MATHS

BOOKS - VIKAS GUPTA MATHS (HINGLISH)

STRAIGHT LINES

Exercise 1 Single Choice Problems

1. The ratio in which the line segment joining (2, -3) and (5,6) is divided by the x- axis is :

A. $3:1$

B. $1:2$

C. $\sqrt{3}:2$

D. $\sqrt{2}:3$

Answer: B

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2. If is the line whose equation is $ax + by = c$. Let M be the reflection of 'L through the y-axis and let N be the reflection of L through the x-axis. Which of the following must be true about M and N for choices of a, b and c?

A. The x- intercepts of M and N are equal

B. The y- intercepts of M and N are equal

C. The slopes of M and N are equal

D. The slopes of M and N are reciprocal

Answer: C

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3. The complete set of real values of a such that the point $p(a, \sin a)$ lies inside the triangle formed by the lines $x - 2y + 2 = 0; x + y = 0$ and $x - y - \pi = 0$ is:

A. $\left(0, \frac{\pi}{6}\right) \cup \left(\frac{\pi}{3}, \frac{\pi}{2}\right)$

B. $\left(\frac{\pi}{2}, \pi\right) \cup \left(\frac{2\pi}{2}, 2\pi\right)$

C. $(0, \pi)$

D. $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$

Answer: C

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4. Let m be a positive integer and let the lines $13x + 11y = 700$ and $y = mx - 1$ intersect in a point whose coordinates are integer. Then m equals to :

A. 4

B. 5

C. 6

D. 7

Answer: C

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5. If $P \equiv \left(\frac{1}{x_p}, p\right), Q = \left(\frac{1}{x_q}, q\right), R = \left(\frac{1}{x_r}, r\right)$ where $x_k \neq 0$, denotes the k^{th} terms of a H.P. for $k \in N$, then :

A. ar.

$$(\Delta PQR) = \frac{p^2q^2r^2}{2}\sqrt{(p-q)^2 + (q-r)^2 + (r-p)^2}$$

B. ΔPQR is a right angled triangle

C. the points P,Q, R are collinear

D. None of these

Answer: C

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6. If the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four times their product , then the value of c is

A. 1

B. -1

C. 2

D. -2

Answer: C

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7. A piece of cheese is located at (12, 10) in a coordinate plane. A mouse is at (4,-2) and is running up the line $y = -5x + 18$. At the point (a, b), the mouse starts getting farther from the cheese rather than closer to it. The value of $(a + b)$ is :

A. 6

B. 10

C. 18

D. 14

Answer: B

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8. The vertex of the right angle of a right angled triangle lies on the straight line $2x - y - 10 = 0$ and the two other vertices, at points $(2, -3)$ and $(4, 1)$, then the area of triangle in sq. units is-

A. $\sqrt{10}$

B. 3

C. $\frac{33}{5}$

D. 11

Answer: B

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9. Given a family of lines a(2x +y+4) + b(x-2y-3)=0 .The number of lines belonging to the family at a distance of $\sqrt{10}$ from point $(2, -3)$ is

A. 0

B. 1

C. 2

D. ∞

Answer: B

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10. Point $(0, \beta)$ lies on or inside the triangle fromed by the lines $y = 0, x + y = 8$ and $3x - 4y + 12 = 0$. Then β can be :

A. 2

B. 4

C. 8

D. 12

Answer: A

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11. the lines $x + y + 1 = 0; 4x + 3y + 4 = 0$ and $x + \alpha y + \beta = 0,$ where $\alpha^2 + \beta^2 = 2,$ are concurrent

A. $\alpha = 1, \beta = -1$

B. $\alpha = 1, \beta = \pm 1$

C. $\alpha = -1, \beta = \pm 1$

D. $\alpha = \pm 1, \beta = 1$

Answer: D

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12. A straight line through the origin 'O' meets the parallel lines $4x + 2y = 9$ and $2x + y = -6$ at points

P and Q respectively. Then the point 'O' divides the segment PQ in the ratio

A. $1:2$

B. $4:3$

C. $2:1$

D. $3:4$

Answer: D

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13. If the points (2a, a), (a, 2a) and (a, a) enclose a triangle of area 72 units, then co-ordinates of the centroid of the triangle may be :

A. $(4, 4)$

B. $(-4, 4)$

C. $(12, 12)$

D. $(16, 16)$

Answer: D

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14. Let $g(x) = ax + b$, where $a < 0$ and g is defined from [1,3] onto [0,2] then the value of $\cot\left(\cos^{-1}(|\sin x| + |\cos x|) + \sin^{-1}(-|\cos x| - |\sin x|)\right)$ is equal to :

A. $g(1)$

B. $g(2)$

C. $g(3)$

D. $g(1) + g(3)$

Answer: C

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15. If any point P is at the equal distances from points A(a+b,a-b) and B(a-b,a+b), then locus of a point is

A. $ax + by = 0$

B. $ax - by = 0$

C. $bx + ay = 0$

D. $x - y = 0$

Answer: D

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16. If the equation $4y^3 - 8a^2yx^2 - 3ay^2x + 8x^3 = 0$ represents three straight lines, two of them are perpendicular, then sum of all possible values of a is equal to

A. $\frac{3}{8}$

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

C. $\frac{1}{4}$

D. -2

Answer: B

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17. The orthocentre of the triangle formed by the lines $x - 7y + 6 = 0, 2x - 5y - 6 = 0$ and $7x + y - 8 = 0$ is

A. $(8, 2)$

B. $(0, 0)$

C. $(1, 1)$

D. $(2, 8)$

Answer: C

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18. All the chords of the curve $2x^2 + 3y^2 - 5x = 0$ which subtend a right angle at the origin are concurrent at :

A. $(0, 1)$

B. $(1, 0)$

C. $(-1, 1)$

D. $(1, -1)$

Answer: B

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19. From a point $P = (3, 4)$ perpendiculars PQ and PR are drawn to line $3x + 4y - 7 = 0$ and a variable line $y - 1 = m(x - 7)$ respectively then maximum area of triangle PQR is :

A. 10

B. 12

C. 6

D. 9

Answer: D

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20. the equation of two adjacent sides of rhombus are given by $y = x$ and $y = 7x$. the diagonals of the rhombus intersect each other at point of $(1, 2)$.then the area of the rhombus is:

A. $\frac{10}{3}$

B. $\frac{20}{3}$

C. $\frac{40}{3}$

D. $\frac{50}{3}$

Answer: A

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21. The point P(3, 3) is reflected across the line $y = -x$. Then it is translated horizontally 3 units to the left and vertically 3 units up. Finally, it is reflected across the line $y = x$. What are the coordinates of the point after these transformations ?

A. $(0, -6)$

B. $(0, 0)$

C. $(-6, 6)$

D. $(-6, 0)$

Answer: A

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22. The equation $x = t^3 + 9$ and $y = \frac{3t^3}{4} + 6$ represents a straight line where t is a parameter. Then y-intercept of the line is :

A. $-\frac{3}{4}$

B. 9

C. 6

D. 1

Answer: A

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23. The combined equation of two adjacent sides of a rhombus formed in first quadrant is $7x^2 - 8xy + y^2 = 0$, then slope of its longer diagonal is

A. $-\frac{1}{2}$

B. -2

C. 2

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

Answer: C

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24. The number of integral point inside the triangle made by the line $3x + 4y - 12 = 0$ with the coordinate axes which are equidistant from at least two sides is/are :

(an integral point is a point both of whose coordinates are integers.)

A. 1

B. 2

C. 3

D. 4

Answer: A

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25. The area of triangle formed by the straight lines whose equations are $y = 4x + 2, 2y = x + 3$ and $x = 0$ is :

A. $\frac{25}{7\sqrt{2}}$

B. $\frac{\sqrt{2}}{28}$

C. $\frac{1}{28}$

D. $\frac{15}{7}$

Answer: C

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26. in a triangle ABC, if A is $(1, 2)$ and the equations of the medians through B and c are $x + y = 5$ and $x = 4$ respectively then B must be:

A. $(1, 4)$

B. $(7, -2)$

C. $(4, 1)$

D. $(-2, 7)$

Answer: B

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27. The equation of image of pair of lines $y = |x - 1|$ with respect to y-axis is :

A. $x^2 - y^2 - 2x + 1 = 0$

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

C. $4x^2 - 4x - y^2 + 1 = 0$

D. $x^2 - y^2 + 2x + 1 = 0$

Answer: D

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28. If P, Q and R are three points with coordinates $(1, 4), (4, 5)$ and (m, m) respectively, then the value of

m for which $PR + RQ$ is minimum, is :

A. 4

B. 3

C. $\frac{17}{8}$

D. $\frac{7}{2}$

Answer: A

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29. The vertices of a triangle are $(A(-1, -7), B(5, 1),$ and $C(1, 4)$. The equation of the bisector of $\angle ABC$ is____

A. $y + 2x - 11 = 0$

B. $x - 7y + 2 = 0$

C. $y - 2x + 9 = 0$

D. $y + 7x - 36 = 0$

Answer: B

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30. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then $c =$

A. -3

B. -1

C. 3

D. 1

Answer: A

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31. The equations of L_1 and L_2 are $y = mx$ and $y = nx$, respectively. Suppose L_1 make twice as large of an angle with the horizontal (measured counterclockwise from the positive x-axis) as does L_2 and that L_1 has 4 times the slope of L_2. If L_1 is not horizontal, then the value of the product (mn) equals:

A. $\frac{\sqrt{2}}{2}$

B. $-\frac{\sqrt{2}}{2}$

C. 2

D. -2

Answer: C

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32. Given $A(0, 0)$ and $B(x, y)$with $x\varepsilon(0, 1)$ and $y > 0$. Let the slope of the line AB equals m_1 Point C lies on the line $x = 1$ such that the slope of BC equals m_2 where $0 < m_2 < m_1$ If the area of the triangle ABC can expressed as $(m_1 - m_2)f(x)$, then largest possible value of $f(x)$ is:

A. 1

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. $\frac{1}{8}$

Answer: D

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33. If a, b, c are in harmonic progression, then the straight line $\left(\left(\frac{x}{a}\right)\right)_{\frac{y}{b}} + \left(\frac{l}{c}\right) = 0$ always passes through a fixed point. Find that point.

A. $(-1, 2)$

B. $(-1, -2)$

C. $(1, -2)$

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

Answer: C

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34. if $\frac{X^2}{a} + \frac{y^2}{b} + \frac{2xy}{h} = 0$ represent pair of straight lies and slope one line is twice the other line then $ab: h^2$.

A. $9:8$

B. $8:9$

C. $1:2$

D. $2:1$

Answer: A

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35. Statement-1: variable line drawn through a fixed point cuts the coordinate axes at A and B. The locus of mid-point of AB is a circle. because Statement 2: Through 3 non-collinear points in a plane, only one circle can be drawn.

A. Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

B. Statement-1 is true, statement-2 is true and statement-2 is not the correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: D

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36. A line passing through origin and is perpendicular to two given lines $2x + y + 6 = 0$ and $4x + 2y - 9 = 0$. The ratio in which the origin divides this line is

A. $1:2$

B. $1:1$

C. $5:4$

D. $3:4$

Answer: D

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37. If a vertex of a triangle is (1, 1) and the mid-points of two side through this vertex are (-1, 2) and (3, 2), then centroid of the triangle is

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

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

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

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

Answer: C

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38. The diagonals of a parallelogram PQRS are along the lines x+3y =4 and 6x-2y = 7, Then PQRS must be :

A. rectangle

B. square

C. rhombus

D. neither rhombus nor rectangle

Answer: C

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39. The two points on the line $x + y = 4$that at a unit perpendicular distance from the line lie $4x + 3y = 10$ are (a_1, b_1) and (a_2, b_2), then $a_1 + b_1 + a_2 + b_2$

A. 5

B. 6

C. 7

D. 8

Answer: D

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40. The orthocenter of the triangle formed by lines $x + y = 1, 2x + 3y = 6$ and $4x - y + 4 = 0$ lines in quadrant number

A. first quadrant

B. second quadrant

C. third quadrant

D. fourth quadrant

Answer: A

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41. The equation of the line passing through the intersection of the lines $3x + 4y = -5, 4x + 6y = 6$ and perpendicular to $7x - 5y + 3 = 0$ is :

A. $5x + 7y - 2 = 0$

B. $5x - 7y + 2 = 0$

C. $7x - 5y + 2 = 0$

D. $5x + 7y + 2 = 0$

Answer: D

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42. The point (2, 1), (8, 5) and (x, 7) lie on a straight line. Then the value of x is :

A. 10

B. 11

C. 12

D. $\frac{35}{3}$

Answer: B

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43. In a parallelogram PQRS (taken in order), P is the point (-1, -1), Q is (8, 0) and R is (7, 5). Then S is the point :

A. $(-1, 4)$

B. $(-2, 2)$

C. $\left(-2, \frac{7}{2}\right)$

D. $(-2, 4)$

Answer: D

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44. The area of triangle whose vertices are $(a, a), (a+1, a+1), (a+2, a)$ is :

A. a^3

B. $2a$

C. 1

D. 2

Answer: C

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45. The equation $x^2 + y^2 - 2xy - 1 = 0$ represents :

A. two parallel straight lines

B. two perpendicular straight lines

C. a point

D. a circle

Answer: A

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46. Let A (-2, 0) and B(2, 0), then the number of integral values of a, `a in [-10, 10] for which line segment AB subtends an acute angle at point C (a, a+1) is

A. 15

B. 17

C. 19

D. 21

Answer: C

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47. The angle between sides of a rhombus whose v2 times sides is mean of its two diagonal, is equal to: $a)30^\circ\,(b)45^\circ\,(c)60^\circ\,(d)90^\circ$

A. 300°

B. 45°

C. 60°

D. 90°

Answer: D

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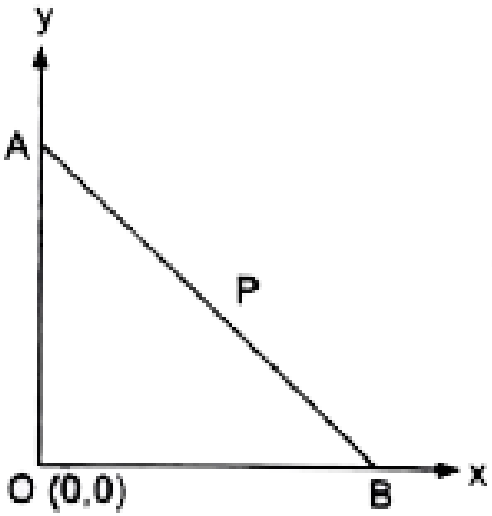
48. A rod of AB of length 3 rests on a wall as follows :



P is a point on AB such that $AP:PB=1:2$ If the rod slides along the wall, then the locus of P lies on

A. $2x+y+xy=2$

B. $4x^2+xy+xy+y^2=4$

C. $4x^2+y^2=4$

D. $x^2+y^2-x-2y=0$

Answer: C

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49. if $\frac{X^2}{a} + \frac{y^2}{b} + \frac{2xy}{h} = 0$ represent pair of straight lies and slope one line is twice the other line then $ab : h^2$.

A. $8:9$

B. $1:2$

C. $2:1$

D. $9:8$

Answer: D

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50. locus of point of reflection of point $(a, 0)$ w.r.t. the line $yt = x + at^2$ is given by:

A. $x - a = 0$

B. $y - a = 0$

C. $x + a = 0$

D. $y + a = 0$

Answer: C

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51. A light ray emerging from the point source placed at $P(1, 3)$ is reflected at a point Q in the axis of x. If the reflected ray passes through the point $R(6, 7)$, then the abscissa of Q is:

A. $\frac{5}{2}$

B. 3

C. $\frac{7}{2}$

D. 1

Answer: A

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52. if the axes are rotated through 60 in the anticlockwise sense,find the transformed form of the equation $x^2 - y^2 = a^2$,

A. $X^2 + Y^2 - 3\sqrt{3}XY = 2a^2$

B. $X^2 + Y^2 = a^2$

C. $Y^2 - X^2 - 2\sqrt{3}XY = 2a^2$

D. $X^2 - Y^2 + 2\sqrt{3}XY = 2a^2$

Answer: C

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53. The straight lines $3x + y - 4 = 0, x + 3y - 4 = 0$ and $x + y = 0$ form a triangle which is :

A. equilateral

B. right- angled

C. acute- angled and isosceles

D. obtuse - angled and isosceles

Answer: D

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54. if m and b are real numbers and $mb > 0$, then the line whose equation is $y = mx + b$ cannot contain the

point

A. $(0, 2008)$

B. $(2008, 0)$

C. $(0, -2008)$

D. $(20, -100)$

Answer: B

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55. The number of possible straight lines passing through $(2, 3)$ and forming a triangle with the coordinate axes, whose area is 12 sq. units, is one (b) two (c) three (d) four

A. one

B. two

C. three

D. four

Answer: C

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56. If x_1, x_2, x_3 and y_1, y_2, y_3 are both in $G.P.$ with the same common ratio then the points $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3)

A. lie on a straight line

B. lie on a circle

C. are vertices of a triangle

D. None of these

Answer: A

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57. Locus of centroid of the triangle whose vertices are $(a\cos t, a\sin t), (b\sin t - b\cos t) and (1, 0),$ where t is a parameter is: $(3x-1)^2 + (3y)^2 = a^2 - b^2$

$(3x-1)^2 + (3y)^2 = a^2 + b^2$

$(3x+1)^2 + (3y)^2 = a^2 + b^2$

$(3x+1)^2 + (3y)^2 = a^2 - b^2$

A. $(3x-1)^2+(3y)^2=a^2-b^2$

B. $(3x-1)^2+(3y)^2=a^2+b^2$

C. $(3x+1)^2+(3y)^2=a^2+b^2$

D. $(3x+1)^2+(3y)^2=a^2-b^2$

Answer: B

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58. The equation of the straight line passing through the point $(4.\ 3)$ and making intercepts on the co ordinate axes whose sum is -1, is

A. $\frac{x}{2}+\frac{y}{3}=-1$ and $\frac{x}{-2}+\frac{y}{1}=-1$

B. $\frac{x}{2} - \frac{y}{3} = -1$ and $\frac{x}{-2} + \frac{y}{1} = -1$

C. $\frac{x}{2} + \frac{y}{3} = 1$ and $\frac{x}{2} + \frac{y}{1} = 1$

D. $\frac{x}{2} - \frac{y}{3} = 1$ and $\frac{x}{-2} + \frac{y}{1} = 1$

Answer: D

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59. Let A $(3, 2)$ and B $(5, 1)$. ABP is an equilateral triangle is constructed one the side of AB remote from the origin then the orthocentre of triangle ABP is:

A. $\left(4 - \frac{1}{2}\sqrt{3}, \frac{3}{2} - \sqrt{3}\right)$

B. $\left(4 + \frac{1}{2}\sqrt{3}, \frac{3}{2} + \sqrt{3}\right)$

C. $\left(4-\frac{1}{6}\sqrt{3}, \frac{3}{2}-\frac{1}{3}\sqrt{3}\right)$

D. $\left(4+\frac{1}{6}\sqrt{3}, \frac{3}{2}+\frac{1}{3}\sqrt{3}\right)$

Answer: D

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60. Area of the triangle formed by the lines through point (6, 0) and at a perpendicular distance of 5 from point (1, 3) and line $y = 16$ in square units is :

A. 160

B. 200

C. 240

D. 130

Answer: C

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61. The orthocentre of the triangle with vertices $(5, 0), (0, 0), \left(\frac{5}{2}, \frac{5\sqrt{3}}{2}\right)$ is :

A. $(2, 3)$

B. $\left(\frac{5}{2}, \frac{5}{2\sqrt{3}}\right)$

C. $\left(\frac{5}{6}, \frac{5}{2\sqrt{3}}\right)$

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

Answer: B

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62. All chords of the curve $3x^2 - y^2 - 2x + 4y = 0$ which subtend a right angle at the origin, pass through the fixed point

A. $(1, 2)$

B. $(1, -2)$

C. $(2, 1)$

D. $(-2, 1)$

Answer: B

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63. Let $P(-1, 0), Q(0, 0), R\left(3, 3\sqrt{3}\right)$ be three points then the equation of the bisector of the angle $\angle PQR$ is :

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

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

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

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

Answer: C

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Exercise 2 One Or More Than One Answer Is Are Correct

1. A line makes intercepts whose sum is 9 and product is 20 .If the x-intercept is greater,then the equation of the line is

A. $4x + 5y - 20 = 0$

B. $5x + 4y - 20 = 0$

C. $4x - 5y - 20 = 0$

D. $4x + 5y + 20 = 0$

Answer: A::B

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2. The equation(s) of the medians of the triangle formed by the points (4, 8), (3, 2) and 5, -6) is/are :

A. $x = 4$

B. $x = 5y - 3$

C. $2x + 3y - 12 = 0$

D. $22x + 3y - 92 = 0$

Answer: A::C::D

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3. The value(s) of t for which the lines $2x + 3y = 5, t^2x + ty - 6 = 0$ and $3x - 2y - 1 = 0$

are concurrent, can be :

A. $t = 2$

B. $t = -3$

C. $t = -2$

D. $t = 3$

Answer: A::B

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4. If one of the lines given by the equation $ax^2 + 6xy + by^2 = 0$ bisects the angle between the co-ordinate axes, then value of $(a + b)$ can be :

A. -6

B. 3

C. 6

D. 12

Answer: A::C

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5. Suppose ABCD is a quadrilateral such that the coordinates of A, B and C are $(1, 3)(-2, 6)$ and $(5, -8)$ respectively. For what choices of coordinates of D will make ABCD a trapezium ?

A. (3, -6)

B. (6, -9)

C. (0, 5)

D. (3, -1)

Answer: B::D

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6. One diagonal of a square is the portion of the line $\sqrt{3}x + y = 2\sqrt{3}$ intercepted by the axes. Obtain the extremities of the other diagonal is : (A) $\left(1+\sqrt{3}, -1+\sqrt{3}\right)$ (B) $\left(1+\sqrt{3}, 1+\sqrt{3}\right)$ (C) $\left(1-\sqrt{3}, -1+\sqrt{3}\right)$ (D) $\left(1-\sqrt{3}, 1+\sqrt{3}\right)$

A. $\left(1+\sqrt{3}, \sqrt{3}-1\right)$

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

C. $\left(1-\sqrt{3}, \sqrt{3}-1\right)$

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

Answer: B::C

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7. Two sides of a rhombus ABCD are parallel to the lines y = x + 2 and y = 7x + 3 If the diagonals of the rhombus intersect at the point (1, 2) and the vertex A is on the y-axis, then vertex A can be

A. $\left(0, \frac{5}{2}\right)$

B. (0, 0)

C. (0, 5)

D. (0, 3)

Answer: A::B

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8. Find the equations of the sides of the triangle having $(3, -1)$ as a vertex, $x - 4y + 10 = 0$ and $6x + 10y - 59 = 0$ being the equations of an angle bisector and a median respectively drawn from different vertices.

A. $6x + 7y - 13 = 0$

B. $2x + 9y - 65 = 0$

C. $18x + 13y - 41 = 0$

D. $6x - 7y - 25 = 0$

Answer: B::C::D

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9. A(1, 3) and C(5, 1) are two opposite vertices of a rectangle ABCD. If the slope of BD is 2, then the coordinates of B can be :

A. (4, 4)

B. (5, 4)

C. (2, 0)

D. (1, 0)

Answer: A::C

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10. All the points lying inside the triangle formed by the points (1, 3), (5, 6), and (-1, 2) satisfy :

A. $3x + 2y \geq 0$

B. $2x + y + 1 \geq 0$

C. $-2x + 11 \geq 0$

D. $2x + 3y - 12 \geq 0$

Answer: A::B::C

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11. The slope of a median, drawn from the vertex A of the triangle ABC is -2. The co-ordinates of vertices B and C are respectively (-1, 3) and (3, 5). If the area of the triangle be 5 square units, then possible distance of vertex A from the origin is/are.

A. 6

B. 4

C. $2\sqrt{2}$

D. $3\sqrt{2}$

Answer: A::C

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12. The points $A(0, 0), B(\cos\alpha, \sin\alpha)$ and $C(\cos\beta, \sin\beta)$ are the vertices of a right angled triangle if :

A. $\sin\left(\frac{\alpha-\beta}{2}\right) = \frac{1}{\sqrt{2}}$

B. $\cos\left(\frac{\alpha-\beta}{2}\right) = -\frac{1}{\sqrt{2}}$

C. $\cos\left(\frac{\alpha-\beta}{2}\right) = \frac{1}{\sqrt{2}}$

D. $\sin\left(\frac{\alpha-\beta}{2}\right) = -\frac{1}{\sqrt{2}}$

Answer: A::B::C

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Exercise 3 Comprehension Type Problems

1. The equations of the sides AB and CA of a ΔABC are $x + 2y = 0$ and $x - y = 3$ respectively. Given a fixed point P(2, 3).

Q. Let the equation of BC is $x + py = q$. Then the value of $(p + q)$ if P be the centroid of the ΔABC is :

A. 14

B. -14

C. 22

D. -22

Answer: D

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2. The equations of the sides AB and CA of a ΔABC are $x + 2y = 0$ and $x - y = 3$ respectively. Given a fixed point P(2, 3).

Q. If P be orthocentre of ΔABC then equation of side BC is :

A. $y + 5 = 0$

B. $y - 5 = 0$

C. $5y + 1 = 0$

D. $5y - 1 = 0$

Answer: A

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3. Consider a triangle ABC with vertex $A(2, -4)$. The internal bisectors of the angle B and C are $x + y = 2$ and$x - 3y = 6$ respectively. Let the two bisectors meet at I.if (a, b) is incentre of the triangle ABC then $(a + b)$ has the value equal to

A. 1

B. 2

C. 3

D. 4

Answer: B

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4. Consider a triangle ABC with vertex $A(2, -4)$. The internal bisectors of the angle B and C are $x + y = 2$ and$x - 3y = 6$ respectively. Let the two bisectors meet at I.

If (x_1, y_1) and (x_2, y_2) are the co-ordinates of the point B and C respectively, then the value of $(x_1x_2 + y_1y_2)$ is equal to :

A. 4

B. 5

C. 6

D. 8

Answer: D

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Exercise 5 Subjective Type Problems

1. If the area of the quadrilateral ABCD whose vertices are A(1, 1), B(7, -3), C(12, 2) and D(7, 21) is Δ. Find the sum of the digits of Δ.

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2. The equation of a line through the mid-point of the sides AB and AD of rhombus ABCD, whose one diagonal is $3x - 4y + 5 = 0$ and one vertex is A(3, 1) is $ax + by + c = 0$. Find the absolute value of $(a + b + c)$ where a, b, c are integers expressed in lowest form.

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3. If the point $\left(\alpha, \alpha^4\right)$ lies on or inside the triangle formed by lines $x^2y + xy^2 - 2xy = 0$, then the largest value of α is .

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4. The minimum value of $[x_1 - x_2)^2 + \left(12 - \sqrt{1 - (x_1)^2} - \sqrt{4x_2}\right]^{\frac{1}{2}}$ for all permissible values of x_1 and x_2 is equal to $a\sqrt{b} - c$ where $a, b, c \in N$, the find the value of a+b-c

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5. The number of lines that can be drawn passing through point (2, 3) so that its perpendicular distance from (-1, 6) is equal to 6 is :

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6. The graph of $x^4 = x^2y^2$ is a union of n different lines, then the value of n is.

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7. The orthocentre of triangle formed by lines $x + y - 1 = 0, 2x + y - 1 = 0$ and $y = 0$ is (h, k), then $\frac{1}{k^2} =$

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8. The point (-2,a) lies in the interior of the triangle formed by the lines $y = x, y = -x$ and $2x + 3y = 6$ the integral value of a is

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9. Let $A \equiv (-1, 0), B \equiv (3, 0),$ and PQ be any line passing through (4, 1) having slope m. Find the range of m for which there exist two points on PQ at which AB subtends a right angle.

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10. Given that the three points where the curve $y = bx^2 - 2$ intersects the x-axis and y-axis form an equilateral triangle. Find the value of 2b.

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