

   D. 2 only

Answer: C

134. What is the equation of the straight line passing through the point (2, 3) and making an intercept on the positive y-axis equal to twice its intercept on the positive x-axis ?

    A. $2x + y = 5$

    B. $2x + y = 7$

    C. $x + 2y = 7$

D. $2x - y = 1$

Answer: B

135. Given three straight lines $2x + 11y - 5 = 0, 24x + 7y - 20 = 0,$ and $4x - 3y - 2 = 0$. Then, they form a triangle one line bisects the angle between the other two two of them are parallel

A. 12 and 4 respectively

B. 11 and 5 respectively

C. Equal to each other

D. Not equal to each other

Answer: C

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136. The equation of the line, when the portion of it intercepted between the axes is divided by the point (2, 3) in the ratio of 3 : 2, is

A. Either $x + y$ or $9x + y = 12$

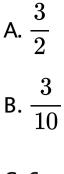B. Either $x + y = 5$ or $4x + 9y = 30$

C. Either $x + y = 4$ or $x + 9y = 12$

D. Either $x + y = 5$ or $9x + 4y = 30$

Answer: D

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137. 15. The distance between the lines 3x + 4y

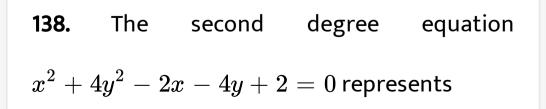= 9 and 6x + 8y = 15 IS: (c) 6 (d) 2 10

A. $\dfrac{3}{2}$

B. $\dfrac{3}{10}$

C. 6

D. 5

Answer: B

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138. The second degree equation

$x^2 + 4y^2 - 2x - 4y + 2 = 0$ represents

A. A point

B. An ellipse of semi-major axis 1

C. An ellipse with eccentricity $\dfrac{\sqrt{3}}{2}$

D. None of the above

Answer: A

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139. The angle between the two lines

$1x + my + n = 0$ and $1'x + m'y + n' = 0$

is given by $\tan^{-1}\theta$. What θ equal to ?

A. $\left| \dfrac{lm' - l'm}{ll' - mm'} \right|$

B. $\left| \dfrac{lm' + l'm}{ll' + mm'} \right|$

C. $\left| \dfrac{lm' - l'm}{ll' + mm'} \right|$

D. $\left| \dfrac{lm' + l'm}{ll' - mm'} \right|$

Answer: C

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140. Consider the following statements :

1. The distance between the lines

$y = mx + c_1$ and $y = mx + c_2$ is $\dfrac{|c_1 - c_2|}{\sqrt{1 - m^2}}$.

2. The distance between the lines

$ax + by + c_1$ and $ax + by + c_2 = 0$ is

$\dfrac{|c_1 - c_2|}{\sqrt{a^2 + b^2}}$.

3. The distance between the lines $x = c$ and

$x = c_2$ is $|c_1 - c_2|$. Which of the above

statements are correct ?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

141. What is equation of straight line pass through the point of intersection of the line $\frac{x}{2} + \frac{y}{3} = 1$ and $\frac{x}{3} + \frac{y}{2} = 1$, and parallel the $4x + 5y - 6 = 0$?

A. $20x + 25y - 54 = 0$

B. $25x + 20y - 54 = 0$

C. $4x + 5y - 54 = 0$

D. $4x + 5y - 54 = 0$

Answer: A

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142. Consider the following statements :

Statement I : If the line segment joining the points P(m, n) and Q(r. s) subtends an angle α at the origin, then

$$\cos \alpha = \frac{ms - nr}{\sqrt{(m^2 + n^2)(r^2 + s^2)}}.$$

Statements II : In any triangle ABC, it is true

that $a^2 = b^2 + c^2 - 2bc \cos A$.

What of the following is correct in respect of the above two statements ?

A. Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I

B. Both Statement I and Statement II are true, but Statement II is not the correct explanation of statement I

C. Statement I is true, but Statement II is

false

D. Statement I is false, but Statement II is

true

Answer: D

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143. Consider the following statements :

1. For an equation of a line,

$x \cos q + y \sin q = p,$ in normal form, the

length of the perpendicular from the point (a, b) to the line is

$|a \cos q + b \sin q + p|$.

2. The length of the perpendicular from the point (a, b) to the line $\frac{x}{a} + \frac{y}{b} = 1$ is $\left| \frac{a\alpha + b\beta - ab}{\sqrt{a^2 + b^2}} \right|$.

Which of the above statements is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: D

144. The points (1, 3) and (5, 1) are two opposite vert of a rectangle. The other two vertices lie on the line find the $y = 2x + c$. Find c and the remaining vertices.

A. 2

B. -2

C. 4

D. -4

Answer: D

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145. If the lines $3y + 4x = 1, y = x + 5$ and $5y + bx = 3$ are concurrent the n $b =$

A. 1

B. 3

C. 6

D. $\dfrac{1}{2}$

Answer: C

146. What is the equation of the straight line which is perpendicular to $y = x$ and passes through $(3, 2)$?
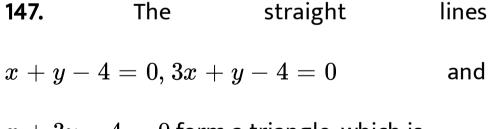
A. $x - y = 5$

B. $x + y = 5$

C. $x + y = 1$

D. $x - y = 1$

Answer: B

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147. The straight lines

$x + y - 4 = 0, 3x + y - 4 = 0$ and

$x + 3y - 4 = 0$ form a triangle, which is

A. isosceles

B. right-angled

C. equilateral

D. scalene

Answer: A

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148. The centroid of the triangle with vertices A(2, -3, 3), B(5, -3, -4) and C (2, -3, -2) is the point

A. (-3, 3, -1)

B. (3, -3, -1)

C. (3, 1, -3)

D. (-3, -1, -3)

Answer: B

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149. The minimum distance from the point (4, 2) to $y^2 = 8x$ is equal to

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. 2

D. $3\sqrt{2}$

Answer: B

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150. What is the minimum value of $a^2x + b^2y$ where $xy = c^2$?

A. abc

B. 2abc

C. 3abc

D. 4abc

Answer: B

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