MATHS

BOOKS - BHARATI BHAWAN MATHS (HINGLISH)

Coordinates and Straight Lines

Example

1. If the coordinates of the mid-points of the sides of a triangle are $(1, \ 1), \ (2, \ \ -3)$ and $(3, \ 4)$, find the vertices of the triangle.

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2. If $A(at^2, 2at)$,$B\left(\frac{a}{t^2}, \ -2\frac{a}{t}\right)$ and $C(a, 0)$ then 2a is equal to. (a) Arithmatic mean of CA and CB (b) Geometric mean of CA and CB (c) Harmonic mean of CA and CB (d) None of these

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3. Find t if the area of the pentagon ABCDE be $\frac{45}{2}$ where a=(1,3), B=(-2,5), C=(-3,-1) D=(0,-2) and E=(2,t).

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4. A point moves so that the sum of its distances from $(ae, 0)and(- ae, 0)$ is $2a$, prove that the equation to its locus is $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, where $b^2=a^2(1-e^2)\cdot$

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5. ABC is a variable triangle with the fixed vertex C(1,2) and A,B having the coordinates (cos t,sin t), (sin t, -cos t) respectively where t is a parameter. Find the locus of the centroid of the ΔABC.

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6. A vertex of an equileteral triangle is (2;3) and the equation of the opposite sides is $x + y = 2$ .Find the equation of the other sides of triangle .

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

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8. The equations of two sides of a square are $3x + 4y - 5 = 0$ and $3x + 4y - 15 = 0$. The third side has a point (6, 5) on it. Find the equation of this third side and the remaining side of the square.

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9. Two sides of a rhombus lying in the first quadrant are given by $3x - 4y = 0 and 12x - 5y = 0$. If the length of the longer diagonal is 12, then find the equations of the other two sides of the rhombus.

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10. Find the equation of the line passing through the point $P(1, 2)$ cutting the lines $x + y - 5 = 0$ and $2x - y = 7$ at A and B respectively such that the $H.M.$ of PA and PB is 10. (A, B lie on the same side of P)

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11. Coordinates of the orthocentre of the triangle whose sides are 3x -2y = 6, 3x + 4y + 12 = 0 and 3x-8y+12=0 is

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12. Determine all the values of α for which the point (α, α^2) lies inside the triangle formed by the lines. $2x + 3y - 1 = 0$ $x + 2y - 3 = 0$ $5x - 6y - 1 = 0$

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13. A variable line cuts n given concurrent straight lines at $A_1, A_2 \ldots A_n$ such that $\sum_{i=1}^{n} \frac{1}{OA_i}$ is a constant. Show that A,A , A such it always passes through a fixed point, O being the point of intersection of the lines

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14. Find the value of p, if the following lines are concurrent.

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15. Let a line $L_1 : 3x + 2y - 6 = 0$ intersect the x and y axes at P and Q respectively. Let another line L_2 perpendicular to L_1 cut the x and y axes at R and S respectively.The locus of point of intersection of the lines PS and QR is

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16. 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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17. If the image of the point (x_1, y_1) with respect to the mirror ax+by+c=0 be (x_2, y_2), show that

$$\frac{x_2 - x_1}{a} = \frac{y_2 - y_1}{b} = \frac{-2(ax_1 + by_1 + c)}{a^2 + b^2}.$$

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18. The mid-point of the line segment joirning $(3, -1)$ and $(1, 1)$ is shifted by two units (in the sense of increasing y) perpendicular to the line segment. Find the co-ordinates of the point in the new position

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19. The line PQ whose equation is $x - y = 2$ cuts the x-axis at $P, andQ$ 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) $x = -2$

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20. A ray of light is sent along the line $x - 2y - 3 = 0$ upon reaching the line $3x - 2y - 5 = 0,$ the ray is reflected from it. Find the equation of the line containing the reflected ray.

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Exercise

1. If a vertex of a triangle is $(1, 1)$, and the middle points of two sides passing through it are $-2, 3)$ and $(5, 2)$, then find the centroid and the incenter of the triangle.

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2. If two vertices of a parallelogram are $(3, 2)$, $(-1, 0)$ and the diagonals cut at $(2, -5)$, find the other vertices of the parallelogram.

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3. If a triangle has it's orthocenter at (1,1) and circumcentre (3/2,3/4) then centroid is:

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4. One end of a thin straight elastic string is fixed at $A(4, -1)$ and the other end B is at $(1, 2)$ in the unstretched condition. If the string is stretched to triple its length to the point C, then find the coordinates of this point.

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5. Find the centroid and incentre of the triangle whose vertices are $(2, 4)$, $(6, 4)$ and $(2, 0)$.

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6. If the vertices of a trianglehave integral coordinates, prove that the trinagle cannot be equilateral.

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7. Show that the equation of the locus of a point which moves so that the sum of its distance from two given points $(k, 0)$ and $(-k, 0)$ is equal to $2a$ is : $\frac{x^2}{a^2} + \frac{y^2}{a^2 - k^2} = 1$

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8. A stick of length l slides with its ends on two mutually perpendicular lines. Find the locus of the middle point of the stick.

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9. if x and y coordinates of a point P in $x-y$plane are given by $x=(u\cos\alpha)t, y=(u\sin\alpha)t-\frac{1}{2}gt^2$where t is a aprameter and $u, \alpha, g$the constants. Then the locus of the point P is a parabola then whose vertex is:

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10. A straight line L is perpendicular to the line $5x-y=1$. The area of the triangle formed by line L, and the coordinate axes is 5. Find the equation of line L.

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11. Find the equation of the line passing through the point $(2, 3)$ and making an intercept of length $3 units$ between the lines $y+2x=2 and y+2x=5.$

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12. The equation of the straight line through the point of intersection of lines $x - 3y + 1 = 0$ and $2x + 5y - 9 = 0$ and whose distance from the origin is $\sqrt{5}$ is

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13. Find the points on the line $x + y = 4$ that lies at a unit distance from the line $4x + 3y = 10$.

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

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15. lines $L_1 : ax + by + c = 0$ and $L_2 : lx + my + n = 0$ intersect at the point P and make a angle θ between each other. find the equation of a line Ldifferent from L_2 which passes through P and makes the same angle θ with L_1

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16. The st. lines $3x + 4y = 5$ and $4x - 3y = 15$ interrect at a point $A(3, -1)$. On these linepoints B and C are chosen so that $AB = AC$. Find the possible eqns of the line BC pathrough the point $(1, 2)$

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17. The equations of the perpendicular bisectors of the sides $ABandAC$ of triangle ABC are $x - y + 5 = 0$ and $x + 2y = 0$, respectively. If the point A is $(1, -2)$, then find the equation of the line BC.

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18. If (h, r) is the foot of the perpendicular from (x_1, y_1) to $lx + my + n = 0$, prove that : $\frac{x_1 - h}{l}, = \frac{y_1 - r}{m}, = \frac{lx_1 + my_1 + n}{l^2 + m^2}$

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19. Equations of two straight lines are $x \cos\alpha + y \sin\alpha = p$ and $x \cos\beta + y \sin\beta = p'$. Show that the area of the quadrilateral formed by the two lines and the perpendiculars drawn from the origin to the lines is $\frac{1}{2\sin(B - \alpha)}[2pp' - (p2 + p'2)\cos(\alpha - \beta)\}.$

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20. The side AB,BC,CD and DA of a quadrilateral are $x + 2y = 3, x = 1, x - 3y = 4, 5x + y + 12 = 0$ respectively. The angle between diagonas AC and BC is

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21. Let ABC be a triangle with $AB = AC \cdot$ If D is the midpoint of BC, E is the foot of the perpendicular drawn from D to $AC, andF$ is the midpoint of $DE,$ then prove that AF is perpendicular to $BE \cdot$

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22. Show that the lines $4x + y - 9 = 0, x - 2y + 3 = 0, 5x - y - 6 = 0$ make equal intercepts on any line of slope 2.

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23. 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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24. A straight line through the point $A(-2, -3)$ cuts the line $x+3y=9$ and x+y+1=0atB and C $respectively. F \in dtheequationofthel \in e$ if AB.AC=20`.

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25. A line through $A(-5, -4)$ meets the lines $x+3y+2=0, 2x+y+4=0andx-y-5=0$ at the points $B, CandD$ rspectively, if $\left(\frac{15}{AB}\right)^2+\left(\frac{10}{AC}\right)^2=\left(\frac{6}{AD}\right)^2$ find the equation of the line.

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26. The sides $ABandAC$ of a triangle ABC are respectively $2x+3y=29andx+2y=16$ respectively. If the mid-point of

$BC is (5, 6)$ then find the equation of BC.

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27. Find the equations of the lines which pass through the point $(4, 5)$ and make equal angles with the lines $5x - 12y + 6 = 0$ and $3x = 4y + 7$

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28. Find the bisector of acute angle between the lines $x + y - 3 = 0 \text{ and } 7x - y + 5 = 0$

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29. Determine whether the origin lies inside or outside the triangle whose sides are given by the equations $7x - 5y - 11 = 0, 8x + 3y + 31 = 0, x + 8y - 19 = 0.$

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30. The equation of the bisector of the angle between the lines $x + 2y - 2 = 0, 3x - 6y - 11 = 0$ which contains the point $(1, -3)$ is

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31. Find the values of β so that the point $(0, \beta)$ lies on or inside the triangle havind the sides $3x + y + 2 = 0, 2x - 3y + 5 = 0 and x + 4y - 14 = 0.$

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32. Given vertices $A(1, 1), B(4, -2) \& C(5, 5)$ of a triangle, find the equation of the perpendicular dropped from C to the interior bisector of the angle A.

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33. Find the equation of the sides of a triangle ABC with $A(1, 3)$ as a vertex and $x - 2y + 1 = 0$ and $y - 1 = 0$ as the equation of two of its medians.

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34. Find the equation of the legs of a right isosceles triangle if the equation of its hypotenuse is $x - 2y - 3 = 0$ and the vertex of the right angle is at the point $(1, 6)$,

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35. In a right angled triangle the vertex at the right angle is $(1, 1)$, one of the sides of the triangle is $2x - y = 1$ and the mid point of the hypotenuse is $(5, -2)$, find the equation of the other sides of the triangle.

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36. The ends of the base of an isosceles triangle are at $(2a, 0)$ and $(0, a)$. The equation of one side is $x = 2a$. The equation of the other side, is

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37. Two sides of an isosceles triangle are given by the equations $7x - 3 = 0 and x + y - 3 = 0$ and its third side passes through the point $(1, -1)$. Determine the equation of the third side.

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38. An equilateral triangle ABC has its centroid at the origin and the base BC lies along the line $x + y = 1$. Area of the equilateral ΔABC is

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39. The experimities of the diagonal of a square are (1,1) ,$(-2, -1)$ .Obtain the other two vertices and the equation of the other diagonal .

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40. Find the equation of the two straight lines through $(1, 2)$ forming the two sides of a square of which $4x + 7y = 12$ is one diagonal

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41. If two sides of a square are along $5x - 12y + 26 = 0$ and $5x - 12y - 65 = 0$ then find its area.

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

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43. One side of a rectangle lies along the line $4x + 7y + 5 = 0$. Two of its vertices are $(-3, 1) and (1, 1)$. Find the equations of the other three sides.

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44. The equation of one side of a rectangle is $3x - 4y - 10 = 0$ and the coordinates of two of its vertices are $(-2, 1)$ and $(2, 4)$. Find the area of the rectangle and the equation of that diagonal of the rectangle which passes through the point $(2, 4)$.

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45. Two consecutive sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. If the equation of one diagonal is $11x = 7y = 9$, find the equation of the other diagonal.

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46. A rhombus has two of its sides parallel to the lines $y = 2x + 3$ and $y = 7x + 2$. If the diagonals cut at (1, 2) and one vertex is on the y-axis, find the possible values of the ordinate of that vertex.

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47. The area of a parallelogram is 12 square units. Two of its vertices are the points $A(-1, 3)$ and $B(-2, 4)$. Find the other two vertices of the parallelogram, if the point of intersection of diagonals lies on x-axis on its positive side.

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48. Find the orthocentre of the triangle the equations of whose sides are $x + y = 1, 2x + 3y = 6 and 4x - y + 4 = 0.$

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49. Two vertices of a triangle are $(4, -3) \& (-2, 5)$. If the orthocentre of the triangle is at $(1, 2)$, find coordinates of the third vertex .

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50. The equations of two sides of a triangle are $3x - 2y + 6 = 0 \, and \, 4x + 5y - 20 \, and$ the orthocentre is (1,1). Find the equation of the third side.

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

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52. In a triangle, ABC, the equation of the perpendicular bisector of AC is $3x - 2y + 8 = 0$. If the coordinates of the points A and B are $(1, -1) \& (3, 1)$ respectively, then the equation of the line BC & the centre of the circum-circle of the triangle ABC will be

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53. A variable plane moves in such a way that the sum of the reciprocals of its intercepts on the three coordinate axes is constant. Show that the plane passes through a fixed point.

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54. A straight line moves such that the algebraic sum of the perpendiculars drawn to it from two fixed points is equal to $2k$. Then, then straight line always touches a fixed circle of radius. $2k$ (b) $\frac{k}{2}$ (c) k (d) none of these

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55. Let ABC be a given isosceles triangle with $AB = AC$. Sides $ABandAC$ are extended up to $EandF$, respectively, such that $BExCF = AB^2$. Prove that the line EF always passes through a fixed point.

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56. A straight line moves in such a way that the length of the perpendicular upon it from the origin is always p. Find the locus of the centroid of the triangle which is formed by the line and the axes.

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57. which Find the locus of the mid-point of the portion of the line $x \cos \alpha + y \sin \alpha = p$ intercepted between the axes

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58. Find the equation of the line which cuts off equal and positive intercepts from the axes and passes through the point (α, β).

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59. A straight line segment of length/moves with its ends on two mutually perpendicular lines. Find the locus of the point which divides the line segment in the ratio 1:2

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60. A line cuts the x-axis at $A(7, 0)$ and the y-axis at $B(0, -5)$ A variable line PQ is drawn perpendicular to AB cutting the x-axis in P and the y-axis in Q. If AQ and BP intersect at R, find the locus of R

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61. A variable straight line passes through the points of intersection of the lines $x + 2y = 1$ and $2x - y = 1$ and meets the co-ordinates axes in A and $B.$ Prove that the locus of the midpoint Of AB is $10xy = x + 3y.$

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62. A variable straight line is drawn through the point of intersection of the straight lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$ and meets the coordinate axes at A and B. Show that the locus of the midpoint of AB is the curve $2xy(a+b)=ab(x+y)$

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63. P is the point (-1,2), a variable line through P cuts the x & y axes at A&B respectively Q is the point on AB such that PA, PQ, PB are H.P. Find the locus of Q

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64. A rectangle PQRS has its side PQ parallel to the line $y=mx$ and vertices $P, Q,$ and S on the lines $y=a, x=b,$and $x=-b,$ respectively. Find the locus of the vertex $R.$

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65. A point $P'movealongthey - a\xi s. A \neg herp \oint Q$ $movessott\hat{t}hefixedstraightl \in ex$ cos alpha + sin alpha = p $istheperpendic\underline{a}rbi \sec \to rofthel \in esegment$PQ. $F \in dthelocusof$ Q`.

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66. Locus of the middle point of the intercept on the line $y = x + c$ made by the lines $2x + 3y = 5$ and $2x + 3y = 8, c$ being a parameter is

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67. Two points $PandQ$ are given. R is a variable point on one side of the line PQ such that $\angle RPQ - \angle RQP$ is a positive constant 2α. Find the locus of the point R.

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68. Let $L_1 = 0 and L_2 = 0$ be two fixed lines. A variable line is drawn through the origin to cut the two lines at R and $S\dot{P}$. is a point on the line AB such that $\frac{(m+n)}{OP} = \frac{m}{OR} + \frac{n}{OS}$. Show that the locus of P is a straight line passing through the point of intersection of the given lines R, S, R are on the same side of O).

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69. A variable straight line passes through a fixed point (h,k). Find the locus of the foot of the perpendicular on it drawn from the origin.

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70. A straight lien is drawn from a fixed point O metting a fixed straight line P. A point Q is taken on the line OP such that $OP. OQ$ is constant. Show that the locus of Q is a circle.

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71. The point $P(1, 1, 1)$ is transiated parallel to $2x = y$in the first quadrant through a unith distance. The coordinates of the point in new position are

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72. Two particles start from the point $(2, -1)$, one moving 2 units along the line $x + y = 1$ and the other 5 units along the line $x - 2y = 4$. If the particles move towards increasing y, then their new positions are

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73. The line $2x - y = 5$ turns about the point on it, whose ordinate and abscissae are through an angle of 45° in the anti-clockwise direction.

Find the equation of the line in the new position.

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74. The line $x + 2y = 4$ is-translated parallel to itself by 3 units in the sense of increasing x and is then rotated by 30° in the clockwise direction about the point where the shifted line cuts the x-axis.Find the equation of the line in the new position

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75. A ray of light coming fromthe point (1, 2) is reflected at a point A on the x-axis and then passes through the point (5,3). The coordinates of the point A is :

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76. A man starts from the point $P(-3, 4)$ and will reach the point $Q(0, 1)$ touching the line $2x + y = 7$ at R. The coordinates R on the line so that he will travel in the shortest distance is

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77. A beam of light is sent along the line $x - y = 1$, which after refracting from the x-axis enters the opposite side by turning through 30^0 towards the normal at the point of incidence on the x-axis. Then the equation of the refracted ray is $(2 - \sqrt{3})x - y = 2 + \sqrt{3}$

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

$y = (2 - \sqrt{3})(x - 1)$

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78. Show that the points (-2,3), (8, 3) and (6, 7) are the vertices of a right angle triangle .

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79. The points $(1, -2), (-3, 0)$and $(5, 6)$ are the vertices of aright angled isosceles triangle

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80. The distance of (1,2) from the line 3x-4y+15=0 measured parallel to the line 4x+3y=0 is

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81. The set of lines ax + by+ c= 0, where 3a+ 2b+ 4c =0, is concurrent at the point:

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82. If a and b are real numbers between o and 1 such that the points (a,0), (1,b) and (0,0) form an equilateral triangle then a=______ and b=________.

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83. If $a, bandc$ are in $AP,$ then the straight line $ax+by+c=0$ will always pass through a fixed point whose coordinates are_____

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84. Let the algebraic sum of the perpendicular distances from the points $(2,0), (0,2) and (1,1)$ to a variable straight line be zero. Then the line pass through a fixed point whose coordinates are $(1,1)$ b. $(2,2)$ c. $(3,3)$ d. $(4,4)$

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85. If the point $(2a-3, a^2-1)$ is on the same side of the line $x+y-4=0$ as that of the origin then

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86. The points $(-a, -b), (0, 0). (a, b)$ and (a^2, a^3) are

A. collinear

B. vertices of a parallelogram

C. vertices of a rectangle

D. none of these

Answer:

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87. The points $\left(0, \frac{8}{3}\right), (1, 3)$ and $(82, 30)$ are vertices of

A. an obtuse-angled $\triangle$

B. an acute-angled $\triangle$

C. a right-angled $\triangle$

D. an isosceles $\triangle$

Answer:

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88. 15. The distance between the lines 3x + 4y = 9 and 6x + 8y = 15 IS: (c) 6

(d) 2 10

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

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

C. 6

D. none of these

Answer:

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89. The straight lines $x + y = 0, 3x + y - 4 = 0$ and $x + 3y - 4 = 0$ form a triangle which is (A) isosceles (B) right angled (C) equilateral (D) scalene

A. isosceles

B. equilateral

C. right angled

D. none of these

Answer:

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

A. p+q+r=0

B. $p^2 + q^2 + q^2 = pq + qr + rp$

C. $p^3 + q^3 + r^3 = 3pqr$

D. none of these

Answer:

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91. Given four lines whose equations are $x + 2y - 3 = 0, 2x + 3y - 4 = 0, 3x + 4y - 7 = 0$ and $4x + 5y - 6 = 0$, then the lines are

A. they are all concurrent

B. they are sides of a quadrilateral

C. they are sides of a trapezium

D. none of these

Answer:

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

A. a straight line parallel to the x-axis

B. a cirle passing through the origin

C. a circle with the centre at the origin

D. a straight line parallel to the y-axis

Answer:

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93. If the sum of the distances of a point from two perpendicular lines in a plane is 1, then its locus is a square (b) a circle a straight line (d) two intersecting lines

A. a square

B. a circle

C. a straight line

D. two intersecting lines

Answer:

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94. The image of the point (-1,3) by the line x - y = 0 , is

A. (3,-1)

B. (1,-3)

C. (-1,-1)

D. (3,3)

Answer:

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95. The point (4, 1) undergoes the following three transformations successively: (a) Reflection about the line y = x (b) Translation through a distance 2 units along the positive direction of the x-axis. (c) Rotation through an angle $\frac{\pi}{4}$ about the origin in the anti clockwise direction. The final position of the point is given by the co-ordinates.

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

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

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

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

Answer:

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96. All points lying inside the triangle formed by the points (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:

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97. The two line segment joining $(-2, 7), (-5, -3)$ and $(-8, -13), (1, 17)$ cut each other at

A. only one point

B. no point

C. infinite number of points

D. none of these

Answer: C

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98. If line $y - x + 2 = 0$ is shifted parallel to itself towards the $x -$ axis by a perpendicular distance of $3\sqrt{2}$ units, then the equation of the new line is may be -

A. y=x-8

B. y=x+4

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

D. none of these

Answer:

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99. If the point $(a^2, a+1)$ lies in the angle between the lines $3x - y + 1 = 0$ and $x + 2y - 5 = 0$ containing the origin, then find the value of $a\cdot$

A. $a \geq 1$ or $a \leq -3$

B. $a \in (0, 1)$

C. $a \in (-3, 0) \cup \left(\frac{1}{3}, 1\right)$

D. none of these

Answer:

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100. The locus of a point which moves so that the difference of the squares of its distances from two given points is constant, is a

A. a circle

B. a straight line

C. a pair of lines

D. none of these

Answer:

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101. If $|x_1y_11x_2y_21x_3y_31| = |a_1b_11a_2b_21a_3b_31|$ then the two triangles with vertices $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ and $(a_1, b_1), (a_2, b_2), (a_3, b_3)$ are equal to area (b) similar congruent (d) none of these

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102. The straight line passing through the point of intersection of the straight line $x + 2y - 10 = 0$ and $2x + y + 5 = 0$ is

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103. State whether the statements are true or false. The perpendicular bisector of the line segment joining the points (1,1) and (3,5) passes through the point (0,4).

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104. P(m, n) (where m, n are natural numbers) is any point in the interior of the quadrilateral formed by the pair of lines $xy = 0$ and the lines $2x + y - 2 = 0$ and $4x + 5y = 20$. The possible number of positions of the point P is.

A. six

B. four

C. five

D. none of these

Answer:

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105. If $\alpha, \alpha^2)$ falls inside the angle made by the lines $2y = x, x > 0\&y = 3x, x > 0,$ then the set of values of α is $(-\infty, 3)$ (b) $\left(\frac{1}{2}, 3\right)$ $(0, 3)$ (d) $(-\infty, 0) \cup \left[\frac{1}{2}, \infty\right]$

A. $(\alpha, 3)$

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

C. (0,3)

D. $(- \propto, 0) \cup \left(\frac{1}{2}, \propto\right)$

Answer:

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106. 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. $\alpha = , \beta = 0$ c. $\alpha = , \beta = -1$ d. none of these

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

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

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

D. none of these

Answer:

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107. $A = \left(\sqrt{1-t^2} + t, 0\right)$ and $B = \left(\sqrt{1-t^2} - t, 2t\right)$ are two variable points then the locus of mid-point of AB is

A. a straight line

B. a pair of lines

C. a circle

D. none of these

Answer:

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108. If one diagonal of a square is the portion of the line $\frac{x}{a}+\frac{y}{b}=1$ intercepted by the axes, then the extremities of the other diagonal of the square are

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109. The three intercepts made on the line $x+y=5\sqrt{2}$ by the lines $y=x\tan\theta$ at $\theta=0,\frac{\pi}{4},\alpha\left(\frac{\pi}{4}<\alpha<\frac{\pi}{2}\right)$ are in A.P. then $\tan\alpha$=

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110. Let the coordinates of the foot of the perpendicular from the vertices of ΔABC on the opposite sides are $D(20, 25)$, $E(8, 16)$ and $F(8, 9)$. Then the orthocentre ΔABC is

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111. P is any point on the $x - a = 0$. If $A = (a, 0)$and PQ , the bisector of $\angle OCA$ meets the x-axis in Q prove that the locus of the foot of prependicular from Q on Op is $(x - a)^2(x^2 + y^2) = a^2y^2$

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