MATHS

BOOKS - ML KHANNA

RECTANGULAR CARTESIAN CO-ORDINATE SYSTEM AND THE STRAIGHT LINE

EXAMPLE

1. The origin is shifted to (-2,3) then what are the co-ordinates of the point (3,-5) in the new position ?

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2. If the origin is shifted to (1,-2) the co -ordinates of A become (2,3). What are the original co ordinates of A?

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3. Determine as to what point the axes of the co-ordinates be shifted so as to remove the first degree terms from the equation

$f(x, y) = 2x^2 + 3xy + 3y^2 - 12x + 12y + 24 = 0$

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4. What will be the co ordinates of the point $(4, 2\sqrt{3})$ when the axes are rotated through an angle of 30° in clockwise sense?

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5. What will be the co ordinates of the point in original position if its co ordinates after rotation of axes through an angle 60° be $(2, -\sqrt{3})$?

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6. Let $0 < \alpha < \pi/2$ be a fixed angle. If $P = (\cos\theta, \sin\theta)$ and $Q = (\cos(\alpha - \theta), \sin(\alpha - \theta))$.

then Q is obtained from P by

A. clockwise rotation around origin through an angle α

B. Anticlockwise rotation around origin through an angle α

C. reflection in the line through origin with slope $\tan\alpha$

D. reflection in the line through origin with slope $\tan\frac{\alpha}{2}$

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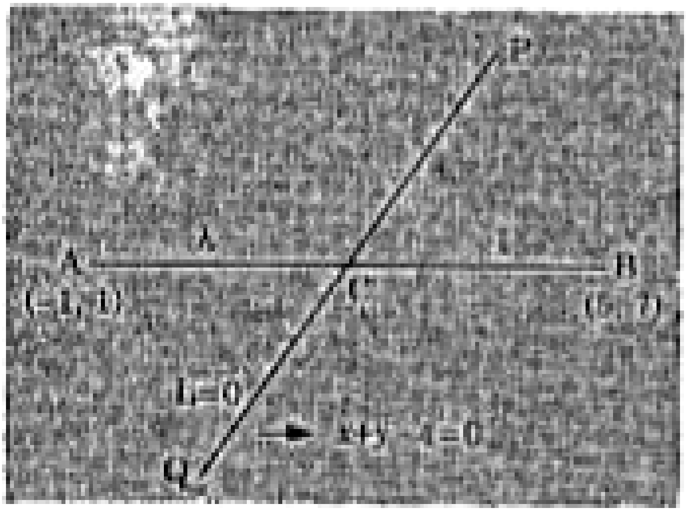
7. PQ divides AB in the ratio



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8. If the given lines be $3x+4y-11=0$ and $12x-5y-2=0$, then find the bisectors of the angles between them and discriminate which bisects the acute angle or which bisects the obtuse angle .

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9. Find the equation of the bisector of acute angle between the lines $5y - 12x = 20$ and $3x - 4y = 8$

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PROBLEM SET(1)(MULTIPLE CHOICE QUESTIONS)

1. The triangle formed by the points $A(2a, 4a), B(2a, 6a)$ and $C\left(2a + \sqrt{3}a, 5a\right)$ is

A. right angled

B. isosceles

C. equilateral

D. None

Answer: C

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2. The points $A(12, 8), B(-2, 6)$ and C(6,0) are the vertices of

A. right angled Δ

B. isosceles Δ

C. equilateral Δ

D. None

Answer: A

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3. The points $(1, 1), (-1, -1)$ and $(-\sqrt{3}, \sqrt{3})$ are the angular points of a triangle, then the triangle is

A. right angled

B. isoceles

C. equilateral

D. None

Answer: C

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4. If $P(1,2), Q(4,6), R(5,7)$ and S(a,b) are the vertices of a parallelogram PQRS then

A. a=2,b=4

B. a=3,b=4

C. a=2,b=3

D. a=3,b=5

Answer: C

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5. The extremities of the diagonal of a parallelogram are the points (3,-4) and (-6,5). Third vertex is the point (-2,1), then the fourth vertex is

A. (1,1)

B. (1,0)

C. (0,1)

D. (-1,0)

Answer: D

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6. Mid points of the sides Ab and AC of a ΔABC are (3,5) and (-3,-3) respectively, then the length of the side BC is

A. 10

B. 20

C. 15

D. 30

Answer: B

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7. The coordinates of the mid-points of the sides of a triangle are (4, 2), (3, 3) and (2, 2). What will be the coordinates of the centroid of the triangle?

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

B. $(3, 3)$

C. $(4, 3)$

D. None of these

Answer: A

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8. If the 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. $(1, 7/3)$

B. $(1/3, 7/3)$

C. $(-1, 7/3)$

D. $(-1/3, 7/3)$

Answer: A

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9. If a vertex of a triangle be (1,1) and the middle points of the two sides through it be (-2,3) and (5,2) then the centroid of the triangle is

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

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

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

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

Answer: A

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10. The centroid of a triangle is (2,3) and two of its vertices are (5,6) and (-1,4). The thrid vertex of the triangle is

A. (2,1)

B. (2,-1)

C. (1,2)

D. (1,-2)

Answer: B

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11. The co-ordinates of the third vertex of an equilateral triangle whose two vertices are at (3,4) and (-2,3) are

A. (1,1) or (1,-1)

B. $\left(\frac{1+\sqrt{3}}{2}, \frac{7-5\sqrt{3}}{2}\right)$ or $\left(\frac{1-\sqrt{3}}{2}, \frac{7+5\sqrt{3}}{2}\right)$

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

D. None of these

Answer: B

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12. The vertices of a triangle ABC are (2,1), (5,2) and (3,4) respectively. The circumcentre is the point

A. $\left(\frac{3}{4}, \frac{7}{4}\right)$

B. $\left(\frac{13}{4}, \frac{9}{4}\right)$

C. $\left(\frac{11}{4}, \frac{5}{4}\right)$

D. None

Answer: B

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13. If a and b are real numbers between 0 and 1 such that the points (a,1), (1,b) and (0,0) form an equilateral triangle, then a,b are

A. $2-\sqrt{3}, 2-\sqrt{3}$

B. $\sqrt{3}-1, \sqrt{3}-1$

C. $\sqrt{2}-1, \sqrt{2}-1$

D. None of these

Answer: A

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14. Perpendicular from the origin to the line joining the points $(c\cos\alpha, c\sin\alpha)$ and $(c\cos\beta, c\sin\beta)$ divides it in the ratio

A. $2:1$

B. $1:2$

C. $1:1$

D. None of these

Answer: C

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15. If $A(a, a), B(-a, -a)$ are two vertices of an equilateral triangle then its thrid vertex is

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

B. $(-a\sqrt{3}, a\sqrt{3})$

C. $(a\sqrt{3}, a\sqrt{3})$

D. $(-a\sqrt{3}, -a\sqrt{3})$

Answer: B::C

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16. The range of values of α in the interval $(0, \pi)$ such that the points (3,5) and $(\sin\alpha, \cos\alpha)$ lie on the same side of the line $x + y - 1 = 0$ is

A. $(0, \pi/4)$

B. $(\pi/4, \pi/2)$

C. $(0, \pi/2)$

D. None

Answer: C

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17. ABC is an isosceles triangle. If the coordinates of the base are B(1,3) and C(-2,7), the coordinates of vertex A can be

A. $(1, 6)$

B. $\left(-\frac{1}{2}, 5\right)$

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

D. $\left(-7, \frac{1}{8}\right)$

Answer: C::D

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18. A point P on y-axis is equisdistant from the points A(-5,4) and B(3,-2).

Its co ordinates are

A. $\left(0, \frac{4}{3}\right)$

B. $\left(0, \frac{3}{4}\right)$

C. $\left(0, \frac{3}{7}\right)$

D. $\left(0, \frac{7}{3}\right)$

Answer: D

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19. If the vertices P,Q,R of a triangle PQR are rational points, which of the following points of the triangle PQR is (are) always rational points(s)?

A. centroid

B. incentre

C. circumcentre

D. orthocentre

Answer: A::C::D

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20. If α, β, γ are the real roots of the equation $x^3 - 3ax^2 + 3bx - 1 = 0$, then the centroid of the triangle whose vertices are the points $\left(\alpha, \frac{1}{\alpha}\right), \left(\beta, \frac{1}{\beta}\right)$ and $\left(\gamma, \frac{1}{\gamma}\right)$ is the point

A. (a, b)

B. $(a, -b)$

C. $(-a, b)$

D. $(-a, -b)$

Answer: A

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21. Let O(0, 0), P(3, 4), Q(6, 0) be the vertices of the triangle OPQ. The point R inside the triangle OPQ is such that the triangles OPR, PQR are of equal area. The coordinates of R are

A. $\left(\frac{4}{3}, 3\right)$

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

C. $\left(3, \frac{4}{3}\right)$

D. $\left(\frac{4}{3}, \frac{2}{3}\right)$

Answer: C

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22. Let S_1, S_2 , ... Be squares such that for each $n \geq 1$ the length of a side of S_n equals the lengths of a diagonal of S_{n+1} . If the length of a sides of S_1 is 10 cm, then for which of the following values of n is the area of S_n less than 1 square cm ?

A. 7

B. 8

C. 9

D. 10

Answer: B::C::D

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23. If the point P(x,y) be equidistant from the points $A(a+b, b-a)$ and $B(a-b, a+b)$, then

A. $ax = by$

B. $bx = ay$

C. $xy = ab$

D. none

Answer: B

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24. If the equation of the locus of a point equidistant from the points $(a_1, b_1$, and (a_2, b_2) is $(a_1 - a_2)x + (b_1 - b_2)y + c = 0$, then the value of c is

A. $\frac{1}{2}(a_2^2 + b_2^2) - (a_1^2 - b_1^2)$

B. $(a_1^2 - a_2^2 + b_1^2 - b_2^2)$

C. $\frac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$

D. $\sqrt{(a_1^2 + b_1^2 - a_2^2 - b_2^2)}$

Answer: A

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25. Vertices of a ΔABC are $A(2, 2), B(-4, -4), C(5, -8)$. Then length of the median through C is

A. $\sqrt{65}$

B. $\sqrt{117}$

C. $\sqrt{85}$

D. $\sqrt{113}$

Answer: C

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26. If O be the origin and $Q_1(x_1, y_1)$ and $Q_2(x_2, y_2)$ be two points then $OQ_1 . OQ_2 \cos(\angle Q_1OQ_2)$ is equal to

A. $x_1y_2 + x_2y_1$

B. $\left(x_1^2 + y_1^2\right)\left(x_2^2 + y_2^2\right)$

C. $\left(x_1 - x_2\right)^2 + \left(y_1 - y_2\right)^2$

D. $x_1x_2 + y_1y_2$

Answer: D

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27. The sides of a triangle are $3x + 4y$, $4x + 3y$ and $5x + 5y$ units, where $x > 0$, $y > 0$. The triangle is

A. right angled

B. acute angled

C. obtuse angled

D. isosceles

Answer: C

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28. The triangle OAB is right angled where points O,A,B are (0,0) $(\cos\theta, \sin\theta)$ and $(\cos\phi \sin\phi)$ respectively , then θ and ϕ are connected by the relation

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

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

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

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

Answer: A::B::C::D

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29. The line joining the points $A(b\cos\theta, b\sin\theta)$ and $B(a\cos\phi, b\cos\phi)$ is produced to the point L(x,y) so that $AL: LB=b: a$ then

$x\cos\frac{\theta+\phi}{2}+y\sin\frac{\theta+\phi}{2}=$

A. 1

B. -1

C. 0

D. $a^2 + b^2$

Answer: C

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30. The vertices of a triangle ABC has co -ordinates $(\cos\theta, \sin\theta)$ $(\sin\theta, -\cos\theta), (1, 2)$. As θ varies the locus of centroid of the triangle is the circle

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

B. $3(x^2 + y^2) - 2x - 4y + 1 = 0$

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

D. None of these

Answer: B

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31. Locus of the centroid of a triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t)$ and (1,0) where t is parameter is :

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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32. Triangle is formed by the co-ordinates (0,0),(0,21) and (21,0). Find the number of integral co ordinate strictly inside the triangle (integral co ordinates of both x and y)

A. 190

B. 105

C. 231

D. 205

Answer: A

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33. If $p, x_1, x_2, \ldots\ldots\ldots x_i$..... And $q, y_1, y_2, \ldots\ldots\ldots\ldots y_i$...are in A.P. with common differences a and b respectively then the centre of mean position of the points $A_i(x_i, y_i), i = 1, 2$......n lies on the line

A. $ax - bh = aq - bp$

B. $ax - by = bq - ap$

C. $bx - ay = ap - bq$

D. $bx - ay = bp - aq$

Answer: D

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34. The vertices of a triangle are the points $A(-36, 7), B(20, 7)$ and $C(0, -8)$. If G and I be the centroid ad incentre of the triangle, then G I is equal to

A. $\frac{1}{3}\sqrt{397}$

B. $\frac{1}{3}\sqrt{173}$

C. $\frac{1}{3}\sqrt{205}$

D. None

Answer: C

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35. The co ordinates of the base BC of an isosceles triangle are $B(1, 3)$ and $C(-2, 7)$ then the co-ordinates of its vertex A are

A. $\left(\frac{5}{6}, 6\right)$

B. $\left(-7, \frac{1}{8}\right)$

C. $(1, 6)$

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

Answer: A::B::C::D

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PROBLEM SET(1)(TRUE AND FALSE)

1. The mean point of the vertices of a quadrilateral coincides with the mid point of the line joining the mid points of the diagonals.

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PROBLEM SET(1)(FILL IN THE BLANK)

1. If the vertices of a trianle ABC be the ponts (-36,7),(20,7) and (0,-8) respectively the the coordinates of its centroid incentre are ....and ....respectively.

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2. The vertices of a triangle ABC are (0,0),(2,-1) and (9,2) respectively, then $\cos B =$ ....

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3. The set of all real numbers x such that $x^2 + 2x, 2x + 3$ and $x^2 + 3x + 8$ are the sides of a triangle is ....

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PROBLEM SET(2)(MULTIPLE CHOICE QUESTIONS)

1. The point $(0, 8/3)$, $(1, 3)$ and (82,30) are the vertices of

A. obtuse angled triangle

B. acute angled triangle

C. right angled triangle

D. isosceles triangle

Answer: C

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2. The straight line $x + y = 0$, $3x + y - 4 = 0$, $x + 3y - 4 = 0$ form a triangle which is

A. isosceles

B. equilateral

C. right angled triangle

D. None of these

Answer: A

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

A. isosceles

B. right angled

C. equilateral

D. None

Answer: A

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4. The points $A(1, -1), B(\sqrt{3}, \sqrt{3})$ and $C(0, \sqrt{3}-1)$ are the vertices of a triangle which is

A. equilateral

B. isosceles

C. right angled

D. obtuse angled

Answer: B::C

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5. The vertices of a triangle are

$A(2, 4), B(2, 6), C(2+\sqrt{3}, 5)$

The triangle is

A. isosceles

B. rt. Angled isosceles

C. equilateral

D. none

Answer: C

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6. Determine whether the triangle formed by the lines $x - 7y + 12 = 0, 7x + y - 16 = 0$ and $3x + 4y - 4 = 0$ is

A. equilateral

B. right angled

C. isosceles

D. none

Answer: B::C

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7. The number of triangle formed by the curves $x^3 - x^2 - x - 2 = 0$ and $4x^2 + x^2y^2 + 2y^2 - 2xy^2 - 12x + 8 = 0$ is equal to

A. 0

B. 1

C. 2

D. 3

Answer: A

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8. The area of a triangle is 5 units. Two of its certices are $(2, 1)$ and $(3, -2)$. The third vertex lies on y = x + 3. Find the co-ordinates of the third vertex of the triangle.

A. $\left(\frac{7}{2}, \frac{13}{2}\right)$

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

C. $\left(-\frac{3}{2}, \frac{3}{2}\right)$

D. $(0, 0)$

Answer: A::C::D

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9. The vertices of a triangle ABC are $(\lambda, 2-2\lambda), (-\lambda+1, 2\lambda)$ an $(\_4-\lambda, 6-2\lambda)$. If its area be 70 units then number of integral values of λ is

A. 1

B. 2

C. 4

D. 0

Answer: A

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10. If the co-ordinates of points A,B,C,D are (6,3),(-3,5),(4,-2) and (x,3x) respectively and if $\frac{\Delta DBC}{\Delta ABC}=\frac{1}{2}$, then x=

A. $\frac{8}{11}$

B. $\frac{11}{8}$

C. $\frac{7}{9}$

D. 0

Answer: B

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11. Let A(1,k),B(1,1) and C(2,1) be the vertices of a right angled triangle with AC as its hypotenuse. If the area of the triangle is 1, then the set of values which k can take is given by:

A. (1,3)

B. (0,2)

C. (-1,3)

D. (-3,-2)

Answer: C

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12. If the points (2k,k),(k,2k) and (k,k) with $k > 0$ enclose a triangle of area 18 square units then the centroid of triangle is equal to

A. (8,8)

B. (4,4)

C. (-4,-4)

D. $\left(4\sqrt{2}, 4\sqrt{2}\right)$

Answer: D

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13. The area of the triangle with vertices at (-4,1),(1,2),(4,-3) is

A. 14

B. 16

C. 15

D. None of these

Answer: A

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14. The area of the triangle with vertices at the points $(a, b+c), (b, c+a), (c, a+b)$ is

A. 0

B. $a+b+c$

C. $ab+bc+ca$

D. None of these

Answer: A

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15. If r is the geometric mean of p and q, then the line $px + qy + r = 0$

A. has a fixed direction

B. passes thorugh a fixed point

C. forms with the axs a triangle of constant area

D. sum of its intercepts on the axes is constant

Answer: C

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16. A line passsing through the point (2,2) cuts the axes of co-ordinates at A and B such that area $OAB = k(k > 0)$. The intercepts on the axes are the roots of the equation

A. $x^2 - kx + 2k = 0$

B. $x^2 - 2kx + k = 0$

C. $x^2 = kx + 2k = 0$

D. $x^2 + kx + k = 0$

Answer: A

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17. The centroid of a triangle is (1,4) and the co-ordinate of its two vertices are (4,-3) and (-9,7). Then the area of the triangle is

A. $183/2$

B. $-183/2$

C. 183

D. None of these

Answer: A

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18. Let $A(2, -3) and B(-2, 1)$ be vertices of a triangle ABC. If the centroid of this triangle moves on the line $2x + 3y = 1$, then the locus of the vertex C is the line $2x + 3y = 9$ $2x - 3y = 7$ $3x + 2y = 5$ $3x - 2y = 3$

A. $2x + 3y = 9$

B. $2x - 3y = 7$

C. $3x + 2y = 5$

D. $3x - 2y = 3$

Answer: A

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19. Line L is perpendicular to the lines $5x - y = 1$. The area of triangle formed by the line and coordinate axes is 5. Its equation is

A. $x + 5y = \sqrt{2}$

B. $x + 5y = 5\sqrt{2}$

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

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

Answer: B::C

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20. Area of the triangle with vertces (a,b),(x_1, y_1) and (x_2, y_2) where a, x_1, x_2 are in G.P with common ratio r and b, y_1, y_2 are in G.P with common ratio s is

A. $ab(r-1)(s-1)(s-r)$

B. $\frac{1}{2}ab(r+1)(s+1)(s-r)$

C. $\frac{1}{2}ab(r-1)(s-1)(s-r)$

D. $ab(r+1)(s+1)(r-s)$

Answer: C

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21. The points $(x_r, y_r), r = 1, 2, 3$ are the vertices fo an quilateral triangle of side a then the square of the determinant $D = \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$ equals

A. $4a^4$

B. $3a^4$

C. $\frac{3}{4}a^4$

D. None of these

Answer: C

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22. $(x_1 - x_2)^2 + (y_1 - y_2)^2 = a^2$

$(x_2 - x_3)^2 + (y_2 - y_3)^2 = b^2$ and

$(x_3 - x_1)^2 + (y_3 - y_1)^2 = c^2$ then

$\frac{1}{4}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$ is equal to

A. $s(s-a)^2$

B. $(s-b)(s-c)^2$

C. $s(s-a)(s-b)(s-c)$ wher $2s = a+b+c$

D. none

Answer: C

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23. If P be a point equidistant from points A (3,4) and B (5,-2) and area of ΔPAB is 10 square units, then find the co-ordinates of point P.

A. (7,4) or (13,2)

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

C. (2,7) or (4,13)

D. None of these

Answer: B

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24. P(3, 1), Q(6, 5) and R(x, y) are three points such that the angle PRQ is a right angle and the area of ΔPRQ is 7. The number of such points R that are possible is

A. 0

B. 1

C. 2

D. 3

Answer: C

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25. If P and Q are two points on the line 3x + 4y = - 15, such that OP = OQ = 9 units, the area of the triangle POQ will be

A. $9\sqrt{2}$

B. $18\sqrt{2}$

C. $12\sqrt{2}$

D. None

Answer: B

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26. P(2,1) , Q (4,-1) , R (3,2) are the vertices of a triangle and if through P and R lines parallel to opposite sides are drawn to intersect in S , then the area of PQRS , is

A. 12

B. 8

C. 6

D. 4

Answer: D

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27. If the extremities of the base of an isosceles triangle are the points (2a,0) and (0,a) and the equation of one of its side is x=2a, then area of the triangle in sq. units is

A. $5a^2$

B. $\frac{5}{2}a^2$

C. $\frac{25}{2}a^2$

D. None

Answer: B

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28. The line $x + y = 4$ divides the line joining the points (-1,1) and (5,7) in the ratio

A. $2:3$

B. $1:2$

C. $1:1$

D. $4:3$

Answer: B

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29. The line segment joining the points (-3,-4), and (1,-2) is divided by y-axis in the ratio a. 1:3 b. 2:3 c. 3:1 d. 3:2

A. $1:3$

B. $2:3$

C. $3:1$

D. $3:2$

Answer: C

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30. The line segment joining the points (1,2) and (-2,1) is divided by the line $3x+4y=7$ in the ratio a. 3:4 b. 4:3 c. 9:4 d. 4:9

A. $3:4$

B. $4:3$

C. $9:4$

D. $4:9$

Answer: D

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31. If A and B are the points (-3,4) and (2,1). Then the co -ordinates of pont C on AB produced such that AC=2BC are

A. (2,4)

B. (3,7)

C. (7,-2)

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

Answer: C

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32. P and Q are points on the line joining A(-2,5) and B(3,1) such that AP=PQ=QB. Then the mid pont of PQ is

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

B. $\left(-\frac{1}{2}, 4\right)$

C. $(2, 3)$

D. $(1, 4)$

Answer: A

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33. A the equation of the lines joining the origin to the points of trisection of the portion of the line $3x + y = 12$ intercepted between the axes are

A. $y = \frac{1}{2}x$

$y = 2x$

B. $y = x$

$y = -x$

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

$y = 6x$

D. None

Answer: C

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34. The perpendicular bisector of the line segment joining P (1, 4) and Q (k, 3) has yintercept -4 . Then a possible value of k is (1) 1 (2) 2 (3) -2 (4) -4

A. 1

B. 2

C. -2

D. -4

Answer: D

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35. If a straight line passes through (x_1, y_1) and its segment between the axes is bisected at this point then its equation is given by

A. $\frac{x}{x_1} + \frac{y}{y_1} = 2$

B. $2(xy_1 + yx_1) = x_1y_1$

C. $xy_1 + yx_1 = x_1y_1$

D. none

Answer: A

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36. The equations of the straight line passing through the point (4,3) and making intercepts on the co ordinate axes whose sum is -1 is:

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

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

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

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

Answer: D

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37. A straight line through the point P(3,4) is such that its intercept between the axes is bisected at P. its equation is :

A. $3x-4y+7=0$

B. $4x+3y=24$

C. $3x+4y=25$

D. $x+y=7$

Answer: B

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38. The equation of the straight line passing through the origin and the middle point of the intercept of the line $ax + by + c = 0$ between the axes is

A. $ax + by = 0$

B. $ax - by = 0$

C. $bx + ay = 0$

D. $bx - ay = 0$

Answer: B

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39. Given points $A(4, 5), B(-1, -4), C(1, 3), D(5, -3)$,then the ratio of the segments into which AB is divided by CD is

A. $13:20$

B. $11:19$

C. $21:29$

D. None of these

Answer: A

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40. A,B,C are three collinear points such that AB=2.5 and the co ordinates of A and C are respectively (3,4) and (11,10) then the co ordinates of the point B are

A. $\left(5, \frac{11}{2}\right)$

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

C. $\left(1, \frac{11}{2}\right)$

D. $\left(1, \frac{5}{2}\right)$

Answer: A

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41. Determine the ratio in which the line $y - x + 2 = 0$ divides the line joining the points $(3, -1)$ and $(8, 9)$?

A. $1:2$

B. $2:3$

C. $3:4$

D. $1:1$

Answer: B

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42. Consider three points $P = (-\sin(\beta - \alpha), -\cos\beta)$,

$Q = (\cos(\beta - \alpha), \sin\beta)$

and$R = (\cos(\beta - \alpha + \theta), \sin(\beta - \theta))$

where $0 < \alpha, \beta, \theta < \frac{\pi}{4}$. Then

A. P lies on the line segment RQ

B. Q lies on the line segment PR

C. R lies on the line segment QP

D. P,Q,R are non collinear

Answer: D

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43. If the lines $3y + 4x = 1$, $y = x + 5$ and $5y + bx = 3$ are concurrent then the value of b is

A. 1

B. 3

C. 6

D. 0

Answer: C

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44. Three lines $px+qy+r=0$, $qx+ry+p=0$ and $rx+py+q=0$ are concurrent , if

A. $\Sigma a^3=3abc$

B. $\sigma a=0$

C. $\Sigma a^2=\Sigma ab$

D. None

Answer: A::B::C::D

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45. a,b,c are the sides of a triangle ABC. If the lines $ax+by+c=0, bx+cy+a=0$ and $cx+ay+b=0$ be concurrent then ΔABC is

A. right angled

B. isosceles

C. equilateral

D. none

Answer: C

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46. The lines $x+ay+a^3=0, x+by+b^3=0$ and $x+cy+c^3=0$ where a,b,c are all distinct are concurrent.

A. for all values of a,b,c

B. if $a+b+c=0$

C. if $a^3 + b^3 + c^3 - 3abc = 0$

D. for no values of a,b,c

Answer: B::C

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47. Given the four lines with the equations

$x + 2y - 3 = 0, 3x + 4y - 7 = 0,$

$2x + 3y - 4 = 0, 4x + 5y - 6 = 0,$ then

A. they are all concurrent

B. only three lines are concurrent

C. they are the sides of a quadrilateral

D. None of these

Answer: B

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48. The three straight lines $2x + 11y - 5 = 0, 24x + 7y = 20$ and $4x - 3y - 2 = 0$ are such that

A. they form a triangle

B. they are all concurrent

C. one of them is a bisector of the other two

D. none

Answer: B::C

Watch Video Solution

49. The three lines $l_1 = 4x - 3y + 2 = 0, l_2 = 3x + 4y - 4 = 0$ and $l_3 = x - 7y + 6 = 0$

A. form a rt. angled isosceles triangle

B. form a rt. Angled triangle

C. are concurrent

D. None

Answer: C

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50. The point(-4,5) is the vertex of a square and one of its diagonals is $7x - y + 8 = 0$. The equation of the other diagonal is

A. $7x - y = 23$

B. $x + 7y = 31$

C. $x - 7y = 31$

D. None

Answer: B

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51. The lines $ax + 2y + 1 = 0, bx + 3y + 1 = 0$ and $cx + 4y + 1 = 0$ are concurrent of a,b,c are in

A. A.P

B. G.P

C. H.P

D. None

Answer: A

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52. If the straight lines $x + 2y - 9 = 0, 3x + 5y - 5 = 0$ and $ax + by - 1 = 0$ are concurrent, then the straight line $35x - 22y - 1 = 0$ passes through

A. (a,-b)

B. (a,b)

C. (-a,b)

D. None

Answer: D

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53. If the lines $ax + y + 1 = 0$, $x + by + 1 = 0$ and $x + y + c = 0$ (a,b,c are distinct and $ab, c, \neq 1$) are concurrent then the value of $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

A. 0

B. 1

C. 2

D. None

Answer: B

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54. The points $(-a, -b), (0, 0), (a, b)$ and (a^2, ab) are

A. collinear

B. vertices of a rectangle

C. vertices of a parallelogram

D. none

Answer: A

Watch Video Solution

55. For what value of k are the points $(k, 2-2k)(-k+1, 2k)and(-4-k, 6, 6-2k)$ are collinear?

A. 2,3

B. 1,0

C. $\frac{1}{2}, -1$

D. 1,2

Answer: C

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56. The points (x,2x),(2y,y) and (3,3) are collinear

A. for all values of (x,y)

B. 2 is A.M. of x,y

C. 2 is G.M. of x,y

D. 2 is H.M. of x,y

Answer: D

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57. If t_1, t_2 and t_3 are distinct, the points $(t_1 2at_1 + at_1^3), (t_2, 2\text{at}_2 + at_2^3)$ and $(t_3, 2at_3 + at_3^3)$

A. $t_1 t_2 t_3 = -1$

B. $t_1 + t_2 + t_3 = t_1 t_2 t_3$

C. $t_1 + t_2 + t_3 = 0$

D. $t_1 + t_2 + t_3 = -1$

Answer: C

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58. The equations $(b-c)x + (c-a)y + (a-b) = 0$ and $(b^3 - c^3)x + (c^3 - a^3)y + a^3 - b^3 = 0$ will represent the same line if

A. b=c

B. c=a

C. a=b

D. $a+b+c=0$

Answer: A::D

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59. A,B,C are the points (a,p),(b,q) and (c,r) respectively such that a,b,c are in A.P. and p,q,r in G.P. If the points are collinear then

A. $p=q=r$

B. $p^2=q$

C. $q^2=r$

D. $r^2=p$

Answer: A

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60. If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in GP, 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 an ellipse

C. lie on a circle

D. are vertices of a triangle

Answer: A

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61. The points $A(a, b+c), B(b, c+a), C(c, a+b)$ are

A. collinear

B. non collinear

C. one is mid point of other two

D. none

Answer: A

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62. If a,b,c are all unequal and different from 1 and the points $\left(\frac{t^3}{t-1}, \frac{t^2-3}{t-1}\right), t=a, b, c$ are collinear then $ab+bc+ca=$

A. abc

B. $-abc$

C. $abc+3\Sigma a$

D. None

Answer: C

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63. If the points (a,b),(c,d) and (a-c,b-d) are collinear, then

A. $ab = cd$

B. $ac = bd$

C. $ad = bc$

D. None

Answer: C

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64. If $25p^2 + 9q^2 - r^2 - 30pq = 0$, then a point on the line $px + qy + r = 0$ is

A. $(-5, 3)$

B. $(1, 2)$

C. $(0, 0)$

D. $(5, 3)$

Answer: A

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65. The equation $(1+2k)x+(1-k)y+k=0, k$ being parameter represents a family of lines. The line which belongs to this family and is at a maximum distance from the point (1,4) is

A. $33x+12y+7=0$

B. $12x+33y-7=0$

C. $4x-y+7=0$

D. $12x-33y+7=0$

Answer: B

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66. The family of straight lines

$x(a+b)+y(a-b)=2a$ where a and b are parameters, are

A. concurrent at (1,-1)

B. concurrent at (1,1)

C. not concurrent

D. None of these

Answer: B

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67. The set of lines $ax + by + c = 0$ where $3a + 2b + 4c = 0$ are concurrent at the point

A. (3,2)

B. (2,4)

C. $(3/4, 1/2)$

D. None

Answer: C

Watch Video Solution

68. If a,b,c are in A.P then the straight lines $ax + by + c = 0$ will always pass through the point

A. (1,1)

B. (2,2)

C. (-2,1)

D. (1,-2)

Answer: D

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69. The equation of the line which passes through the point (-3,8) and cuts of +ve intercepts on the axes whose sum is 7 is

A. $3x - 4y = 12$

B. $4x + 3y = 12$

C. $3x + 4y = 12$

D. $4x - 3y = 12$

Answer: B

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70. The eq. of the straight line which passes through the point (1,-2) and cuts of equal intercepts from the axes will be

A. $x + y = 1$

B. $x - y = 1$

C. $x + y + 1 = 0$

D. $x - y - 3 = 0$

Answer: C::D

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71. The equations of the line the reciprocal of whose intercepts on the axes are a and b is given by

A. $x/a + y/b = 1$

B. $ax + by = 1$

C. $ax + by = ab$

D. $ax - by = 1$

Answer: B

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72. A straight line meets the axes at A and B such that the centroid of ΔOAB is (a,a). The equation of the line AB is

A. $x + y = a$

B. $x - y = 3a$

C. $x + y = 2a$

D. $x + y = 3a$

Answer: D

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73. IF the co ordinates of the mid points D,E,F of the sides BC,CA,AB of a triangle ABC are (-1,2),(3,5) and (2,3) respectively, the equation of BC is

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

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

C. $2x - y = 0$

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

Answer: A

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74. If each of the points $A(x_1, 4), B(-2, y_1)$ lies on the line joining the points C(2,-1),D(5,-3) then the point $P(x_1, y_1)$ lies on the line

A. $6(x + y) - 25 = 0$

B. $2x + 6y + 1 = 0$

C. $2x3y + 16 = 0$

D. $6(x + y) - 23 = 0$

Answer: B::C

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75. The straight lines $ax + 5y = 7$ and $4x + by = 5$ intersected in the point (2,-1), the first meets the x-axis in P and Q the second meets the y-axis in Q, then thelenght of PQ is

A. $10\sqrt{7}/6$

B. $13/6$

C. $\sqrt{149}/6$

D. $\sqrt{99}/6$

Answer: C

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76. Consider the equation $y-k=m(x-h)$. In this equation, if m and h are fixed and different lines are drawn for different value of k, then

A. the lines will pass through a single point

B. there will be just two lines

C. there will be a set of parallel lines

D. None of these

Answer: C

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77. If a pair of opposite vertices of parallelogram are (1,3) and (-2,4) and the sides are parallel to $5x - y = 0$ and $7x + y = 0$, then the equation of a side through (1,3) is

A. $5x - y = 2$

B. $7x + y = 10$

C. $5x - y + 14 = 0$

D. $7x + y + 10 = 0$

Answer: A::B::C::D

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78. If $3x + 4y + 3 = 0, 3x + 4y - 7 = 0$ and $4x - 3y - 2 = 0$ be the three sides of a square, then the equation of the fourth side is

A. $4x - 3y - 12 = 0$

B. $4x - 3y + 8 = 0$

C. $4x - 3y - 10 = 0$

D. $4x - 3y + 6 = 0$

Answer: A::B::C::D

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79. The equations to a pair of opposite sides of a parallelogram are $x^2 - 5x + 6 = 0$ and $y^2 - 6y + 5 = 0$. The equations of its diagonals are

A. $x + 4y = 13$ and $y = 4x - 7$

B. $4x + y = 13$ and $4y = x - 7$

C. $4x + y = 13$ and $y = 4x - 7$

D. $y - 4x = 13$ and $y + 4x = 7$

Answer: C

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80. The point P(a,b) and Q(b,a) lie on the lines $3x+2y-13=0$ and $4x-y-5=0$. The equation of line PQ is

A. $x-y=5$

B. $x+y=5$

C. $x-y=-5$

D. $x+y=-5$

Answer: B

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81. How are the points (3,4) and (2,-6) situated w.r.t the line $3x-4y-8=0$?

A. same side

B. opposite side

C. one on the line

D. none

Answer: B

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82. The sides AB,BC,CD and DA of a quadrilateral are $x + 2y = 3, x = 1, x - 3y = 4, 5x + y + 12 = 0$ respectively. The angles between diagonals AC and BD is

A. 45°

B. 60°

C. 90°

D. 30°

Answer: C

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83. The equation of the line through the point (-5,4) such that its segment intercepted by the lines $x+2y+1=0$ and $x+2y-1=0$ is of length $\frac{2}{\sqrt{5}}$ is

A. $2x-y=4$

B. $2x-y=-14$

C. $2x-y=0$

D. none

Answer: B

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84. Let PS be the median of the triangle with vertices P(2,2), Q(6,-1) an R(7,3). The equation of the line passing through (1,-1) and parallel to PS is

A. $2x-9y-7=0$

B. $2x - 9y - 11 = 0$

C. $2x + 9y - 11 = 0$

D. $2x + 9y + 7 = 0$

Answer: D

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85. If $A(9, -9), B(1, 3)$ are the ends of a right angled isosceles triangle then the third vertex is

A. (8,-2)

B. (-8,2)

C. (8,-8)

D. None of these

Answer: A

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86. A triangle ABC right angled at A has points A and B as (2, 3) and (0, -1) respectively. If BC = 5 units, then the point C is

A. (4,2)

B. (-4,2)

C. (0,-4)

D. (3,-3)

Answer: A

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87. The medians AD and BE of the triangle with vertices A(0,b),B(0,0) and C(a,0) are mutually perpendicular if

A. $b = \sqrt{2}a$

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

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

D. $a = -\sqrt{2}b$

Answer: B::D

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88. The line $4x + y = \lambda$ cuts the axes of co ordinates at A and B. If C is the foot of perendicular drawn from origin O, then AC:CB=

A. $1:16$

B. $16:1$

C. $2:1$

D. $1:2$

Answer: A

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89. The equations of perpendicular bisectors of the sides AB and AC of a triangle ABC are $x - y + 5 = 0$ and $x + 2y = 0$ respectively

If the point A is (1,-2) the equation of the line BC is

A. $23x + 4y - 40 = 0$

B. $23x + 14y + 40 = 0$

C. $14x + 23y - 40 = 0$

D. $14x + 23y + 40 = 0$

Answer: C

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90. The side AB of an isosceles triangle is along the axis of x with vertices $A(-1, 0)$ and $AB = AC$. The equation of the side BC when $\angle A = 120^\circ$ and $BC = 4\sqrt{3}$ is:

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

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

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

D. None

Answer: C

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91. A straight line through the point (2,2) intersects the line $\sqrt{3}x + y = 0$ and $\sqrt{3}x - y = 0$ at the points A and B respectively. If O be the origin and ΔOAB be equilateral then the equation of the line AB is

A. $x + y - 4 = 0$

B. $y - 2 = 0$

C. $x - 2 = 0$

D. None

Answer: B

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92. The line $ax + by + c = 0$ intersects the line $x \cos \alpha + y \sin \alpha = c$ at the point P and angle between them is $\pi / 4$. If theline $x \sin \alpha - y \cos \alpha$ also passes through the point P, then

A. $a^2 + b^2 = c^2$

B. $a^2 + b^2 = 2c^2$

C. $a^2 + b^2 = 2$

D. $a^2 + b^2 = 4$

Answer: C

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93. A line passes through $(2, 2)$ and is perpendicular to the line $3x + y = 3$ .Its y-intercept is

A. $1/3$

B. $2/3$

C. 1

D. $4/3$

Answer: D

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94. If the lines $x(\sin\alpha + \sin\beta) - y\sin(\alpha - \beta) = 3$ and $x(\cos\alpha + \cos\beta) + y\cos(\alpha - \beta) = 5$ are perpendicular then $\sin 2\alpha + \sin 2\beta$ is equal to:

A. $\sin(\alpha - \beta) - 2\sin(\alpha + \beta)$

B. $\sin 2(\alpha - \beta) - 2\sin(\alpha + \beta)$

C. $2\sin(\alpha - \beta) - \sin(\alpha + \beta)$

D. $\sin 2(\alpha - \beta) - \sin(\alpha + \beta)$

Answer: B

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95. The lines $p(p^2+1)x-y+q=0$ and $(p^2+1)^2x+(p^2+1)y+2q=0$ are perpendicular to a common line for

A. more than two value of p

B. no value of p

C. exactly one value of p

D. exactly two values of p

Answer: C

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96. The points $A(x, y), B(y, z)$ and C(z,x) represents the vertices of a right angled triangle, if

A. x=y

B. y=z

C. z=x

D. None of these

Answer: A::B::C

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97. If $A(1, 1), B(\sqrt{3}+1, 2)$ and $C(\sqrt{3}, \sqrt{3}+2)$ be three vertices of a square then the diagonal through B is

A. $y=(\sqrt{3}-2)x+(3-\sqrt{3})$

B. $y=0$

C. $y=x$

D. None of these

Answer: D

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98. $A(-2,4), B(-1,2), C(1,2)$ and $D(2,4)$ are the vertices of a quadrilateral. The line through vertex B which divides the quadrilateral into two equal areas has the equation

A. $x+y=1$

B. $x-y+3=0$

C. $x+1=0$

D. none

Answer: B

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99. The four sides of a quadrilateal are given by $xy(x-2)(y-3)=0$. A line is drawn parallel to $x-4y=0$ and it divides the quadrilateral into two equal areas. It equation is given by

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

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

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

D. $x-4y-1=0$

Answer: B

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100. The vertex C of a triangle ABC moves on the line $L \equiv 3x+4y+5=0$. The co-ordinates of the points A and B are $(2, 7)$ and $(5, 8)$ The locus of centroid of ΔABC is a line parallel to:

A. AB

B. BC

C. CA

D. L

Answer: D

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101. The three lines $4x-7y+10, x+y=5$ and $7x+4y=15$ form the sides of a triangle Then the point (1,2) is its

A. centroid

B. incentre

C. orthocentre

D. None of these

Answer: C

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102. The equation of the base of an equilateral triangle is $x + y = 2$ and the vertex is (2,-1). Length of its side is

A. $\sqrt{\left(\frac{1}{2}\right)}$

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

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

D. $\sqrt{2}$

Answer: C

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103. The distance between the lines $4x + 3y = 11$ and $8x + 6y = 15$ is

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

B. $\frac{7}{3}$

C. $\frac{7}{5}$

D. $\frac{7}{10}$

Answer: D

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104. The distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$ is

A. $3/2$

B. $3/10$

C. 6

D. None of these

Answer: B

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105. A variable point $\left(1 + \frac{\lambda}{\sqrt{2}}, 2 + \frac{\lambda}{\sqrt{2}}\right)$ lies in between two parallel lines $x + 2y = 1$ and $2x + 4y = 15$ then the range of λ is given by

A. $0 < \lambda < \frac{5\sqrt{2}}{6}$

B. $-\frac{4\sqrt{2}}{5} < \lambda < \frac{5\sqrt{2}}{6}$

C. $-\frac{4\sqrt{2}}{5} < \lambda < 0$

D. None of these

Answer: B

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106. The sum of the abscissas of all the point on the line $x + y = 4$ that lie at a unit distance from the line $4x + 3y - 10 = 0$ is

A. -4

B. -3

C. 3

D. 4

Answer: A

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107. If p_1, p_2, p_3 be the length of perpendiculars from the points $(m^2, 2m), (mm', m+m')$ and $(m'^2, 2m')$ respectively on the line $x\cos\alpha + y\sin\alpha + \dfrac{\sin^2\alpha}{\cos\alpha} = 0$ then p_1, p_2, p_3 are in:

A. A.P

B. G.P

C. H.P

D. None

Answer: B

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108. Points on the line $x + y = 4$ that lie at a unit distance from the line $4x + 3y - 10 = 0$ are

A. (3,1) and (-7,11)

B. (-3,7) and (2,2)

C. (-3,7) and (-7,11)

D. None of these

Answer: A

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109. If 2p is the perpendicular distance from the origin to the line $\frac{x}{a}+\frac{y}{b}=1$ then $a^2, 8p^2, b^2$ are in

A. A.P

B. G.P

C. H.P

D. None

Answer: C

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110. If a,b,c are in H.P then the straight line $\frac{x}{a}+\frac{y}{b}+\frac{1}{c}=0$ always passes through the fixed point whose coordinates are

A. (-1,-2)

B. (-1,2)

C. (1,-2)

D. $(1, -1/2)$

Answer: C

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111. Let the algebric sum of the perpendicular distance from the points (2,0),(0,2),(1,1) to a variable straight line be zero then the line passes through a fixed point whose co ordinates are

A. (1,1)

B. (2,2)

C. (0,0)

D. None of these

Answer: A

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112. If a,b,c are related by $4a^2 + 9b^2 - 9c^2 + 12ab = 0$ then the greatest distance between any two lines of the family of lines $ax + by + c = 0$ is

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

B. $\frac{2}{3}\sqrt{13}$

C. $3\sqrt{3}$

D. 0

Answer: B

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113. If p and p' the lengths of perpendicular from origin to the lines $x \sec \theta - y \cos ec\theta = a, x \cos \theta - y \sin \theta = a \cos 2\theta,$ then $4p^2 + p^{'2} =$

A. $4a^2$

B. $2a^2$

C. a^2

D. none

Answer: C

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114. If the sides of a square lie along the lines $5x - 12y - 65 = 0$ and $5x - 12y + 26 = 0$ then its area is

A. 3^2

B. 4^2

C. 7^2

D. 9^2

Answer: C

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115. The equation of two sides of a square whose area is 25 sq. units are $3x - 4y = 0$ an d $4x + 3y = 0$. Then equations of other two sides of the square are

A. $3x - 4y \pm 25 = 0, 4x + 3y \pm 25 = 0$

B. $3x - 4y \pm 5 = 0, 4x + 3y \pm 5 = 0$

C. $3x - 4y \pm 5 = 0, 4x + 3y \pm 25 = 0$

D. none

Answer: A

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116. A and B are two fixed points. The vertex C of a ΔBC moves such that $\cot A + \cot B =$ constant. Locus of C is a straight line

A. $\perp$ to AB

B. parallel to AB

C. Inclined at an angle of $A - B$ to AB

D. none

Answer: B

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117. A variable line through (p,q) cuts the axes of co ordinates at A and B respectively. Lines are drawn through A parallel to y-axis and through B parallel to x-axis. If they meet at P, then locus of p is

A. $\frac{x}{p}+\frac{y}{q}=1$

B. $\frac{p}{x}+\frac{q}{y}=1$

C. $\frac{x}{q}+\frac{y}{p}=1$

D. $\frac{q}{x}+\frac{p}{y}=1$

Answer: B

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118. The line L given by $\frac{x}{5}+\frac{y}{b}=1$ passes through the point (13, 32). The line K is parallel to L and has the equation $\frac{x}{c}+\frac{y}{3}=1$ Then the distance between L and K is (1) $\sqrt{17}$ (2) $\frac{17}{\sqrt{15}}$ (3) $\frac{23}{\sqrt{17}}$ (4) $\frac{23}{\sqrt{15}}$

A. $\sqrt{17}$

B. $\frac{17}{\sqrt{15}}$

C. $\frac{23}{\sqrt{17}}$

D. $\frac{23}{\sqrt{15}}$

Answer: C

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119. A variable line cuts the axes of co ordinates in points A and B such that $OA + OB = c$. The locus of foot of perpendicular from origin to the line is

A. $x^2 + y^2 = cxy$

B. $x^2 + y^2 = 2cxy$

C. $(x + y)(x^2 + y^2) = cxy$

D. None of these

Answer: C

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120. Through the point (5,12) a straight line is drawn to meet the axes is points A and B. If the rectangle OACB is completed, then locus of the vertex C is

A. $\frac{10}{x} - \frac{5}{y} = 1$

B. $\frac{12}{x} + \frac{5}{y} = 1$

C. $\frac{5}{x} + \frac{12}{y} = 1$

D. $\frac{5}{x} - \frac{12}{7} = 1$

Answer: C

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121. The line L has intercepts a and b on the coordinate axes. When keeping the origin fixed, the coordinate axes are rotated through a fixed angle,then the same line has intercepts p and q on the rotated axes. Then

A. $a^2 + b^2 = p^2 = q^2$

B. $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2} + \frac{1}{q^2}$

C. $a^2 + p^2 = b^2 = q^2$

D. $\frac{1}{a^2} + \frac{1}{p^2} = \frac{1}{b^2} + \frac{1}{q^2}$

Answer: B

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122. If the expression $x^2 + 4xy + y^2$ transforms to $Ax^2 + By^2$ by rotation of axes through an angle $\theta\left(0 \le \theta \le \frac{\pi}{2}\right)$ then θ is equal to

A. $\theta = \pi/6$

B. $\theta = \pi/4$

C. $\theta = \pi/3$

D. \`none of these

Answer: B

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123. The point (4,1) undergoes the following three transformations successively

(i) Reflection about the line y=x

(ii) Transformation through a distance 2 units along the positive direction of x-axis

(iii) Rotation through angle $\pi/4$ about the origin in the anticlockwise direction. The final position of the point is given by the coordinates

A. $\left(\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$

B. $(-2, 7\sqrt{2})$

C. $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$

D. $(\sqrt{2}, 7\sqrt{2})$

Answer: C

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124. The point $(\alpha^2 + 2\lambda + 5, \lambda^2 + 1)$ lies on the line $x + y = 10$ for:

A. all real values of λ

B. some real values of λ

C. $\lambda = 1$

D. $\lambda = -2$

Answer: B::C::D

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125. The line PQ whose equation is $x - y = 2$ cuts the x-axis at $P, and Q$ is (4,2). The line PQ is rotated about P through 45^0 in the anticlockwise direction. The equation of the line PQ in the new position is $y = -\sqrt{2}$ (b) $y = 2$ $x = 2$ (d) $x = -2$

A. $y = -\sqrt{2}$

B. $y = 2$

C. $x = 2$

D. $x = -2$

Answer: C

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126. The vertices A and D of square $ABCD$ lie on the positive sides of x-axis and y-axis , respectively. If the vertex C is the point $(12, 17)$, then the coordinates of vertex B are

(a)$(14, 16)$ (b) (15, 3) $17, 5)$ (d) $(17, 12)$

A. (14,16)

B. (15,3)

C. (17,5)

D. (17,12)

Answer: C

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127. On the portion of the line $\frac{x}{3}+\frac{y}{4}=1$ intercepted between the axes a square is constructed away from the origin. Coordinates of the vertex of square which is farthest from origin is

A. (3,8)

B. (6,4)

C. (7,3)

D. (4,7)

Answer: D

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128. P is a point on either of the two lines $y-\sqrt{3}|x|=2$ at a distance 5 units from their point of intersection The coordinates of the foot of the perpendicular from P on the bisector of the angle between them are

A. $\left\{0, \frac{1}{2}(4+5\sqrt{3})\right\}$

B. $\left\{\left(0, \frac{1}{2}(4-5\sqrt{3})\right\}\right.$

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

D. None of these

Answer: A

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129. If the lie $y = x\sqrt{3}$ cuts the curve $x^3 + y^3 + 3xy + 5x^2 + 3y^2 + 4x + 5y + 1 = 0$ at the points A,B,C then OA.OB.OC is equal to

A. $\frac{4}{13}(3\sqrt{3}-1)$

B. $3\sqrt{3}+1$

C. $\frac{1}{\sqrt{3}\left(2+7\sqrt{3}\right)}$

D. None of these

Answer: C

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130. If the axes are turned through an angle $\tan^{-1} 2$ then the equation $4xy - 3x^2 = a^2$ becomes

A. $x^2 - 4y^2 = 2a^2$

B. $x^2 - 4y^2 = a^2$

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

D. $x^2 \_ 2xy = a^2$

Answer: A

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131. Consider the lines given by

$L_1 = x + 3y - 5 = 0$

$L_2 = 3x - ky - 1 = 0$

$L_3 = 5x + 2y - 12 = 0$

Match the statements/Expression in Column-I with the statements/Expressions in Column-II and indicate your answer by darkening the appropriate bubbles in the 4 × 4 matrix given in OMR.

Column–I	Column–II
(A) L_1, L_2, L_3 are concurrent, if	(P) $k = -9$
(B) One of L_1, L_2, L_3 is parallel to at least one of the other two, if	(Q) $k = -\frac{6}{5}$
(C) L_1, L_2, L_3 form a triangle, if	(R) $k = \frac{5}{6}$
(D) L_1, L_2, L_3 do not form a triangle, if	(S) $k = 5$

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132. Shifting of origin (0,0) to (h,k)

$f(x, y) \to f(x + h, y + k)$

Rotation of axes through an angle θ

By rotating the axes through an angle θ the equation

$xy - y^2 - 3y + 4 = 0$ is transformed to the form which does not contain the term of xy then $\sin\theta =$

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133. Shifting of origin (0,0) to (h,k)

$f(x, y) \to f(x + h, y + k)$

Rotation of axes through an angle θ

The equation $2xy = 9$ is transformed to $x^2 - y^2 = 9$ by rotating the axes through an angle $\pi/4$. Is this statement true of false?

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134. Shifting of origin (0,0) to (h,k)

$f(x, y) \to f(x + h, y + k)$

Rotation of axes through an angle θ

By rotating the axes through an angle θ in anti clockwise direction the equation $f(x, y) = x^2 - 2xy + 3y^2 + 4x - 4y + 1 = 0$, transforms to the form which does not contain the term of y then $\theta = 135^\circ$

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135. Shifting of origin (0,0) to (h,k)

$f(x, y) \rightarrow f(x+h, y+k)$

Rotation of axes through an angle θ

Axes area rotated through a +ive obtuse agle θ so that the transformed equation of the curve $3x^2 - 6xy + 3y^2 + 7x - 3 = 0$ isfree from the term of xy then the coefficint of x^2 inthe transformed equation is ....

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136. BE and CF are two medians of ΔABC whose vertex A is (1,3). The equation of BE is $x - 2y + 1 = 0$ and CF is y-1=0.

Determine the following:

The co-ordinates of points B,C and centroid G. The equations of lines AB and AC.

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PROBLEM SET(2)(TRUE AND FALSE)

1. If the vertices of a triangle have integral coordionates, then the triangle the triangle cannot be equilateral.

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2. $y = m_1x + c_1, y = m_2x + c_2$ and $x = 0$ are the sides of a triangle whose area is $\frac{1}{2}\frac{(c_1 - c_2)^2}{m_1 - m_2}$.

A. True

B. False

C.

D.

Answer: T

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3. If the lines $p_r x + q_r y + 1 = 0, r = 1, 2, 3$ be concurrent then the points $(p_r, q_r), r = 1, 2, 3$ are collinear.

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4. If $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = \begin{vmatrix} a_1 & b_1 & 1 \\ a_2 & b_2 & 1 \\ a_3 & b_3 & 1 \end{vmatrix}$, then the 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) must be congruent.

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5. The lines $(p-q)x + (q-r)y + (r-p) = 0$

$(q-r)x + (r-p)y + (p-q) = 0$

$(r-p)x+(p-q)y+(q-r)=0$

are concurrent

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6. If a,b are distinct and different from zero, then (a^2, a), (b^2, b) and (0,0) are collinear.

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7. If x,y,z are different from 1 (one) and are the roots of the equation $t^3+t^2+t-4=0$ then the points

$$\left(\frac{x^3}{x-1}, \frac{x^2-3}{x-1}\right), \left(\frac{y^3}{y-1}, \frac{y^2-3}{y-1}\right), \left(\frac{z^3}{z-1}, \frac{z^2-3}{z-1}\right)$$ are collinear

is this statement true?

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PROBLEM SET(2)(fill in the blanks)

1. If (-4,5) is a vertex of a square and one of its diagonal is 7x-y+8-0.Find the equation of other diagonal

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2. The co-ordinates of those points on the line $3x + 2y = 5$ which are equisdistant from the lines $4x + 3y - 7 = 0$ and $2y - 5 = 0$ are ...... and..............

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PROBLEM SET(3)(MULTIPLE CHOICE QUESTIONS)

1. The number of integral values of m for which the x-coordinate of the point of intersection of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer is 2 (b) 0 (c) 4 (d) 1

A. 2

B. 0

C. 4

D. 1

Answer: A

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2. The equation of the lines through the point of intersectiono the lines $x - 3y + 1 = 0, 2x + 5y - 9 = 0$ and whose disance from the origin is $\sqrt{5}$ are

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

$5x - 7y + 12 = 0$

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

$3x - 5y + 2 = 0$

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

D. none

Answer: C

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3. Given the family of lines

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

A. 0

B. 1

C. 2

D. 4

Answer: B

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4. The straight line passing through the point of intersection of the straight lines

$x - 3y + 1 = 0$ and $2x + 5y - 9 = 0$

an having infinite slope and at a distance 2 units from the origin has the equation

A. x=2

B. $3x + y - 1 = 0$

C. $y = 1$

D. None of these

Answer: A

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5. The equation of the diagonal through origin of the quadrilateral formed by the lines $x = 0, y = 0, x + y - 1 = 0$ and $6x + y - 3 = 0,$ is

A. $4x - 3y = 0$

B. $3x - 2y = 0$

C. $x = y$

D. $x + y = 0$

Answer: B

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6. A variable line passes through the point of intersection of the lines $x + 2y - 1 = 0$ and $2x - y - 1 = 0$ and meets the coordinate axes in A and B. The locus of the mid poind of AB is

A. $x + 3y = 0$

B. $x + 3y = 10$

C. $x + 3y = 10xy$

D. none

Answer: C

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7. The base BC of a triangle ABC is bisected at the point (a,b) and equation to the sides AB and AC are respectively $ax+by=1$ and $bx+ay=1$. Equation of the median through A is

A. $ax-by=ab$

B. $(2b-1)(ax+by)=ab$

C. $(2ab-1)(ax+by-1)=\left(a^2+b^2-1\right)(bx+ay-1)$

D. $bx-ay=1$

Answer: C

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8. The line through the pont of intersection of lines $ax + by + c = 0$ and $dx + b'y + c' = 0$ which is parallel to y-axis is

A. $x(ab' - d'b) + (cb' - c'b) = 0$

B. $x(ab' - a'b) + (cb' + c'b) = 0$

C. $y(ab' - a'b) + (ac' - d'c) = 0$

D. none

Answer: D

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9. The line parallel to the X-axis and passing through the point of intersection of the lin $ax + 2by + 3b = 0$ and $bx - 2ay - 3a = 0$ where $(a, b) \neq (0, 0)$ is

A. above the axis at a distance $3/2$ from it

B. above the x-axis at a distance $2/3$ from it

C. below the x-axis at a distance $3/2$ from it.

D. below the x-axis at a distance $2/3$ from it.

Answer: C

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10. Consider the family of line $(x + y - 1) + \lambda(2x + 3y - 5) = 0$ and $(3x + 2y - 4) + \mu(x + 2y - 6) = 0$ Equation of a straight line that belongs to both the families is:

A. $x - 2y - 8 = 0$

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

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

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

Answer: B

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11. Equation of a straight line passing through the point of intersection of $x-y+1=0$ and $3x+y-5=0$ and perpendicular to one of them is

A. $x+y+3=0$

B. $x+y-3=0$

C. $x-3y+5=0$

D. $x-3y+5=0$

Answer: B::D

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12. The equation of the line passing though the intersection of $x-\sqrt{3}y+\sqrt{3}-1=0$ and $x+y-2=0$ and making an angle of 15° with the first line is

A. $x-y=0$

B. $x - y + 1 = 0$

C.

D.

Answer: A

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13. The point of intersection of the lines $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$ lies on

A. $x - y = 0$

B. $(x + y)(a + b) = 2ab$

C. $(px + qy)(a + b) = (p + q)abc$

D. $(px - qy)(a - b) = (p - q)ab$

Answer: A::B::C

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14. The equation of the straight line whilch is perpendicular to y=x and passes through (3,2) will a given by

A. $x - y = 5$

B. $x + y = 5$

C. $x + y = 1$

D. $x - y = 1$

Answer: B

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15. The equation of the line passing through (1,2) and perpendicular to $x + y + 1 = 0$ is

A. $y - x + 1 = 0$

B. $y - x - 1 = 0$

C. $y - x + 2 = 0$

D. $y - x - 2 = 0$

Answer: B

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16. The equation of the right bisector of the line segment joining the points (7,4) and(-1,-2) is

A. $4x + 3y - 10 = 0$

B. $3x - 4y + 7 = 0$

C. $4x + 3y - 15 = 0$

D. none

Answer: C

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17. Foot of perpendicular drawn from (0,5) to the line $3x - 4y - 5 = 0$ is

A. (1,3)

B. (2,3)

C. (3,2)

D. (3,1)

Answer: D

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18. The equation of the line passing through $(2, 3)$ and perpendicular to the line joining $(-5, 6)$ and $(-6, 5)$ is

A. $x + y + 5 = 0$

B. $x - y + 5 = 0$

C. $x - y - 5 = 0$

D. $x - y - 5 = 0$

Answer: D

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

A. $1/3$

B. $2/3$

C. 1

D. $4/3$

Answer: D

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20. The point (1,3) and (5,1) are two opposite vertices of a rectangle. The other two vertices lie on the line $y = 2x + c$, then the other vertices and c are

A. (1,1)(2,3)

B. (4,4),(2,0)

C. (0,0),(5,4)

D. none

Answer: B

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21. The number of lines that are parallel to $2x + 6y + 7 = 0$ and have an intercept of length 10 between the co ordinate axes is

A. 1

B. 2

C. 4

D. infinite

Answer: B

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22. The ratio in which the line $3x+4y+2=0$ divides the distance between $3x+4y+5=0$ and $3x+4y-5=0$ is

A. $7:3$

B. $3:7$

C. $2:3$

D. None of these

Answer: B

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23. The equation of two sides of a square whose area is 25 square units are $3x-4y=0$ and $4x+3y=0$. The equation of the other two sides of the square are

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24. A(-1,1),B(5,3) are opposite vertices of a square in xy-plane.

The equation of the other diagonal (not passing throug A,B) of the square is given by

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

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

C. $y + 3x - 8 = 0$

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

Answer: C

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25. In a rhombus ABCD the diagonals AC and BD intersect at the point (3,4) . If the point A is (1,2) the diagonal BD has the equation

A. $x - y - 1 = 0$

B. $x + y - 1 = 0$

C. $x - y + 1 = 0$

D. $x + y - 7 = 0$

Answer: D

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26. A square of side 'a' lies above the x-axis and has one vertex at the origin. The side passing through the origin makes an angle α (0 < $\alpha' <$ pi`/4) with the positive direction of x-axis. Find the equation of diagonal not passing through the origin ?

A. $y(\cos\alpha - \sin\alpha) - x(\sin\alpha - \cos\alpha) = \alpha$

B. $y(\cos\alpha+\sin\alpha)-x(\sin\alpha-\cos\alpha)=a$

C. $y(\cos\alpha-\sin\alpha)+x(\sin\alpha+\cos\alpha)=\alpha$

D. $y(\cos\alpha+\sin\alpha)+x(\cos\alpha-\sin\alpha)=\alpha$

Answer: D

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27. The points

(i) $A(0,\ -1), B(2,1), C(0,3), D(\,-2,1)$

are the vertices of a

A. square

B. rectangle

C. parallelogram

D. none

Answer: A::B::C

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28. The four lines $ax + by + c = 0$ enclose a

A. square

B. parallelogram

C. rectangle

D. rhombus whose are is $\frac{2c^2}{ab}$

Answer: D

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29. The area bounded by the curves $y = |x| - 1 and y = -|x| + 1$ is 1 b. 2 c. $2\sqrt{2}$ d. 4

A. 1

B. 2

C. $2\sqrt{2}$

D. 4

Answer: B

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30. Area of the parallelogram formed by the lines y = mx, y = mx + 1,y = nx and y =nx+1 equals to

A. $\frac{|m+n|}{(m-n)^2}$

B. $\frac{2}{|m+n|}$

C. $\frac{1}{|m+n|}$

D. $\frac{1}{|m-n|}$

Answer: D

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31. If $A(1, 1)$, $B(\sqrt{3}+1, 2)$ and $C(\sqrt{3}, \sqrt{3}+2)$ be three vertices of a square then the diagonal through B is

A. $y = (\sqrt{3}-2)x + (3-\sqrt{3})$

B. $y = 0$

C. $y = x$

D. None of these

Answer: D

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32. The diagonals of the parallelogram whose sides are $lx + my + n = 0$,$lx + my + n', = 0$, $mx + ly + n = 0$, $mx + ly + n' = 0$ include an angle

A. $\pi/3$

B. $\pi/2$

C. $\tan^{-1}\left(\frac{l^2 - m^2}{l^2 + m^2}\right)$

D. $\tan^{-1}\left(\frac{2lm}{l^2 + m^2}\right)$

Answer: B

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

A. rectangle

B. square

C. cyclic quadrilateral

D. rhombus

Answer: D

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34. If the quadrilateral formed by the lines

$ax + by + c = 0, a'x + b'y + c = 0$

$ax + by + c' = 0, a'x + b'y + c' = 0$

have perpendicular diagonals then

A. $b^2 + c^2 = b'^2 + c'^2$

B. $c^2 + a^2 = c'^2 + a'^2$

C. $a^2 + b^2 = a'^2 + b'^2$

D. None of these

Answer: C

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35. If the area of the rhombus enclosed by lines $lx \pm my \pm n = 0$ be 2 square units, then:

A. $m^2 = n$

B. $n^2 = lm$

C. $m = \ln$

D. $n - \ln$

Answer: B

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36. A straight line thorugh P(1,2) is such that its intercept between the axes is bisected at P. Its equations is

A. $x + 2y = 5$

B. $x - y + 1 = 0$

C. $x + y - 3 = 0$

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

Answer: D

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37. The acute angle between the lines $ax + by + c = 0$ and $(a + b)x = (a - b)y, a \neq b$ is

A. 15°

B. 30°

C. 45°

D. 60°

Answer: C

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38. The line which is parallel to x-axis and crosses the curve $y = \sqrt{x}$ at an angle of $45a$ is

A. $x = 1/4$

B. $y = 1/4$

C. $y = 1/2$

D. $y = 1$

Answer: C

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39. The reflection of the point (4,-13) in the line $5x + y + 6 = 0$ is

A. $(-1, -14)$

B. $(3, 4)$

C. $(1, 2)$

D. $(-4, 13)$

Answer: A

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40. The image of the point A(1,2) by the line mirror y=x is the point B and the image of B by the line mirror y=0 is the point (α, β) then

A. $\alpha = 1, \beta = -2$

B. $\alpha = 0, \beta = 0$

C. $\alpha = 2, \beta = -1$

D. None of these

Answer: C

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PROBLEM SET(3)(TRUE AND FALSE)

1. Equation of the line passing through the point $(a\cos^3\theta, a\sin^3\theta)$ and perpendicular to the line $x\sec\theta + y\cos\theta = a$ is

$x\cos\theta - y\sin\theta = a\sin 2\theta$.

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2. Line joining the points (3,-4) and (-2,6) is perpendicular to the line joining the points (-3,6) and (9,-18).

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3. The lines $3x + 4y + 7 = 0$ and $4x + 3y + 5 = 0$ are perpendicular.

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4. The lines $ax + by + c = 0$ an $Ax + By + C = 0$ are perpendicular of $aA + bB = 0.$

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5. If $u = a_1x + b_1y + c_1 = 0, v = a_2x + b_2y + c_2 = 0,$ and $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2},$ then the curve $u + kv = 0$ is the same straight line u

different straight line not a straight line none of these

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6. The equation of the straight line joining the point (a,b) to the point of intersection of the lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$ is $a^2y-b^2x=ab(a-b)$

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7. The equation of the line joining the point $(3, 5)$ to the point of intersection of the lines $4x+y-1=0$ and $7x-3y-35=0$ is equidistant from the points $(0, 0)$ and $(8, 34)$.

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8. Area of the parallelogram formed by the lines

$a_1x+b_1y+c_1=0, a_1x+b_1y+d_1=0$

and $a_2x + b_2y + c_2 = 0, a_2x + b_2y + d_2 = 0$ is

$$\frac{[d_1 - c_1)(d_2 - c_2)}{\left[\left(a_1^2 + b_1^2\right)\left(a_2^2 + b_2^2\right)\right]^{1/2}}$$

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PROBLEM SET(3)(FILL IN THE BLANKS)

1. The equation to the straight line passing through the intersection of $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$ and (1,2) is ....

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2. The equation of the straight line passing through the intersection of $x + 2y - 19 = 0, x - 2y - 3 = 0$ and at a distance of 5 from (-2,4) are...........

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3. Area of the parallelogram whose sides are $x\cos\alpha + y\sin\alpha = p, x\cos\alpha + y\sin\alpha = q, x\cos\beta + y\sin\beta = r, x\cos\beta +$

is ....

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4. The area enclosed within the curve $|x| + |y| = 1$ is :

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5. Let the algebraic sum of the perpendicular distance from the points (2, 0), (0,2), and (1, 1) to a variable straight line be zero. Then the line passes through a fixed point whose coordinates are___

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6. If the straight lines $ax + by + p = 0$ and $x\cos\alpha + y\sin\alpha - p = 0$ enclose an angle $\pi/4$ between them and meet the straight line $x\sin\alpha - y\cos\alpha = 0$ in the same point, then the value of $a^2 + b^2$ is equal to ....

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7. If $4A^2 + 9B^2 - C^2 + 12AB = 0$, then the family of straight lines $Ax + By + C = 0$ is either concurrent at.......or at..........

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PROBLEM SET(4)(MULTIPLE CHOICE QUESTIONS)

1. The incentre of the triangle formed by $x = 0, y = 0$ and $3x + 4y = 12$ is

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

B. $(1, 1)$

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

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

Answer: B

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2. The incentre of the triangle formed by axes and the line $\frac{x}{a} + \frac{y}{b} = 1$ is

A. $\left(\frac{a}{b}, \frac{b}{2}\right)$

B. $\left(\frac{a}{3}, \frac{b}{3}\right)$

C. $\left[\frac{ab}{a+b+\sqrt{a^2+b^2}}, \frac{ab}{a+b+\sqrt{a^2+b^2}}\right]$

D. $\left[\frac{ab}{a+b+\sqrt{ab}}, \frac{ab}{a+b+\sqrt{ab}}\right]$

Answer: C

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3. The line $3x + 4y - 24 = 0$ cuts the x -axis at A and y-axis at B. Then the incentre of a triangle OAB, where O is the origin is

A. (1,2)

B. (2,2)

C. (12,2)

D. (2,12)

Answer: B

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4. The orthocentre of the triangle with vertices $\left[2, \frac{\left(\sqrt{3}-1\right)}{2}\right], \left(\frac{1}{2}, -\frac{1}{2}\right)$ and $\left(2, -\frac{1}{2}\right)$ is

A. $\left[\frac{3}{2}, \frac{\sqrt{3}-3}{6}\right]$

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

C. $\left[\frac{5}{4}, \frac{\sqrt{3}-2}{4}\right]$

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

Answer: B

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5. Orthocentre of triangle whose vertices are (0,0),(3,4),(4,0) is

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

B. $\left(3, \frac{5}{4}\right)$

C. $(5, -2)$

D. $\left(3, \frac{3}{4}\right)$

Answer: D

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6. The orthocenter of the triangle formed by (0,0),(8,0),(4,6) is

A. $(4, 8/3)$

B. $(3, 4)$

C. $(4, 3)$

D. $(-3, 4)$

Answer: A

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7. Let the vertices of a triangle (0,0),(3,0) and (0,4) its orthocentre is

A. (0,0)

B. $(1, 4/3)$

C. $(3/2, 2)$

D. None of these

Answer: A

Watch Video Solution

8. The orthocentre of the triangle formed by the lines $xy=0$ and $x+y=1$ is

A. $(1/2, 1/2)$

B. $(1/3, 1/3)$

C. $(0, 0)$

D. $(1/4, 1/4)$

Answer: C

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9. Orthocentre of the triangle formed by joining the points $\left(4, \frac{1}{4}\right), \left(3, \frac{1}{3}\right), \left(2, \frac{1}{2}\right)$ is

A. $\left(\frac{1}{24}, 24\right)$

B. $\left(-\frac{1}{24}, -24\right)$

C. $\left(-\frac{1}{24}, 24\right)$

D. $\left(\frac{1}{24}, -24\right)$

Answer: B

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10. The mid points of the sides of a triangle are (5,0),(5,12) and (0,12). The orthocentre of this triangle is

A. (0,0)

B. (10,0)

C. (0,24)

D. $\left(\frac{13}{3}, 8\right)$

Answer: A

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11. The equations to the sides of a triangle are $x - 3y = 0, 4x + 3y = 5$ and $3x + y = 0$. The line $3x - 4y = 0$ passes through

A. the incentre

B. the centoid

C. the circumcentre

D. the orthocentre of the triangle

Answer: D

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12. The algebraic sum of the perpendicular distance from $A(x_1, y_1), B(x_2, y_2)$ and $C(x_3, y_3)$ to a variable line is zero, then the line passes through

A. the orthocentre of ΔABC

B. the centroid of ΔABC

C. the circumcentre of ΔABC

D. None of these

Answer: B

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13. One side of an equilateral triangle is the line $3x+4y+8=0$ and its centroid is at O(1,1). The length of its side is

A. 2

B. $\sqrt{5}$

C. $6\sqrt{3}$

D. $\sqrt{7}$

Answer: A

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14. The circumcentre of the triangle formed by the lines $xy + 2x + 2y + 4 = 0$ and $x + y + 2 = 0$ is

A. (0,0)

B. (-2,-2)

C. (-1,-1)

D. (-1,-2)

Answer: C

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15. A point equidistant from the line $4x + 3y + 10 = 0, 5x - 12y + 26 = 0$ and $7x + 24y - 50 = 0$is

A. (1,-1)

B. (1,1)

C. (0,0)

D. (0,1)

Answer: C

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16. If the orthocentre and centroid of a triangle are (-3, 5) and (3, 3) then its circumcentre is

A. (6,2)

B. (0,8)

C. (6,-2)

D. (0,4)

Answer: C

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17. Of the three lines $x+\sqrt{3}y=0$, $x+y=1$ and $x-\sqrt{3}y=0$ two are equations of two altitudes of an equilateral triangle. The centroid of Δ is the point

A. $(0, 0)$

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

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

D. None of these

Answer: A

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18. Vertics of a triangle ABC are the points (0,0),(a,0) and $\left(\frac{a}{2}, \frac{a\sqrt{3}}{2}\right)$. Its incentre is the point

A. $\left(\frac{3a}{4}, \frac{\sqrt{3}a}{4}\right)$

B. $\left(\frac{a}{2}, \frac{a\sqrt{3}}{6}\right)$

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

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

Answer: A

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19. The vertices of a triangle OAB are (0,0),(a,0) and (0,b) respectively. The distance between its orthocentre and circumcentre is

A. $(a+b)$

B. $(a-b)$

C. $\frac{1}{2}\sqrt{a^2+b^2}$

D. $\frac{1}{2}\sqrt{a^2-b^2}$

Answer: C

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20. The vertices of a triangle are (1,2) (2,1) and $\left\{\frac{1}{2}(3+\sqrt{3}), \frac{1}{2}(3+\sqrt{3})\right\}$. The dstnace between its orthocentre and circumcentre is

A. $(3+\sqrt{3})$

B. 2

C. $\sqrt{2}$

D. 0

Answer: C

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21. p_1, p_2, p_3 are the distances of points (1,1),(2,0) and (0,2) from a variable line L such that $p_1+p_2+p_3=0$. The line L passes through a fixed point

A. (1,2)

B. (1,1)

C. (2,1)

D. none

Answer: D

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22. The incentre of triangle with vertices $(1, \sqrt{3})$, $(0, 0)$ and (2, 0) is

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

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

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

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

Answer: B

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23. One vertex of the equilateral triangle with centroid at the origin and one side as $x+y-2=0$ is

A. (-1,-1)

B. (2,2)

C. (-2,2)

D. None of these

Answer: D

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24. Two vertices of a triangle ABC are B(5,-1) and C(-2,3) .If the orthocentre of the triangle is the origin , find the thrid vertex.

A. (4,7)

B. (-4,-7)

C. (-4,7)

D. None of these

Answer: C

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25. If one of the diagonals of a square is along the line $x = 2y$ and one of its vertices is (3, 0), then its sides through this vertex are given by the equations (A) $y - 3x + 9 = 0, 3y + x - 3 = 0$ (B) $y + 3x + 9 = 0, 3y + x - 3 = 0$ (C) $y - 3x + 9 = 0, 3y - x + 3 = 0$ (D) $y - 3x + 9 = 0, 3y + x + 9 = 0$

A. $y - 3x + 9 = 0, 3y + x - 3 = 0$

B. $y + 3x + 9 = 0, 3y + x - 3 = 0$

C. $y - 3x + 9 = 0, 3y - x + 3 = 0$

D. $y - 3x + 3 = , 3y + x = 9 = 0$

Answer: B

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26. A pair of straight lines drawn through the origin form with the line $2x + 3y = 6$ an isosceles right angled triangled then the sides and the area of the triangle thus formed is

A. $x - 5y = 0$

$5x + y = 0$

$\Delta = \frac{36}{13}$

B. $3x - y = 0$

$x + 3y = 0$

$\Delta = \frac{12}{17}$

C. $5x - y = 0$

$x + 5y = 0$

$D \leq ta = \frac{13}{5}$

D. None

Answer: A

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27. The equation of two equal sides of an isosceles triangle are 7x - y + 3 = 0 and x + y - 3 = 0 and its third side is passes through the point (1, - 10). The equation of the third side is

A. $x - 3y - 7 = 0$ or $3x + y - 31 = 0$

B. $x - 3y - 31 = 0$ or $3x + y - 7 = 0$

C. $x - 3y - 31 = 0$ or $3x + y + 7 = 0$

D. None of these

Answer: A

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28. The equations of the lines through (-1,-1) and making angle 45a with the line $x + y = 0$ are given by

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

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

C. $xy + x + y = 0$

D. $xy + x + y + 1 = 0$

Answer: C

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29. A ray of light coming from the point (1,2) is reflected at a pont A on the x-axis and then passes through the point (5,3). The co ordinate of the point A is

A. $\left(\frac{13}{5}, 0\right)$

B. $\left(\frac{5}{13}, 0\right)$

C. $(-7, 0)$

D. None of these

Answer: D

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30. Let PQR be a right angled isosceles triangle, right angled at P(2,1). If the equation of the line QR is $2x+y=3$, then the equation representing the pair of lines PQ and PR is

A. $3x^2-3y^2+8xy+20x+10y+25=0$

B. $3x^2-3y^2+8xy-20x-10y+25=0$

C. $3x^2-3y^2+8xy+10x+15y+20=0$

D. $3x^2-3y^2-8xy-10x-15y-20=0$

Answer: A

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31. The equation of the bisector of the acute angle between the lines

$3x - 4y + 7 = 0$ and $12x + 5y - 2 = 0$ is

A. $21x + 77y - 101 = 0$

B. $11x + 3y + 20 = 0$

C. $21x - 7y + 3 = 0$

D. $11x - 3y + 9 = 0$

Answer: B

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32. Let $P = (-1, 0)$, $Q(0, 0)$ and $R = (3, 3\sqrt{3})$ be three points. Then the equation of the bisector of the 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: D

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33. Area of Δ formed by line $x+y=3$ and $\angle$ bisectors of pair of straight lines $x^2-y^2+2y=1$ is

A. 2

B. 4

C. 6

D. 8

Answer: C

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34. The equation of the line whilch bisects the obtuse angle between the lines $x - 2y + 4 = 0$ and $4x - 3y + 2 = 0$ is

A. $(4 - \sqrt{5})x - (3 - 2\sqrt{5})y + (2 - 4\sqrt{5}) = 0$

B. $(3 - 2\sqrt{5})x - (4 - \sqrt{5})y + (2 + 4\sqrt{5}) = 0$

C. $(4 + \sqrt{5})x - (3 + 2\sqrt{5})y + (2 + 4\sqrt{5}) = 0$

D. None of these

Answer: C

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35. The vertices of a triangle ABC are (1,1),(4,-2) and (5,5) respectively. Then equation of perpendiculart dropped from C to the internal bisector of angle A is

A. $y - 5 = 0$

B. $x - 5 = 0$

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

D. none

Answer: A

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

A. $3x - 7y - 8 = 0$

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

C. $3x - 3y - 7 = 0$

D. None of these

Answer: B

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37. The equation(s) of the bisectors(s) of that angles between the lines $x + 2y - 11 = 0, 3x - 6y - 5 = 0$ which contains the point (1,-3) is

A. $3x = 19$

B. $3y = 7$

C. $3x = 19$ and $3y = 7$

D. None of these

Answer: B

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38. The bisector of the acute angle formed between the lines $4x - 3y + 7 = 0$ and $3x - 4y + 14 = 0$ has the equation

A. $x + y - 7 = 0$

B. $x - y + 3 = 0$

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

D. $x = 2y - 12 = 0$

Answer: A

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39. The lines $L_1 : y - x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q respectively . The bisectors of the acute angle between L_1 and L_2 intersect L_3 at R .

Statement 1 : The ratio PR : RQ equals $2\sqrt{2} : \sqrt{5}$

Statement - 2 : In any triangle , bisector of an angle divides the triangle into two similar triangles .

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40. OrthocentreH: It is the point of intersection of altitude of a triangle.The points O,G,H are collinear. If $L_1 = a_1x + b_1y + c_1 + 0$ etc. then any line through the intersection of L_1 and L_2 i.e. $L_1 + \lambda L_2 = 0$ and perpendiculart to L_3 is

$$\frac{L_1}{a_1a_3+b_1b_3}=\frac{L_2}{a_2a_3+b_2b_3}$$ ....(A)

The vetices of a triangle are $A(p, p\tan\alpha), B(q, q\tan\beta), C(r, r\tan\gamma)$. If circumcentre O of triangle ABC is at the origin and $H(\bar{x}, \bar{y})$ be its orthocentre, then show that

$$\frac{\bar{x}}{\bar{y}}=\frac{\cos\alpha+\cos\beta+\cos\gamma}{\sin\alpha+\sin\beta+\sin\gamma}$$

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41. The line $lx+my+n=0$ bisects the angle between a pair of straight lines of which one is $px+qy+r=0$, then the equation of the other is ....

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42. The vertices of a triangle are $A(p, p\tan\alpha t), B(q, q\tan\beta), C(r, \text{an}\gamma)$. If the circumcentre O of triangle ABC is at the origin and $H(\bar{x}, \bar{y})$ be its orthocentre then prove that

$$\frac{\bar{x}}{\bar{y}}=\frac{\cos\alpha+\cos\beta+\cos\gamma}{\sin\alpha+\sin\beta+\sin\gamma}$$

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43. The vertices of a triangle are

$[at_1t_2, a(t_1+t_2)], [at_2t_3, a(t_2+t_3)]$

$[at_3t_1, a(t_3+t_1)]$

Find the coordinates of its orthocentre.

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44. Prove that the orthocentre of the triangle formed by the three lines

$y = m_1x + a/m_1, y = m_2x + a/m_2,$ and $y = m_3x + a/m_3$ is

$\left\{-a, a\left(\frac{1}{m_1} + \frac{1}{m_2} + \frac{1}{m_3} + \frac{1}{m_1m_2m_3}\right)\right\}$

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45. The sides of a triangle are

$l_R = x\cos\alpha_r + y\sin\alpha_r - p_r = 0, r = 1, 2, 3,$

Prove that the orthocentre is given by

$L_1 \cos(\alpha_2 - \alpha_3) = L_2 \cos(\alpha_3 - \alpha_1)$

$= L_3 \cos(\alpha_1 - \alpha_2)$.

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46. Let $P = (-1, 0)$, $Q = (0, 0)$ and $R = (3, 3\sqrt{3})$ be three points. The equation of the bisector of the angle PQR is

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

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

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

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

Answer: A

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47. If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is

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

B. -2

C. 0.01

D. 2

Answer: C

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PROBLEM SET(4)(TRUE AND FALSE)

1. If the line $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$ them $m = \frac{1 \pm 5\sqrt{2}}{7}$.

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2. The vertex of an equilateral triangle is $(2, 3)$ and the equation of the opposite side is $x + y = 2$. Then, the other two sides are $y - 3 = (2 \pm \sqrt{3})(x - 2)$.

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3. Every point on the line $2x + 11y - 5 = 0$ is at equal distance from the lines $24x + 7y = 20$ and $4x - 3y = 2$.

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4. The lines $(a + b)x + (a - b)y - 2ab = 0$, $(a - b)x + (a + b)y - 2ab = 0$ and $x + y = 0$ form and isosceles triangle whose vertical angle is $2\tan^{-1}\left(\frac{b}{a}\right)$.

A. True

B. False

C.

D.

Answer: F

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PROBLEM SET(4)(FILL IN THE BLANKS)

1. Equation of the straight lines through the point (3,-2) and inclined at 60° to the line $\sqrt{3}x + y = 1$ are ....

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2. The opposite angular points of a square are (3,4) and (1,-1) then the other two vertices are ......and ....

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3. The opposite vertices of a square are $(1, 2)$ and $(3, 8)$, then the equation of a diagonal of the square passing through the point $(1, 2)$, is

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4. The vertices of a triangle are $[at_1t_2, a(t_1 + t_2)]$, $[at_2, a(t_2 + t_3)]$ and $[at_3t_1, a(t_3 + t_1)]$. The co ordinates of the orthocentre of the triangle are.......

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5. The line $lx + my + n = 0$ bisects the angle between a pair of straight lines of which one is $px + qy + r = 0$, then the equation of the other is ....

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PROBLEM SET(5)(MULTIPLE CHOICE QUESTIONS)

1. The direction in which a straight line must be drawn through the point (1,2) so that its point of intersection with the $x+y=4$ may be at a distance $\frac{\sqrt{6}}{3}$ from theis point is

A. $30^\circ, 60^\circ$

B. $15^2, 75^\circ$

C. $||$ to x-axis

D. || to y-axis

Answer: B

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2. If the straight line drawn thriough the point $P(\sqrt{3}, 2)$ and making an angle $\pi/6$ with x-axis meets the line. $\sqrt{3}x-4y+8=0$ at Q then the length PQ is

A. 4

B. 5

C. 6

D. none

Answer: C

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3. Each side of a square of length 6 and its centre is at the point (4,5). If one of its diagonals is parallel to the line y=x then the co ordinates of the vertics of the square are..................

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4. A line through A(-5,-4) meets the lines $x+3y+2=0, 2x+y+4=0,$ and$x-y-5=0$ at B,C and D respectively if

$\left(\frac{15}{AB}\right)^2+\left(\frac{10}{AC}\right)^2=\left(\frac{6}{AD}\right)^2$,then the equation of the lines is

A. $2x + 3y + 22 = 0$

B. $5x - 4y + 7 = 0$

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

D. none

Answer: A

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5. The equation of the lines through the point (2,3) and making an intercept of length 2 units between the lines $y + 2x = 3$ and $y + 2x = 6$ are

A. $x + 3 = 0$

$3x + 4y = 12$

B. $y - 2 = 0$

$4x - 3y = 6$

C. $x - 2 = 0$

$3x + 4y = 18$

D. none

Answer: C

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6. A line is such that its segments between the straight lines $5x - y = 4$ and $3x + 4y - 4 = 0$ is bisected at the point (1,5). Its equation is

A. $23x - 7y + 6 = 0$

B. $7x + 4y + 3 = 0$

C. $83x - 35y + 92 = 0$

D. none

Answer: C

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7. If one vertex of an equilateral triangle of side a lies at the oringin an d the other lies on the line $x - \sqrt{3}y = 0$, the co ordinates of the third vertex are

A. (0,a)

B. $\left(\sqrt{3}a/2, -a/2\right)$

C. $(0, -a)$

D. $\left(-\sqrt{3}a/2, a/2\right)$

Answer: A::B::C::D

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8. If the centroid and a vertex of an equilateral triangle are (2,3) and (4,3) respectively, then the other two vertices are

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

B. $(1, 3 \pm \sqrt{3})$

C. $(2, 2 \pm \sqrt{3})$

D. $(2, 3 \pm \sqrt{3})$

Answer: B

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9. The distance of the point (3,5) from the line $2x + 3y - 14 = 0$ measured parallel to the line $x - 2y = 1$ is

A. $\frac{7}{\sqrt{5}}$

B. $\frac{7}{\sqrt{13}}$

C. $\sqrt{5}$

D. $\sqrt{13}$

Answer: C

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10. A line is drawn from $P(x_1, y_1)$ in the direction θ with the x-axis, to meet $ax + by + c = 0$ at Q. Then the length PQ is equal to

A. $\left|\dfrac{ax_1 + by_1 + c}{\sqrt{(a^2 + b^2)}}\right|$

B. $-\dfrac{ax_1 + by_1 + c}{a\cos\theta + b\sin\theta}$

C. $\dfrac{ax_1 + by_1 + c}{a\cos\theta + b\sin\theta}$

D. $-\dfrac{ax_1 + by_1 + c}{a\sin\theta + b\cos\theta}$

Answer: B

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11. The point A(2,1) is translated parallel to the line $x - y = 3$ by a distance 4 units. If the new position A' is in third quadrant, then the co ordinates of A' are

A. $(2 + 2\sqrt{2}, 1 + 2\sqrt{2})$

B. $\left(-2+\sqrt{2}, \ -1-2\sqrt{2}\right)$

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

D. None of these

Answer: C

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12. The point P(1,1) is translated parallel to 2x=y in the first quadrant through a unit distance. The coordinates of the new position of P are

A. $\left(1 \pm \frac{2}{\sqrt{5}}, 1 \pm \frac{1}{\sqrt{5}}\right)$

B. $\left(1 \pm \frac{1}{\sqrt{5}}, 1 \pm \frac{2}{\sqrt{5}}\right)$

C. $\left(\frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}}\right)$

D. $\left(\frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$

Answer: B

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13. If a line joining two points A(2,0),B(3,1) is rotated about A in anticlockwise direction through an angle 15° such that the point B goes to C in the new positon, then the coordinates of C are

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

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

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

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

Answer: B

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14. If the line $y-\sqrt{3}x+3=0$ cuts the parabola $y^2=x+2$ at A and B, then PA, PB is equal to [where P is $\left(\sqrt{3}, 0\right)$]

A. $\frac{4(\sqrt{3}+2)}{3}$

B. $\frac{4(2-\sqrt{3})}{3}$

C. $\frac{4\sqrt{3}}{2}$

D. $\frac{2(\sqrt{3}+2)}{3}$

Answer: A

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15. 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. $3:4$

C. $2:1$

D. $4:3$

Answer: B

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16. Two sides of a rhombus OABC (O being origin) lying entirely in first or third quadrant of area 2 sq. units are $y=\frac{1}{\sqrt{3}}x$ and $y=\sqrt{3}x$. Then possible co ordinates of B are

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

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

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

D. none

Answer: A::B::C::D

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17. The point P(2,1) is shifted through a distance $3\sqrt{2}$ units measured parallel to the line x+y=1 in the direction of decreasing ordinates, to reach at Q. The image of Q with respect to given line is

A. $(3, \; -4)$

B. $(\; -3, 2)$

C. $(0, \; -1)$

D. none

Answer: A

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18. A line making an angle θ with the +ive direction of x-axis passes through P(5,6) to meet the line $x = 6$ at Q and $y = 6$ at R then OR is :

A. $\dfrac{2(\cos\theta + 3\sin\theta)}{\sin 2\theta}$

B. $\dfrac{2(3\cos\theta + \sin\theta)}{\sin 2\theta}$

C. $\dfrac{2(3\cos\theta - \sin\theta)}{\sin 2\theta}$

D. $\dfrac{2(\cos\theta - 3\sin\theta)}{\sin 2\theta}$

Answer: C

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PROBLEM SET(5)(TRUE AND FALSE)

1. A line through the variable point $A(k+1, 2k)$ meets the lines $7x + y - 16 = 0, 5x - y - 8 = 0, x - 5y + 8 = 0$ at $B, C, D,$ respectively. Prove that AC, AB, AD are in HP.

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PROBLEM SET(5)(FILL IN THE BLANKS)

1. The equation of the straight lines through the point (2,3) and making an intercept of length 3 between the straight lines $4x+3y=3$ and $4x+3y=12$ are ....

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PROBLEM SET(6)(MULTIPLE CHOICE QUESTIONS)

1. If $P(1, 0), Q(-1, 0)$ and $R(2, 0)$ are three given points, then the locus of point S satisfying the relation $SQ^2+SR^2=2sP^2$ is

A. a straight line parallel to x-axis

B. circle through origin

C. circle with centre at the origin

D. a straight line|| to y-axis

Answer: D

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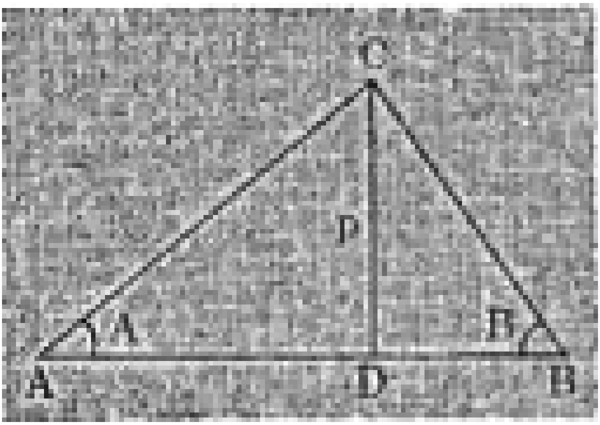
2. A and B are two fixed points. The vertex C of triangle ABC moves such that $\cot A + \cot B =$ constant. The locus of C is a straight line



A. perpendicular to AB

B. parallel to AB

C. inclined at an angle $(A - B)$ to AB

D. None of these

Answer: B

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3. The equation $\sqrt{(x-2)^2+y^2}+\sqrt{(x+2)^2+y^2}=4$ represents

A. a circle

B. a pair of lines

C. a parabola

D. an ellipse

Answer: B

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4. The locus of the mid point of the portion intercepted between ther axes by the line $x\cos\alpha+y\sin\alpha=p$ where p is constant is

A. $x^2+y^2+4p^2$

B. $\frac{1}{x^2}+\frac{1}{y^2}=\frac{4}{p^2}$

C. $x^2+y^2=\frac{4}{p^2}$

D. $\frac{1}{x^2}+\frac{1}{y^2}=\frac{2}{p^2}$

Answer: B

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5. For a variabkle line $\frac{x}{a}+\frac{y}{b}=1$ where $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{c^2}$ the locus of the foot of perpendicular drawn from origin to it is

A. $x^2+y^2=c^2/2$

B. $x^2+y^2=c^2$

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

D. None of these

Answer: A

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6. If the sum of the distances of a point from two perpendicular lines in a planes is 1, then its locus is

A. square

B. circle

C. straight line

D. two intersecting

Answer: B

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7. If the distance of any point (x,y) from the origin is defined as $d(x, y) = \max\{|x|, |y|\}, d(x, y) = a$ none zero constant, then the locus is

A. a circle

B. parallel straight lines

C. a square

D. a triangle

Answer: B

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PROBLEM SET(6)(TRUE AND FALSE)

1. The line $\frac{x}{a} + \frac{y}{b} = 1$ moves in such a way that $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$ where ic si a constnat. The locus of the foot of perpendicular from the origin on the given line is $x^2 + y^2 = c^2$

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2. The line $\frac{x}{a} + \frac{y}{b} = 1$ cuts the axes in A and B and a line perpendicular to AB cuts the axes in P and Q. Locus of the points of intersection of AQ and BP is $x^2 + y^2 + ax + by = 0.$

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3. The ends A and B of a straight line segment of constant length c slide upon the fixed rectangular axes OX and OY, respectively. If the rectangle OAPB be completed, then the locus of the foot of the perpendicular drawn from P to AB is

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PROBLEM SET(6)(FILL IN THE BLANKS)

1. Find the locus of a point whose sum of the distances from the origin and the line $x = 2$ is 4 units. Sketch the path.

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2. The ends of a rod of length l move on two mutually perpendicular lines. The locus of a point on the rod which divides it in the ratio 1:2 is ....

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3. A variable straight line drawn through the point of intersection of lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$ meets the co ordinates axes in A and B. Locus of the mid point of AB is ....

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4. The locus of P such that area of $\Delta PAB = 12$ sq. units where $A=(2,3)$ and $B(-4,5)$ is .....

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5. Locus of the mid points of the portion of the line $x\cos\theta+y\sin\theta=p$ intercepted between the axes is ....

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6. A point moves so that square of its distance from the point $(3, \ -2)$ is numerically equal to its distance from the line $5x - 12y = 3$. The equation of its locus is ....

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7. A line intersects x-axis at A(7,0) and y-axis at B(0,-5). A variable line PQ which is perpendicular to AB intersects x -axis at P and y -axis at Q. If AQ and BP intersect at r then locus of R is ....

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8. A straight line passes through a fixed point (h,k). The locus of the feet of perpendiculars on it drawn from the origin is ....

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SELF ASSESSMENT TEST

1. The triangle joinilng the points A(2,7),B(4,-1),C(-2,6) is

A. equilateral

B. Right angled

C. isosceles

D. None of these

Answer: B

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2. The area of the triangle with vertices at (-4,1),(1,2),(4,-3) is

A. 14

B. 16

C. 15

D. None of these

Answer: A

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3. The area of the triangle with vertices at the point $(a, b+c), (b, c+a), (c, a+b)$ is

A. 0

B. $a+b+c$

C. $ab+bc+ca$

D. none of these

Answer: A

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4. The eq. of the straight line which passes through the point (1,-2) and cuts of equal intercepts from the axes will be

A. $x + y = 1$

B. $x - y = 1$

C. $x + y + 1 = 0$

D. $x - y - 2 = 0$

Answer: C

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5. The equation of the straight line whilch is perpendicular to y=x and passes through (3,2) will a given by

A. $x - y = 5$

B. $x + y = 5$

C. $x + y = 1$

D. $x - y = 1$

Answer: D

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6. The equation of the line passing through (1,2) and perpendicular to $x+y+1=0$ is

A. $y-x+1=0$

B. $y-x-1=0$

C. $y=x+2=0$

D. $y-x-2=0$

Answer: C

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7. If $P(1, 0,), Q=(-1, 0)$ and R=(2,0) are thre given points then the locus of point S satisfying the relation $SQ^2+SR^2=2SP^2$ is

A. a st. line parallel to x-axis

B. circle through origin

C. circle with centre at the origin

D. a straight line parallel to y-axis.

Answer: A

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8. If A and B are the points (-3,4) and (2,1). Then the co -ordinates of pont C on AB produced such that AC=2BC are

A. (2,4)

B. (3,7)

C. (7,-2)

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

Answer: C

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9. P and Q are points on the line joining A(-2,5) and B(3,1) such that AP=PQ=QB. Then the mid pont of PQ is

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

B. $\left(-\frac{1}{2}, 4\right)$

C. $(2, 3)$

D. $(1, 4)$

Answer: B

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10. If the lines $3y + 4x = 1, y = x + 5$ and $5y + bx = 3$ are concurrent then the value of b is

A. 1

B. 3

C. 6

D. 0

Answer: A

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11. The distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$ is

A. $3/2$

B. $3/10$

C. 6

D. None of these

Answer: B

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12. Let the vertices of a triangle (0,0),(3,0) and (0,4) its orthocentre is

A. (0,0)

B. $(1, 4/3)$

C. $(3/2, 3)$

D. None of these

Answer: B

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13. The line $3x+4y-24=0$ cuts the x -axis at A and y-axis at B. Then the incentre of a triangle OAB, where O is the origin is

A. (1,2)

B. (2,2)

C. (12,12)

D. (2,12)

Answer: A::C

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14. Three lines $3x+4y+6=0, \sqrt{2}x+\sqrt{3}y+2\sqrt{2}=0 \text{ and } 4x+7y+8=0$ are (A) sides of triangle (B) concurrent (C) parallel (D) none of these

A. sides of a triangle

B. concurrent at (1,1)

C. parallel

D. None of these

Answer: D

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15. The three lines $ax + by + c = 0$,

$bx + cy + a = 0$, $cx + ay + b = 0$

are concurrent only when

A. $a + b + c = 0$

B. $a^2 + b^2 + c^2 = ab + bc + ca$

C. $a^3 + b^3 + c^3 = 3ab$

D. None of these

Answer: B

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16. The line $(p + 2q)x + (p - 3q)y = p - q$ for different values of p and q passes through the point

A. $(3/2, 5/2)$

B. $(2/5, 2/5)$

C. $(3/5, 3/5)$

D. $(2/5, 3/5)$

Answer: D

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17. The equation $\sqrt{(x-2)^2+y^2}+\sqrt{(x+2)^2+y^2}=4$ represents

A. circle

B. pair of a lines

C. a parabola

D. an ellipse

Answer: B

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18. All points lying inside the triangle formed by the point (1,3),(5,0) and (-1,2) satisfy

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

B. $2x + y - 13 \geq 0$

C. $2x - 3y - 12 \leq 0$

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

Answer: A

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19. The locus of the mid point of the portion intersection between the axes by the line $x \cos \alpha + y \sin \alpha = p$ where p is constant is

A. $x^2 + y^2 = 4p^2$

B. $(1/x^2) + (1/y^2) = 4/p^2$

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

D. $(1/x^2)+(1/y^2)=2/p^2$

Answer: C

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20. The straight line passing through the point of intersection of the straight lines

$x-3y+1=0$ and $2x+5y-9=0$

an having infinite slope and at a distance 2 units from the origin has the equation

A. x=2

B. $3x+y-1=0$

C. $y=1$

D. None of these

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21. The points $(1, 1), (-1, -1)$ and $(-\sqrt{3}, \sqrt{3})$ are the angular points of a triangle, then the triangle is

A. right angled

B. isosceles

C. equilateral

D. None of these

Answer: A

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22. The points $\left(0, \frac{8}{3}\right), (1, 3)$ and $(82, 30)$ are vertices of

A. obtuse angled triangle

B. acute angled tirangle

C. right angled triangle

D. none

Answer: D

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23. The straight lines $x+y=0, 3x+y-4=0, x+3y-4=0$ form a triange which is

A. isosceles

B. equilateral

C. right angled

D. None of these

Answer: A

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

A. isosceles

B. Right angled

C. equilateral

D. none

Answer: A

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

A. rectangle

B. square

C. cyclic quadrilateral

D. rhombus

Answer: C

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26. The points $(-a, -b)$, $(0, 0)$, (a, b) and (a^2, ab) are

A. collinear

B. vertices of a rectangle

C. vertices of a parallelogram

D. None of these

Answer: B

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27. The equation of a line through (2,-3) parallel to y-axis is

A. $y = -3$

B. $y = 2$

C. $x = 2$

D. $x = -3$

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28. The equations of the line the reciprocal of whose intercepts on the axes are a and b is given by

A. $x/a + y/b = 1$

B. $ax + by = 1$

C. $ax + by = ab$

D. $ax - by = 1$

Answer: B

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29. The line L has intercepts a and b on the coordinate axes. When keeping the origin fixed, the coordinate axes are rotated through a fixed angle,then the same line has intercepts p and q on the rotated axes. Then

A. $a^2 + b^2 = p^2 + q^2$

B. $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2} + \frac{1}{q^2}$

C. $a^2 + p^2 = b^2 + q^2$

D. $\frac{1}{a^2} + \frac{1}{p^2} = \frac{1}{b^2} + \frac{1}{q^2}$

Answer: D

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30. The locus of the orthocentre of the triangle formed by the lines

$(1 + p)x - py + p(1 + p) = 0$

$(1 + q)x - qy + q(1 + q) = 0$ and $y = 0$ where $p \neq q$ is

A. a parabola

B. a hyperbola

C. an ellipse

D. a straight line

Answer: A

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31. Orthocentre of the triangle formed by the lines $x + y = 1$ and xy=0 is

A. (0,0)

B. (0,1)

C. (1,0)

D. (-1,1)

Answer: D

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32. The incentre of triangle with vertices $(1, \sqrt{3})$, $(0, 0)$ and (2, 0) is

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

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

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

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

Answer: B

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33. The orthocentre of the triangle with vertices

$\left[2, \frac{\left(\sqrt{3}-1\right)}{2}\right]$, $\left(\frac{1}{2}, -\frac{1}{2}\right)$ and $\left(2, -\frac{1}{2}\right)$ is

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

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

C. $\left(\frac{5}{4}, \frac{\sqrt{3}-2}{4}\right)$

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

Answer: D

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34. Consider three points $P = (-\sin(\beta - \alpha), -\cos\beta)$,

$Q = (\cos(\beta - \alpha), \sin\beta)$

and $R = (\cos(\beta - \alpha + \theta), \sin(\beta - \theta))$

where $0 < \alpha, \beta, \theta < \frac{\pi}{4}$. Then

A. P lies on the line segment RQ

B. Q lies on the line segment PR

C. R lies on the line segment QP

D. P,Q,R are non collinear

Answer: B

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35. The locus of a point which moves so that its distance from x-axis is double of its distance from y-axis it

A. $x = 2y$

B. $y = 2x$

C. $y = 2x + 3$

D. $x = 5y + 1$

Answer: C

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36. Let P be the point $(1, 0)$ and Q a point on the locus $y^2 = 8x$. The locus of mid-point of PQ is :

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

B. $x^2 - 4y + 6 = 0$

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

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

Answer: B

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37. Locus of the centroid of a triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t)$ and (1,0) where t is parameter is :

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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38. The line $y = x$ meets $y = ke^x, k \leq 0$ at

A. no point

B. one point

C. two points

D. None of these

Answer: C

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39. Let O (0,0),P(3,4),Q(6,0) be the vertices of the triangle OPQ. The point R inside the triangle OPQ is such that the triangles OPR,PQR,OQR are of equal area. The coordinates of R are

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

B. $\left(\frac{4}{3}, 3\right)$

C. $\left(3, \frac{4}{3}\right)$

D. $\left(\frac{4}{3}, \frac{2}{3}\right)$

Answer: D

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40. Let A (2,-3) and B(-2,1) be vertices of a triangle ABC. If the centroid of this triangle moves on line 2x + 3y = 1, then the locus of the vertex C is the line :

A. $3x - 2y = 6$

B. $2x - 3y = 7$

C. $3x + 2y = 5$

D. $2x + 3y = 9$

Answer: A::C::D

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41. If the vertices P,Q,R of a triangle PQR are rational points, which of the following points of the triangle PQR is (are) always rational points(s)?

A. centroid

B. incentric

C. circumcentre

D. orthocentre

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42. A straight line through the vertex P of a trinagle PQR intesect the side QR at a point S and the circumcentre of the triangle PQR at the point T. If S is not the centre of the circumcircle, then

A. $\frac{1}{PS}+\frac{1}{PT}<\frac{2}{\sqrt{QW\times SR}}$

B. $\frac{1}{PS}+\frac{1}{ST}>\frac{2}{\sqrt{QS\times SR}}$

C. $\frac{1}{PS}+\frac{1}{ST}<\frac{4}{QR}$

D. $\frac{1}{PS}+\frac{1}{ST}>\frac{4}{QR}$

Answer: B::D

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43. A ray of light along $x+\sqrt{3}y=\sqrt{3}$ gets reflected upon reaching x-axis.The equation of the reflected ray is

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

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

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

D. $\sqrt{3}y=x-1$

Answer: B

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44. The lines $3x + 4y + 7 = 0$ and $4x + 3y + 5 = 0$are perpendicular.

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45. The lines $ax + by + c = 0$ an $Ax + By + C = 0$ are perpendicular of $aA + bB = 0.$

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46. The points (1,2) and (3,4) are on the same side of line $2x - 3y + 5 = 0$

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47. If the points (-2,-5),(2,-2),(8,a) are collinear, then the value of a is ....

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48. A,B,C are the points (-2,-1),(0,3),(4,0). Then the co ordinates of the point D such that ABCD is parallelogram are......

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49. If the sum of the distances of a point from two perpendicular lines in a planes is 1, then its locus is

A. square

B. circle

C. straight line

D. two intersecting

Answer: A

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50. BE and CF are two medians of ΔABC whose vertex A is (1,3). The equation of BE is $x-2y+1=0$ and CF is y-1=0.

Determine the following:

The co-ordinates of points B,C and centroid G. The equations of lines AB and AC.

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MISCELLANEOUS EXERCISE

1. Match the entries of list A and List B

	List- A		List-B
(a)	If the sum of the + ive intercepts on the axes made by a line passing through the point $(-3,8)$ be 7, then its eqn. is ...	1.	$x+y=5$
(b)	If $P(a,b)$ lies on $3x+2y-13=0$ and $Q(b,a)$ lies on $4x-y-5=0$ then the equation of line PQ is ...	2.	$83x-35y+92=0$
(c)	The line $x-y-2=0$ cuts x-axis at A. The equation of the line through A perpendicular to $ax+by+c=0$ is ...	3.	$4x+3y=12$
(d)	The incentre of triangle whose vertices are the points $(1,\sqrt{3})$, $(0,0)$ and $(2,0)$ is ...	4.	$bx-ay-2b=0$
(e)	The segment of the line intercepted between the lines $5x-y-4=0$ and $3x+4y-4=0$ is bisected at the point $(1,5)$. Its equation is ...	5.	$(1,1/\sqrt{3})$

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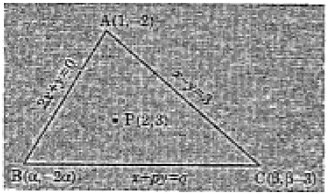
2. In the adjoining figure the sides AB,BC and CA of the triangle ABC are $2x + y = 0$, $x + py = q$ and $x - y = 3$ respectively. The point P inside the triangle is (2,3) then match the entries of column I and column II.



Column I $P(2,3)$ is	Column II Value of $p+q$
(a) Centroid	(i) 47
(b) Orthocentre	(ii) 50
(c) Circumcentre	(iii) 65
	(iv) 74

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3. Consider the lines give by

$L_1 : x + 3y - 5 = 0$, $L_2 : 3x - ky - 1 = 0$, $L_3 : 5x + 2y - 12 = 0$

Column I	Column II
(A) L_1, L_2, L_3 are concurrent, if	(p) $k = -9$
(B) One of L_1, L_2, L_3 is parallel to at least one of the other two, if	(q) $k = -6/5$
(C) L_1, L_2, L_3 form a triangle, if	(r) $k = 5/6$
(D) L_1, L_2, L_3 do not form a triangle, if	(s) $k = 5$

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4. Match the entries of col. I with col II in the following: the vertices of a triangle are A(a,0),B(0,b) and C(a,b).

Column I	Column II
(a) Centroid of Δ	(p) $(a/2, b/2)$
(b) Orthocentre	(q) (a, b)
(c) Circumcentre	(r) $(2a/3, 2a/3)$
(d) Foot of altitude from C	(s) $\left(\frac{a^3}{a^2+b^2}, \frac{b^3}{a^2+b^2}\right)$

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5. The vertices of a triangle ABC are A(1,-2),B(-7,6) and $C(1/5, 2/5)$

Column I	Column II
(a) Eq. of right bisector of AB	(p) $26x + 17y + 8 = 0$
(b) Eq. of side BC	(q) $14x + 23y - 40 = 0$
(c) Eq. of altitude through C	(r) $x - y + 5 = 0$
(d) Eq. of median through A	(s) $5x - 5y - 9 = 0$

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6. If A(2a,4a),B(2a,6a) be two vertices of a triangle ABC and C be the third vertex then match the entries of points in col. With the nature of Δ in col

II.

Column I	Column II
(a) $(4a, 5a)$	(p) equilateral
(b) $[(2+\sqrt{3})a, 5a]$	(q) rt. angled
(c) $(6a, 4a)$	(r) obtuse angled
(d) $(a, 3a)$	(s) isosceles

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7. Match the entries of col.I with col. II under the following conditions:

Column I	Column II
(a) The x-co-ordinate of the point of intersection of lines $3x+4y=9$ and $y=mx+1$ is an integer. Then $m=$	(p) $m=-1$
(b) The line $2x-3y-6=0$ cuts the axis of co-ordinates in $A(a,0)$ and $B(0,b)$ and the line $y=mx+m^2$ passes through (a,b), then $m=$	(q) $m=-2$
(c) If the point $(3, 4)$ lies on the locus of the point of intersection of the lines $x\cos\alpha+y\sin\alpha=m$ and $x\sin\alpha-y\cos\alpha=n$ such that $3m-4n=0$, then $m=$	(r) $m=4$
(d) If the line $y=mx-\frac{8}{m}$ meets the curve $y^2=4x$ at a point where the curve meets the line $y=2$, then $m=$	(s) $m=-4$

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ASSERTION/REASON

1. The lines $L_1: y-x=0$ and $L_2: 2x+y=0$ intersect the line $L_3: y+2=0$ at P and Q respectively . The bisectors of the acute angle between L_1 and L_2 intersect L_3 at R .

Statement 1 : The ratio PR : RQ equals $2\sqrt{2} : \sqrt{5}$

Statement - 2 : In any triangle , bisector of an angle divides the triangle into two similar triangles .

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COMPREHENSION

1. Shifting or origin (0,0) to (b,k)

$f(x, y) \Rightarrow f(x+h, y+k)$

Rotation of axes through an angle θ

$f(x, y) \Rightarrow f(x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta)$

Now Answer the following questions:

(i) By rotating the axes through an angle θ the equation $xy - y^2 - 3y + 4 = 0$ is transformed to the form whcih does not contain the term of xy then $\sin\theta =$ ....

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2. Shifting or origin (0,0) to (b,k)

$f(x, y) \Rightarrow f(x+h, y+k)$

Rotation of axes through an angle θ

$f(x, y) \Rightarrow f(x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta)$

Now Answer the following questions:

The equation $2xy = 9$ is transformed to $x^2 - y^2 = 9$ by rotating the axes through an anlge $\pi/4$, is this statement true of false?

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3. Shifting or origin (0,0) to (b,k)

$f(x, y) \Rightarrow f(x+h, y+k)$

Rotation of axes through an angle θ

$f(x, y) \Rightarrow f(x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta)$

Now Answer the following questions:

By rotating the axes through an angle θ in anti clockwise direction the equation $f(x, y) = x^2 - 2xy + 3y^2 + 4x - 4y + 1 = 0$ transforms to the form whcih does not contain the term of y then $\theta = 135^\circ$

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4. Shifting or origin (0,0) to (b,k)

$f(x, y) \Rightarrow f(x+h, y+k)$

Rotation of axes through an angle θ

$f(x, y) \Rightarrow f(x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta)$

Now Answer the following questions:

Axes are rotated through a+ive obtuse angle θ so that the transformed equation of the curve $3x^2 - 6xy + 3y^2 + 7x - 3 = 0$ is free from the term of xy then the coefficient of x^2 in the transformed equation is...............

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5. $A_1(x_1, y_1), A_2(x_2, y_2), A_3(x_3, y_3)$..........are a point in a plane such that A_1A_2 is bisected at G_1, G_1A_3 is divided in the ratio $1:2atG_2, G_2A_4$ is divided in the ratio $1:3$ at G_3. The process is continued until all n points are exhausted then find the co ordinates of the final point G_n.

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6. $A_1(x_1, y_1), A_2(x_2, y_2), A_3(x_3, y_3)$..........are a point in a plane such that If $x_1 = a, y_1 = b$ and x_is form an A.P. with common difference 2 and y_i 's form an A.P with common difference 4,then find the co-ordinates of G, the centroid.

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7. $A_1(x_1, y_1), A_2(x_2, y_2), A_3(x_3, y_3)$..........are a point in a plane such that If $x_1, y_1 = 2$ and x_i 's form a G.P. with common ratio 2 and y_i 's form a G.P. with common ratio 3, then find the co ordinates of G.

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8. $A_1(x_1, y_1), A_2(x_2, y_2), A_3(x_3, y_3)$..........are a point in a plane such that If a straight line be such that algebraic sum of the perpendicular drawn from the points $A_1, A_2, \ldots\ldots\ldots\ldots\ldots A_n$ is zero then prove that the straight line passes is the centroid G of the given points.

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9. $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$ are the vertices of a triangle ABC and $ax + by + c = 0$ is the equation of the line L, then answer the following questions.

If the centroid of the triangle ABC is at the origin and algebraic sum of the length of the perpendicular from the vertices of the triangle on the line L is equal to 1, then prove that sum of the squares of the reciprocal of intercepts made by L on the co-ordinate axes is 9.

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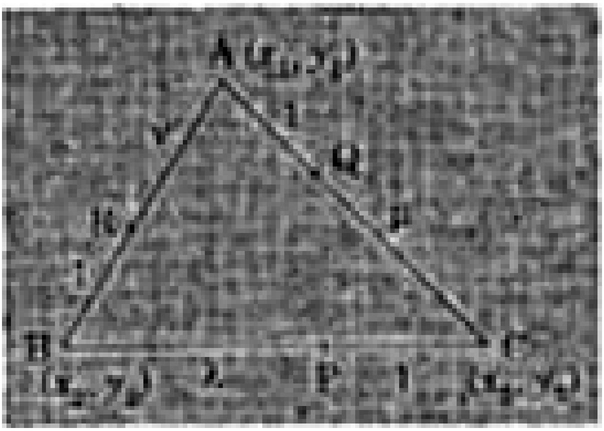
10. $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$ are the vertices of a triangle ABC and $ax + by + c = 0$ is the equation of the line L, then answer the following questions.

If a line $ax + by + c = 0$ cuts the sides BC,CA and AB of triangle ABC at points P,Q and R respectively The prove that

$$\frac{BP}{PC} \cdot \frac{CQ}{QA} \cdot \frac{AR}{RB} = -1$$



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11. $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$ are the vertices of a triangle ABC and $ax + by + c = 0$ is the equation of the line L, then answer the following questions.

If P divides BC in ratio 2:1 and Q divides CA in ratio 1:3 then R divides AB in the what ratio (P,Q,R are the points as in problem 1)

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