13. STRAIGHT LINES

1. If the normal drawn from the origin to the straight line $2x+7y+6=0$ makes an angle 6 with the positive X-axis, then $\theta =$

[TS 6th MAY 2020_SHIFT–1]

1. $Tan^{-1}\frac{7}{2}$ 2. $\pi - Tan^{-1}\frac{7}{2}$
3. $\pi + Tan^{-1}\frac{7}{2}$ 4. $-Tan^{-1}\frac{7}{2}$

2. (x_1, y_1) is the point of concurrence of a family of lines. If the algebraic sum of the lengths of the perpendiculars drawn to these lines from (2, 0), (0, 2) and (1, 1) is zero, then $(x_1, y_1) =$

[TS 6th MAY 2020_SHIFT–1]

1. (1, 1) 2. (0, 2)
3. (–1, 1) 4. (1, 2)

3. If the line $3x+4y+\lambda=0$ divides the distance between the lines $3x+4y+5=0$ and $3x+4y-5=0$ in the ratio of 3 : 7, then a value of λ is

[TS 6th MAY 2019_SHIFT–1]

1. –2 2. 2
3. 0 4. 5

4. If the lines 3x+4y-5=0, 2x+3y-4=0 and px+4y-6=0 all meet at the same point , then p is equal to **[AP EAMCET 17-09-20_Shift-1]**

1. -2 2. 0
3. 1 4. 2

5. A light ray emerging from a point source at A(2,3) is reflected on the y-axis at point 'B' and passes through point C(5,10), then the co ordinates of 'B' are

[AP EAMCET 17-09-20_Shift-2]

1. (5,0) 2. (0,5)
3. (0,2) 4. (2,0)

6. The line $x+y=1$ meets the lines represented by the equation $y^3-6xy^2+11x^2y-6x^3=0$ at the points P, Q, R. If O is the origin then $(OP)^2+(OQ)^2+(OR)^2=$

[AP EAMCET 17-09-20_Shift-2]

1. $\frac{85}{72}$ 2. $\frac{121}{72}$
3. $\frac{212}{72}$ 4. $\frac{217}{72}$

7. The image of the point P(3, 8) with respect to the line $x+3y=7$, assuming the line to be a plane mirror, is equal to _____

[AP EAMCET 17-09-20_Shift-2]

1. (1, 4) 2. (-1, 4)
3. (1, -4) 4. (-1, -4)

8. If a diagonal of a square is along the line 8x-15y=0 and one of its vertices is (1,2),then the equations of the sides of the square passing through this vertex are **[AP EAMCET 18-09-20_Shift-1]**

1. $23x-7y+9=0, 7x+23y+53=0$
2. $23x-7y-9=0, 7x+23y-53=0$
3. $23x+7y-9=0, 7x+23y-53=0$
4. $23x+7y-9=0, 7x+23y+53=0$

9. A straight line is drawn through the point A(1,2) such that its point of intersection with the straight line $x+y=4$ is at a distance $\sqrt{6}/3$ from the given point 'A'. Find the angle which the line makes with the positive direction of x-axis.. **[AP EAMCET 18-09-20_Shift-1]**

1. $\theta = 15^\circ$ & 75° 2. $\theta = 45^\circ$ & 75°
3. $\theta = 45^\circ$ & 60° 4. $\theta = 60^\circ$ & 30°

10. The combined equation of the lines passing through the origin and having slopes $\frac{2}{3}$ and $\frac{-2}{3}$ is **[AP EAMCET 18-09-20_Shift-1]**

1. $2x^2-9y^2=0$ 2. $4x^2-xy-9y^2=0$
3. $4x^2-9y^2=0$ 4. $4x^2+xy-9y^2=0$

11. Given that lines $L_1: y=m_a x, L_2: y=m_b x$ and $L_3: y=m_c x$ make equal intercepts on the line $x+y=1$, then

[AP EAMCET 18-09-20_Shift-1]

1. $2(1+m_a)(1+m_c)=(1+m_b)(1+m_c)$
2. $2(1+m_a)(1+m_c)=(1+m_b)(2+m_a+m_c)$
3. $(1+m_a)(1+m_b)=(2+m_c)(1+m_a+m_c)$

4. $(1+m_a)(1+m_b)=(1+m_b)(2+m_a+m_c)$

12. If (a,8) is a point on the line join of (2,5) and (4,-1) then **[AP EAMCET 18-09-20_Shift-1]**

1. $a=\frac{8}{3}$ 2. $a=\frac{3}{8}$
3. a=1 4. a= -1

13. A straight line L_1 passing through A(3,1) meets the coordinate axes at P and Q such that its distance from the origin O is maximum. The area of ΔOPQ is ____ sq.units

[AP EAMCET 18-09-20_Shift-2]

1. $\frac{100}{3}$ 2. $\frac{25}{3}$
3. $\frac{50}{3}$ 4. $\frac{200}{3}$

14. The equations of lines passing through (5,3) and perpendicular to 2x+y-7=0 is

[AP EAMCET 18-09-20_Shift-2]

1. 2y-x-2=0 2. 2y-x+2=0
3. x+y-8=0 4. 2y-x-1=0

15. If the slope of the line $ax+(3-a)y+7=0$ is 7 then the value of integral part of "a" is

[AP EAMCET 18-09-20_Shift-2]

1. 3 2. 7
3. 0.5 4. 3.5

16. If the lines 3x+y-2=0, px+2y-3=0 and 2x-y-3=0 are concurrent, then p=

[AP EAMCET 21-09-20_Shift-1]

1. -5 2. 5
3. 3 4. -3

17. The equation of the line through the intersection of 3x-4y+1=0 and 5x+y-1=0 which cuts off equal intercepts on the axes is given by

[AP EAMCET 21-09-20_Shift-1]

1. 23x+23y-11=0 2. 23x+23y+11=0
3. 23x-23y-11=0 4. 23x-23y+11=0

18. Find the equation of the right bisector of the line segment joining the points (3,4) and (-1, 2). **[AP EAMCET 21-09-20_Shift-1]**

1. 2x+y-5=0 2. 2x-y+5=0
3. 2x+y+5=0 4. 2x-y-5=0

19. The distance between the lines $3x+4y=9$ and $6x+8y=15$ is equal to ______ units

[AP EAMCET 21-09-20_Shift-2]

1. $\frac{1}{10}$ 2. $\frac{3}{10}$
3. $\frac{5}{10}$ 4. $\frac{7}{10}$

20. If the length of the intercept made on the line $y=ax$ by the lines $y=2$ and $y=6$ is less 5 then **[AP EAMCET 21-09-20_Shift-2]**

1. $a\in(-\infty,\infty)$ 2. $a\in\left(\frac{-4}{3},\frac{4}{3}\right)$
3. $a\in\left(\frac{-3}{4},\frac{4}{3}\right)$ 4. $a<\frac{-4}{3}$ or $a>\frac{4}{3}$

21. A triangle can be uniquely determined by its…….. **[AP EAMCET 21-09-20_Shift-2]**

1.three angles
2.Three sides
3.One of the angles and one of the sides
4.Only one side

22. If 3a + 5b + 6c = 0 then the family of lines ax + by + c = 0 pass through the fixed point

[AP EAMCET 21-09-20_Shift-2]

1. $\left(\frac{5}{6},\frac{1}{2}\right)$ 2. $\left(\frac{1}{2},\frac{1}{3}\right)$
3. $\left(\frac{1}{3},\frac{1}{2}\right)$ 4. $\left(\frac{1}{2},\frac{5}{6}\right)$

23. The number of the values of 'k' for which the lines 2x + y = 1, 3x + 2y = 2, kx + 3y = 3 are concurrent is____

AP EAMCET 22-09-20_Shift-1]

1. 0 2. Infinite
3. 1 4. 2

24. The number of possible straight lines passing through the point (2, 3), while forming a triangle with coordinate axes enclosing an area 12sq.units is

[AP EAMCET 22-09-20_Shift-1]

1. 1
2. 2
3. 3
4. 4

25. The acute angle between the lines $x-y=0$, and $y=0$ is**[AP EAMCET 22-09-20_Shift-1]**

1. $\frac{\pi}{6}$
2. $\frac{\pi}{4}$
3. $\frac{\pi}{3}$
4. $\frac{5\pi}{6}$

26. If M is a point on the line $y=x$ and points $P(0,1), Q(2,0)$ are such that $PM+QM$ is minimum, the ordinates of M are

[AP EAMCET 22-09-20_Shift-2]

1. (0,0)
2. $\left(\frac{13}{17},\frac{13}{17}\right)$
3. $\left(\frac{1}{7},\frac{1}{7}\right)$
4. $\left(\frac{2}{3},\frac{2}{3}\right)$

27. The quadrilateral formed by the pair of line xy+x+y+1=0, xy+3x+3y+9=0 is

[AP EAMCET 22-09-20_Shift-2]

1. Parallelogram
2. Rhombus
3. Rectangle
4. Square

28. If the lines y=3x+1 and 2y=x+3 are equally inclined to the line y=mx+4, then the value of 'm' is equal to

[AP EAMCET 22-09-20_Shift-2]

1. $\frac{1\pm3\sqrt{2}}{7}$
2. $\frac{-1\pm5\sqrt{2}}{7}$
3. 0
4. $\frac{1\pm5\sqrt{2}}{7}$

29. The incentre of triangle formed by lines x + y = 1, x = 1, y = 1 is

[AP EAMCET 22-09-20_Shift-2]

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

30. If S1 and S2 are two straight lines such that the reflection of S1 in S2 and the reflection of S2 in S1 coincide, the angle between S1 and S2 is equal to **[AP EAMCET 23-09-20_Shift-1]**

1. $\frac{\pi}{3}$
2. $\frac{\pi}{6}$
3. $\frac{\pi}{4}$
4. Data insufficient

31. The equation of the line passing through the point of intersection of lines $2x-y+2=0$ and $x+y+4=0$ and the point (5, -2) is ___

[AP EAMCET 23-09-20_Shift-1]

1. $y+2=0$
2. $y-2=0$
3. $4x-3y-6=0$
4. $x-y-7=0$

32. The length of the perpendicular from (1,-2) to the line 12x+5y+63=0 is ___

[AP EAMCET 23-09-20_Shift-1]

1. 4
2. 5
3. 6
4. $\frac{85}{13}$

33. The image of the (6,5) in the line x=3 is ------

1. (5,0)
2. (0,5)
3. (5,5)
4. (5,6)

34. *If* $p=a_1x+b_1y+k_1=0$, $q=a_2x+b_2y+k_2=0$ *and* $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{k_1}{k_2}$, *then the curve* $p+cq$ *is*

1. Not a Straight line
2. A different Straight line
3. Same as the straight line p=0
4. A pair of straight lines

35. The distance between the parallel lines $9x^2-6xy+y^2+18x-6y+8=0$ is

1. $\sqrt{10}$
2. 2
3. $\frac{2\sqrt{153}}{\sqrt{10}}$
4. $\frac{2}{\sqrt{10}}$

36. If the equation of the base of an equilateral triangle is $x+y=6$ and opposite vertex is the point $(-1,-1)$ then the area of the triangle is equal to______sq.units.

1. $\frac{8}{\sqrt{3}}$
2. $32\sqrt{3}$

3. $\frac{32}{\sqrt{3}}$ 4. $16\sqrt{3}$

37. If $x\cos\theta + y\sin\theta = p$ is the normal form and $y = mx + c$ is the slope-intercept form of the line $x + 2y + 1 = 0$, then $\tan^{-1}(\tan\theta + m + c) =$

[TS EAMCET 09-09-20_Shift-1]

1. 0 2. $\frac{\pi}{2}$

3. π 4. $\frac{\pi}{4}$

38. If the family of the straight lines $ax + by + c = 0$, where $2a + 3b = 4c$ is concurrent at the point $P(l, m)$ then the foot of the perpendicular drawn from P to the line $x + y + 1 = 0$ is

[TS EAMCET 09-09-20_Shift-1]

1. $\left(\frac{-3}{8}, \frac{-5}{8}\right)$ 2. $\left(\frac{-2}{5}, \frac{-3}{5}\right)$

3. $(3, -4)$ 4. $(-5, 4)$

39. O(0,0),A(-3,-1) and B(-1,-3) are the vertices of a ΔOAB. P is point on the perpendicular AD drawn from A on OB such that $\frac{AP}{PD} = \frac{3}{4}$. Then the equation of the line L parallel to OB and passing through P, is

[TS EAMCET 09-09-20_Shift-1]

1. 3x-y+3=0 2. 21x-7y+32=0

3. 15x-5y+32=0 4. 3x-y+35=0

40. A straight line $L \equiv 0$ passing through the point A=(-5,-4) and having slope $\tan\theta$ meets the lines $x + 3y + 2 = 0$ and $2x + y + 4 = 0$ respectively at the points B and C. If $\frac{100}{AC^2} - \frac{225}{AB^2} = 4\cos 2\theta + \sin 2\theta$, then the slope of the line $L \equiv 0$ is

[TS EAMCET 09-09-20_Shift-2]

1. $\frac{2}{3}$ 2. $\frac{-2}{3}$

3. $\frac{-1}{2}$ 4. $\frac{1}{2}$

41. The equations of the sides AB,AC and BC of a ΔABC are respectively x-3y=0,3x-y=0,x+y+4=0.If P and Q are the points on the line 3x-y+k=0 passing through B such that PB:BQ=1:1 then k

[TS EAMCET 09-09-20_Shift-2]

1. 8 2. 12

3. -8 4. -12

42. A line L_1 passing through A(3,4) and having slope 1 cuts another line L_2 passing through C at B, such that AB=AC .If the equation of line BC is $2x - y + 4 = 0$, then the equation of AC is

[TS EAMCET 10-09-20_Shift-1]

1. $7x - y - 17 = 0$ 2. $x - y + 1 = 0$

3. $x - 7y + 25 = 0$ 4. $2x + 3y - 18 = 0$

43. Angles made with the X- axis by the two lines passing through the point P(1,2) and cutting the line $x + y = 4$ at a distance $\frac{\sqrt{6}}{3}$ units from the point P are

[TS EAMCET 10-09-20_Shift-1]

1. $\frac{\pi}{5}$ and $\frac{3\pi}{10}$ 2. $\frac{\pi}{6}$ and $\frac{\pi}{3}$

3. $\frac{\pi}{12}$ and $\frac{5\pi}{12}$ 4. $\frac{\pi}{8}$ and $\frac{3\pi}{8}$

44. The straight lines $x + 3y - 9 = 0$, $4x + 5y - 1 = 0$, $px + qy + 10 = 0$ are concurrent if the line $5x + 6y + 10 = 0$ passes through the point

[TS EAMCET 10-09-20_Shift-1]

1. (q,-p) 2. (q,p)

3. (p,-q) 4. (p,q)

45. A function $f : R \to R$ such that $f(1) = 2$ and $f(x + y) = f(x).f(y)\ \forall x, y$. The area (in square units)enclosed by the lines $2|x| + 5|y| \leq 4$ expressed interms of $f(1), f(2)$ and $f(4)$ is

[TS EAMCET 10-09-20_Shift-2]

1. $\frac{f(4)}{f(1)+2f(2)}$ 2. $\frac{f(4)}{1+f(2)}$

3. $\frac{2f(4)}{2f(1)+f(2)}$ 4. $\frac{f(4)}{2f(1)+f(2)}$

46. Two straight lines $3x+4y=5$ & $4x-3y=15$ intersect at the point A. The equations of the lines passing through (1,2) and intersecting the given lines at B and C such that AB=AC are **[TS EAMCET 10-09-20_Shift-2]**

1. $x+4y=9, 4x-y=2$
2. $9x-2y=5, 2x+9y=20$
3. $6x-y=4, x+6y=13$
4. $7x+y=9, x-7y+13=0$

47. The equation of a line making an angle 60^0 with line $x+y-3=0$ and passing through the point (1,1) is **[TS EAMCET 10-09-20_Shift-2]**

1. $(1+\sqrt{3})x+(1-\sqrt{3})y-2=0$
2. $2x+y-3=0$
3. $\sqrt{3}x+(1-\sqrt{3})y=1$
4. $\sqrt{3}x+(2+\sqrt{3})y=2(1+\sqrt{3})$

48. If the straight line passing through the point P(3,4) makes an angle $\frac{\pi}{6}$ with the positive direction of X-axis and meets the line 12x+5y+10=0 at Q, then the length of PQ is **[TS EAMCET 11-09-20_Shift-1]**

1. $\frac{44}{12\sqrt{2}+9}$ 2. $\frac{66}{12\sqrt{3}+5}$

3. $\frac{132}{12\sqrt{3}+5}$ 4. $\frac{148}{6\sqrt{2}+3}$

49. If the equation of the straight line passing through the point of intersection of x+2y-19=0,x-2y-3=0 and which is at a perpendicular distance of 5 units from the point (-2,4) is 5x+by+c=0,then a p0ssible value of 5+b+c is **[TS EAMCET 11-09-20_Shift-1]**

1. -108 2. 10
3. 86 4. -14

50. If two equal sides of an isosceles triangle are given by the equations 7x-y+3=0 and x+y-3=0,then the equation of its third side passing through the point (2,-5) is **[TS EAMCET 11-09-20_Shift-1]**

1. x-3y=17 2. 3x-y=11
3. 7x+2y=4 4. 3x+y=1

51. Let P be the point of intersection of the lines $L_1 \equiv x-y-7=0$ *and* $L_2 \equiv x+y-5=0$. $A(x_1,y_1)$ *and* $B(x_2,y_2)$ are points on the lines $L_1=0$ and $L_2=0$ respectively such that $PA=3\sqrt{2}, PB=\sqrt{2}, x_1y_1\geq 0, x_2y_2\geq 0,$ then the angle made by the line segment AB at the origin is **[TS EAMCET 11-09-20_Shift-1]**

1. $\frac{\pi}{4}$ 2. $\frac{\pi}{2}$

3. $\cos^{-1}\left(\frac{3}{4}\right)$ 4. $\cos^{-1}\left(\frac{9}{\sqrt{85}}\right)$

52. If the lines 3x+y-4=0,x-ay-10=0,bx+2y+9=0 form three successive sides of a rectangle in that order and the fourth side passes through (1,2), then the area of that rectangle (in sq. units) is **[TS EAMCET 11-09-20_Shift-2]**

1. 8 2. $\frac{15}{\sqrt{10}}$

3. $\frac{51}{\sqrt{40}}$ 4. $\frac{51}{4}$

53. The points A(2,1), B(3,-2) and C(a,b) are vertices of rectangle ABCD. If the point p(3,4) lies on CD produced , then 5a+10b= **[TS EAMCET 11-09-20_Shift-2]**

1. 41 2. 10
3. 45 4. -15

54. The sum of the squares of the intercepts made the line $5x-2y=10$ on the co-ordinate axes equals____ **[AP EAMCET 19-08-2021_Shift-1]**

1. 29 2. 25
3. 4 4. 100

55. For three consecutive odd integers a, b *and* c, if the variable line $ax+by+c=0$ Always

passesthrough the point (α,β),the value of $\alpha^2+\beta^2=$ **[AP EAMCET 19-08-2021_Shift-1]**

1. 9 2. 4
3. 5 4. 3

56. The line which is parallel to x- axis and crosses the curve $y=\sqrt{x}$ at an angle of 45^0 is

[AP EAMCET 19-08-2021_Shift-1]

1. $y=\frac{1}{4}$ 2. $y=\frac{1}{2}$
3. $y=1$ 4. $y=4$

57. If $2x+3y+4=0$ is the perpendicular bisector of the line segment joining the points $A(1,2)$ and $B(\alpha,\beta)$, then the value of $13\alpha+13\beta=$

[AP EAMCET 19-08-2021_Shift-1]

1. -81 2. -99
3. 99 4. 81

58. If $A(4,7), B(-7,8)$ and $C(1,2)$ are the vertices of ΔABC, then the equation of perpendicular bisector of the side AB is_____

[AP EAMCET 19-08-2021_Shift-2]

1. $x-11y-24=0$ 2. $11x+y+24=0$
3. $11x-y+24=0$ 4. $11x+y-24=0$

59. The ratio in which the straight line $3x+4y=6$ divides the join of the points $(2,-1)$ and $(1,1)$ is____ **[AP EAMCET 19-08-2021_Shift-2]**

1. $1:4$ 2. $8:13$
3. $4:1$ 4. $-4:1$

60. Find the equation of a line passing through thepoint $(4,3)$, which cuts a triangle of minimum area from the first quadrant

[AP EAMCET 19-08-2021_Shift-2]

1. $3x+4y=24$ 2. $2x-y=5$
3. $2x+y=8$ 4. $x-2y=5$

61. If the orthocentre of the triangle formed by thelines $2x+3y-1=0, x+2y+1=0$ and $ax+by-1=0$ lies at origin, then $\frac{1}{a}+\frac{1}{b}=$

[AP EAMCET 19-08-2021_Shift-2]

1. 0 2. $\frac{1}{60}$
3. $\frac{1}{8}$ 4. 4

62. Find the equation of a straight line passing through $(-5,6)$ and cutting off equal intercepts on the co-ordinate axes.

[AP EAMCET 20-08-2021_Shift-1]

1. $6x-5y=30$ 2. $x-y=-11$
3. $x+y=11$ 4. $x+y=1$

63. Line has slope m and y intercept 4. The distance between the origin and the line is equal to _____ **[AP EAMCET 20-08-2021_Shift-1]**

1. $\frac{4}{\sqrt{1-m^2}}$ 2. $\frac{4}{\sqrt{m^2-1}}$
3. $\frac{4}{\sqrt{m^2+1}}$ 4. $\frac{4m}{\sqrt{m^2+1}}$

64. The equation of the base of an equilateral triangle is $x+y=2$ and one vertex is $(2,-1)$, then the length of the side of the triangle is _______

[AP EAMCET 20-08-2021_Shift-1]

1. $\frac{\sqrt{3/2}}{\sqrt{2/3}}$ 2. $\sqrt{2}$
3. $\sqrt{2/3}$ 4. $\sqrt{3/2}$

65. The equation of a straight line which passes through the point $(a\cos^3\theta, a\sin^3\theta)$ and perpendicular to $(x\sec\theta+y\csc\theta)=a$ is

[AP EAMCET 20-08-2021_Shift-1]

1. $\frac{x}{a}+\frac{y}{b}=a\cos\theta$
2. $x\cos\theta-y\sin\theta=a\cos 2\theta$
3. $x\cos\theta+y\sin\theta=a\cos 2\theta$
4. $x\cos\theta+y\sin\theta-a\cos 2\theta=1$

66. If $A(1,3)\&C(7,5)$ are two opposite vertices of

asquare, then find the equation of a side passing through A. **[AP EAMCET 20-08-2021_Shift-2]**

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

67. 'C' is the centroid of the triangle with vertices $(3,-1),(1,3)\&(2,4)$. Let 'P' be the point of intersection of the lines $x+3y-1=0\&$ $3x-y+1=0$ Then a line which passes through both points C and P would also passes through the point

[AP EAMCET 20-08-2021_Shift-2]

1. $(-9,-7)$
2. $(-9,-6)$
3. $(7,6)$
4. $(9,7)$

68. The distance of the point $(1,2)$ from the line $x+y+5=0$ measured along the line parallel to $3x-y=7$ is equal to

[AP EAMCET 20-08-2021_Shift-2]

1. $4\sqrt{10}$
2. 40
3. $\sqrt{40}$
4. $2\sqrt{20}$

69. Find the equation of a line which passes through $\left(2\cos^3(\theta),2\sin^3(\theta)\right)$ and is perpendicular to the line $x\cos(\theta)-y\sin(\theta)=2\cos(2\theta)$.

[AP EAMCET 20-08-2021_Shift-2]

1. $x\sec(\theta)+y\operatorname{cosec}(\theta)=2$
2. $x\operatorname{cosec}(\theta)+y\sec(\theta)=2$
3. $x\sin(\theta)+y\cos(\theta)=2$
4. $x\cos(\theta)+y\sin(\theta)=2$

70. Find the equation of a straight line which passes through the point $(-1,-1)$ and makes an angle 150^0 with positive direction of x-axis. **[AP EAMCET 23-08-2021_Shift-1]**

1. $\sqrt{3}x+y=1$
2. $\sqrt{3}y+x+\left(1+\sqrt{3}\right)=0$
3. $x+\sqrt{3}y+\left(\sqrt{3}-1\right)=0$
4. $x+y=0$

71. The ratio in which the line joining points $A(-1,-1)\&B(2,1)$ divides the line joining $C(3,4)\&D(1,2)$

[AP EAMCET 23-08-2021_Shift-1]

1. 7:5 internally
2. 7:5 externally
3. 7:11 internally
4. 7:11 externally

72. The lines $(a+2b)x+(a-3b)y=a-b$ for different values of a and b pass through thefixed point whose coordinates are

[AP EAMCET 23-08-2021_Shift-1]

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

73. If (α,β) is the image of the point $(3,-4)$ with respect to the line $4x-y-1=0$, then the value of $\beta-\alpha=$ **[AP EAMCET 23-08-2021_Shift-1]**

1. $\frac{-31}{17}$
2. $\frac{-107}{17}$
3. $\frac{31}{17}$
4. $\frac{13}{71}$

74. The perpendicular bisector of line segment joining the points $P(1,4)$ and $Q(k,3)$ has $y-$ intercept '–4'. Then a possible value of 'k' among the following is _______

[AP EAMCET 23-08-2021_Shift-1]

1. 2
2. –2
3. –4
4. –1

75. The distance between the lines $3x+4y=9$ and 6x+8y=15 is**AP EAMCET 23-08-2021_Shift-1]**

1. $\frac{3}{2}$
2. $\frac{3}{10}$
3. 6
4. $\frac{3}{5}$

76. The angle between the straight lines $3x+4y+9=0$ and $x-7y-22=0$ is _____

[AP EAMCET 23-08-2021_Shift-1]

1. $\frac{\pi}{4}$ 2. $\frac{\pi}{6}$
3. $\frac{\pi}{3}$ 4. $\frac{\pi}{8}$

77. The equation of the lines through the point (3,2) which makes an angle of $45°$ with the line $x-2y=3$ are

[AP EAMCET 23-08-2021_Shift-1]

1. $3x-y=7$ & $x+3y=9$
2. $x-3y=7$ & $3x+y=9$
3. $x-y=3$ & $x+y=2$
4. $2x+y=7$ & $x-2y=9$

78. A line 'L' through $A(-5,-4)$ meets the lines at points 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 find the equation of 'L'. **[AP EAMCET 24-08-2021_Shift-1]**

1. $2x+3y+22=0$ 2. $5x-4y+7=0$
3. $3x-2y+3=0$ 4. $3x-2y+7=0$

79. A straight line $\frac{x}{a}-\frac{y}{b}=1$ passes through the point (8,6) and cuts a triangle of area 12 sq. units from the axes of coordinates. The equations of the straight lines are _____

[AP EAMCET 24-08-2021_Shift-1]

1. $3x+2y=12$ & $3x+8y=24$
2. $3x-2y-12=0$ & $3x-8y+24=0$
3. $2x+3y=12$ & $8x+3y=24$
4. $2x-3y+12=0$ & $8x+3y+24=0$

80. If a straight line through the point $P(1,2)$, which makes an angle $45°$ with the x–axis, meets the line $3x+4y+5=0$ at Q, then length of PQ equals _____ units.

[AP EAMCET 24-08-2021_Shift-1]

1. $\frac{16\sqrt{2}}{7}$ 2. $\frac{\sqrt{7}}{2}$
3. $\frac{7\sqrt{2}}{16}$ 4. $\frac{16}{7}$

81. If the line $px-qy=r$ intersects the coordinate axes at $(a,0)$ and $(0,b)$ then value of $(a+b)$ is equal to **[AP EAMCET 24-08-2021_Shift-2]**

1. $\frac{r(q+p)}{pq}$ 2. $\frac{r(q-p)}{pq}$
3. $\frac{r(p-q)}{pq}$ 4. $\frac{r(p-q)}{p+q}$

82. The number of lines that can be drawn through the point $(4,-5)$ at a distance of 10 units from the point $(1,3)$ is _____

[AP EAMCET 24-08-2021_Shift-2]

1. 1 2. 0
3. 2 4. ∞

83. If a point 'P' on the line $3x+5y=15$ is equidistant from the coordinate axes, then P lies

[AP EAMCET 24-08-2021_Shift-2]

1. Only in the first quadrant
2. Either in first or in second quadrant
3. Either in first or in third quadrant
4. Only in the third quadrant

84. If a point (a, a) falls between the lines $|x+y|=4$, then

[AP EAMCET 25-08-2021_Shift-1]

1. $|a|=2$ 2. $|a|=3$
3. $|a|<2$ 4. $|a|<3$

85. If the straight lines $2x-y+1=0$, $4x+y+2=0$ and $x+y-k=0$ are concurrent, then 'k' equals _____ **[AP EAMCET 25-08-2021_Shift-1]**

1. $\frac{1}{2}$ 2. 2
3. -2 4. $\frac{-1}{2}$

86. Find the value(s) of 'k' such that the distance between the two parallel lines represented by $(x-2y)^2+k(x-2y)=0$ is 3 units.

[AP EAMCET 25-08-2021_Shift-1]

1. 0 2. $\pm3\sqrt{5}$
3. ±5 4. ±3

87. In an isosceles triangle ABC, the coordinates

of vertices B and C of the base BC are (3, 2) and (2, 3) respectively. If the equation of the line AB is $3y = 2x$, then the equation of the line AC is _____

[AP EAMCET 25-08-2021_Shift-1]

1. $2y = 3x$
2. $2y = x$
3. $x + y = 0$
4. $2x - y = 0$

88. If the lines $4x+3y-1=0, x-y+5=0$ and $kx+5y-3=0$ are concurrent then k -=

[AP EAMCET 25-08-2021_Shift-1]

1. 4
2. 5
3. 6
4. 7

89. Find the value of 'k', if the line joining the points $(2,k)$ and $(3,7)$ is parallel to the line joining points $(-2,1)$ and $(3,0)$

[AP EAMCET 25-08-2021_Shift-2]

1. $\frac{37}{5}$
2. $\frac{34}{5}$
3. $\frac{36}{5}$
4. $\frac{35}{5}$

90. The equation of a line through the point (1,2) whose distance from the point (3,1) has the greatest value is ______

[AP EAMCET 25-08-2021_Shift-2]

1. $y = 2x$
2. $y = x + 1$
3. $x + 2y = 5$
4. $y = 3x - 1$

91. Identify the point on the line $2x+3y+7=0$, which is at a distance of +3 units from$(1,-3)$.

[AP EAMCET 25-08-2021_Shift-2]

1. $\left(\frac{\sqrt{13}+9}{\sqrt{13}}, \frac{-3\sqrt{13}+6}{\sqrt{13}}\right)$
2. $\left(\frac{\sqrt{13}-9}{\sqrt{13}}, \frac{-3\sqrt{13}-6}{\sqrt{13}}\right)$
3. $\left(\frac{\sqrt{13}-9}{\sqrt{13}}, \frac{-3\sqrt{13}+6}{\sqrt{13}}\right)$
4. $\left(\frac{\sqrt{13}+9}{\sqrt{13}}, \frac{3\sqrt{13}-6}{\sqrt{13}}\right)$

92. A person standing at the junction (crossing) of two straight paths represented by the equations $2x-3y+4=0$ and $3x+4y-5=0$, wants to reach the path whose equation is $6x-7y+8=0$ in the least time, then the equation of the path he should follow is____

[AP EAMCET 25-08-2021_Shift-2]

1. $119x - 102y - 125 = 0$
2. $119x + 102y - 125 = 0$
3. $102x + 119y - 125 = 0$
4. $102x + 119y + 125 = 0$

93. If the two lines $\frac{3}{2}x+(2a-1)y=3$ and $2x + a^2y = -3$ are perpendicular, then the distanceof their point of intersection from the point $(1,1)$ is

[TS EAMCET 04-08-2021_Shift-2]

1. $\frac{9}{\sqrt{5}}$
2. 3
3. $\frac{\sqrt{45}}{5}$
4. $\sqrt{\frac{3}{5}}$

94. A straight line passing through a fixed point $(3,5)$ intersects the coordinate axes at twopoints A and B. if the locus of $C(x,y)$ whichforms a rectangle with the points A, O and B is $ax + 2hxy + by = 0$, then $a+b+h=$

[TS EAMCET 04-08-2021_Shift-2]

1. $\frac{17}{2}$
2. 7
3. $\frac{15}{2}$
4. 10

95. For all $\alpha, \beta \in R$ and $\alpha\beta > 0$, the line $\alpha x+\beta y+\sqrt{\alpha\beta}=0$ is such that it

[TS EAMCET 04-08-2021_Shift-2]

1. possesses a slope independent of α and β
2. passes through a fixed point
3. forms a triangle of constant area with coordinate axes
4. possesses intercepts on the axes that differ by a quantity independent of α, β

96. Let L_1 be a line passing through $(2,1)$ and $\left(3,\frac{5}{2}\right)$. L_2 is a line perpendicular to L_1

and passingthrough $(4,-1)$. The area of the triangle formed by L_1, L_2 and Y-axis is

[TS EAMCET 04-08-2021_Shift-2]

1. $\frac{121}{39}$
2. $\frac{221}{13}$
3. $\frac{154}{169}$
4. $\frac{22}{13}$

97. If $P'(a,b)$ is the image of the point $P(-1,2)$ with respect to the line $x-2y+3=0$, then the length of the perpendicular from P' onto the line $2x+y-7=0$ is

[TS EAMCET 04-08-2021_Shift-1]

1. $\frac{3}{\sqrt{5}}$
2. 5
3. $\frac{7}{\sqrt{5}}$
4. 7

98. If the vertices of a triangle ABC are $A(1,7), B(-5,-1)$ *and* $(7,4)$, then the equation of a bisector of $\angle ABC$ is

[TS EAMCET 04-08-2021_Shift-1]

1. $7x-9y+26=0$
2. $9x-7y+38=0$
3. $7x+9y+44=0$
4. $9x+7y+52=0$

99. If the portion of a straight line intercepted between the coordinate axes is divided by the point $(2,3)$ in the ratio $2:3$ then the product of the intercepts made by this line on the axes is **[TS EAMCET 05-08-2021_Shift-1]**

1. 25
2. $\frac{29}{6}$
3. 50
4. $\frac{31}{3}$

100. The slope of a line L is 2. If m_1, m_2 are slopes of the two lines which are inclined at an angle of $\frac{\pi}{6}$ with L, then $m_1+m_2=$

[TS EAMCET 05-08-2021_Shift-1]

1. -11
2. 16
3. 11
4. -16

101. In a ΔABC, $2x+3y+1=0, x+2y-12=0$ are the perpendicular bisectors of its sides AB and AC respectively and if A is $(3,2)$, then the slope of the side BC is

[TS EAMCET 05-08-2021_Shift-1]

1. 1
2. $\frac{1}{3}$
3. $\frac{5}{3}$
4. $\frac{5}{2}$

102. If the equation of a line having a slope $m(m \in Z)$, passing through $(1,1)$ and making an angle of $\tan^{-1}\left(\frac{5}{7}\right)$ with the line $x+y-3=0$ is $ax+y+c=0$, then $ac=$

[TS EAMCET 05-08-2021_Shift-1]

1. -7
2. -42
3. -21
4. 12

103. From the point $(3,-4)$ perpendicular lines L_1 *and* L_2 are drawn on each of the lines $S \equiv 2x^2+3xy-2y^2-7x+y+3=0$. The area of the quadrilateral formed by the pair of lines $S=0$, L_1 *and* L_2 is (in square units)

[TS EAMCET 05-08-2021_Shift-1]

1. $\frac{64}{5}$
2. $\frac{72}{5}$
3. 25
4. 35

104. A straight line passing through origin O intersectthe lines $10x-8y-10=0$ and $\frac{x}{4}-\frac{y}{5}+1=0$ at rightangles and at the points P and Q respectively. Then the ratio in which O divides the line segment PQ is **[TS EAMCET 05-08-2021_Shift-2]**

1. $1:2$
2. $1:4$
3. $1:1$
4. $3:4$

105. Consider the lines $L_1 \equiv 4x+5y-6=0$, $L_2 \equiv 2x+3y-4=0, L_3 \equiv 3x-y+2=0$. If the line $L_1=0$ intersects the lines $L_2=0$ and $L_3=0$ at

the points A and B respectively. Then the combined equation of OA and OB is

[TS EAMCET 05-08-2021_Shift-2]

1. $26x^2 + 17xy + 2y^2 = 0$
2. $x^2 - 2xy + y^2 = 0$
3. $3x^2 + 17xy + 2y^2 = 0$
4. $26x^2 + 2xy + 17y^2 = 0$

106. $x - y = 0$ and $\frac{x}{2} + \frac{y}{2} = 1$ are respectively the perpendicular bisectors of the sides AB and AC of a triangle ABC. If the vertex is $A(2,3)$, then the equation of the sides BC is

[TS EAMCET 05-08-2021_Shift-2]

1. $x - 2y + 1 = 0$ 2. $x + 2y - 3 = 0$
3. $2x + y - 3 = 0$ 4. $x - 2y = -4$

107. In an isosceles right angled triangle, if theequation of the hypotenuse and its oppositevertex are $3x + 4y = 4$ and $(2,2)$, then theslopes of the remaining two sides are

[TS EAMCET 05-08-2021_Shift-2]

1. $\frac{1}{7}, -7$ 2. $\frac{-1}{7}, 7$
3. $\frac{1}{7}, 7$ 4. $\frac{-1}{7}, -7$

108. The equation of a given straight line is $\frac{x - x_1}{\cos\theta} = \frac{y - y_1}{\sin\theta} = r$. If the equation of the line perpendicular to the given line and passing through (α, β) is $\frac{x}{a} + \frac{y}{b} = 1$ then $\frac{b}{a} =$

[TS EAMCET 06-08-2021_Shift-2]

1. $\text{Tan}\theta$ 2. $-\text{Tan}\theta$
3. $\cot\theta$ 4. $-\cot\theta$

109. The origin belongs to a region between the lines $x + 2y - 5 = 0$ and $3x - 4y + 5 = 0$. The number of points in that region of the form $\left((\alpha - 1)^2, \alpha\right), \alpha \in Z$ is

[TS EAMCET 06-08-2021_Shift-2]

1. Infinite in number 2. 3
3. 4 4. 2

110. Let $A(1,1)$ be a point .B is the image of Awith respect to the line $x + 2y + 2 = 0$. If C is the foot of the perpendicular from B on the line $3x + 4y - 10 = 0$, then $AC =$

[TS EAMCET 06-08-2021_Shift-2]

1. $\frac{1}{\sqrt{2}}$ 2. 3
3. $\sqrt{3}$ 4. 1

111. Image of $A(1,-2)$ with respect to the straight line $L \equiv 2x - 3y + 5 = 0$ is B. The foot of the perpendicular from $P(-4,-1)$ on to the line joining AB is

[TS EAMCET 06-08-2021_Shift-2]

1. $(1,-2)$ 2. $(-3,4)$
3. $(-1,1)$ 4. $(-5,7)$

112. If the equation of a line parallel to$3x - 2y + 5 = 0$ and at a distance of 5 units from it is $3x - 2y + C = 0$, then C =

[TS EAMCET 06-08-2021_Shift-1]

1. $5\left(\frac{1 \pm \sqrt{13}}{\sqrt{13}}\right)$ 2. $5\left(\pm\sqrt{13} + 1\right)$
3. $5\left(\sqrt{13} \pm 1\right)$ 4. $5\left(\frac{-1 \pm \sqrt{13}}{\sqrt{13}}\right)$

113. If a line L passes through the point of intersectionof the lines $2x + 3y + 1 = 0$ and $x + y - 3 = 0$ and the angle made by the line L with X-axis measured in positive direction from the positive X-axis is $\text{Tan}^{-1}\frac{2}{3}$, then the sum of the intercepts made by this line on the axes is

[TS EAMCET 06-08-2021_Shift-1]

1. $\frac{-1}{41}$ 2. $\frac{205}{6}$
3. $\frac{5}{41}$ 4. $\frac{41}{6}$

114. Match the following

List-I		List-II	
A	Line passing through $(-4,3)$ and having intercepts in the ratio 5:3	I	$2x-5y+4=0$
B	Line passing through $P(2,-5)$ such that P bisectsthe part intercepted between the axes	II	$3x+5y=3$
C	Line parallel to $2x-3y+5=0$ withX-intercept $\frac{2}{5}$ is	III	$10x-15y+4=0$
D	Line perpendicular to $5x+2y+7=0$ with y-intercept $\frac{4}{5}$ is	IV	$10x-15y=4$
		V	$5x-2y-20=0$

The correct match is

[TS EAMCET 06-08-2021_Shift-1]

1.A-II,B-V,C-III,D-I 2.A-V,B-I,C-III,D-II
3.A-II,B-V,C-IV,D-I 4.A-II,B-I,C-IV,D-V

115. If (h,k) is the image of the point $(2,-3)$ with respect to line $5x-3y=2$, then $h+k=$

[TS EAMCET 06-08-2021_Shift-1]

1. -3
2. $\frac{-3}{34}$
3. $\frac{-1}{34}$
4. 5

116. The square of a least distance from origin to a point on the line y = x + 3 which lies at a distance of 2 units from (0, 3) is

[AP EAMCET 04-07-2022_Shift-1]

1. $13+6\sqrt{2}$
2. $10+6\sqrt{2}$
3. $10-6\sqrt{2}$
4. $13-6\sqrt{2}$

117. Starting from the point A (–3, 4), a moving object touches 2x + y – 7 = 0 at B and reaches the point C (0, 1). If the object travels along the shortest path, the distance between A and B is.

[AP EAMCET 04-07-2022_Shift-1]

1. $\frac{68}{\sqrt{170}}$
2. $\frac{9}{\sqrt{5}}$
3. $3\sqrt{2}$
4. $\frac{6}{\sqrt{5}}$

118. Suppose a triangle is formed by x + y = 10 and the coordinate axes. Then the number of points (x, y) where x and y are natural numbers, lying inside the triangle is

[AP EAMCET 04-07-2022_Shift-1]

1. 36
2. 55
3. 45
4. 30

119. If the points of intersection of the coordinate axes and $|x \pm y|=2$ form a rhombus,then its area is **[AP EAMCET 04-07-2022_Shift-2]**

1. 8
2. 16
3. 2
4. 4

120. Suppose ,in triangle ΔABC, $x-y+5=0, x+2y=0$ are respectively the equations of the perpendicular bisectors of the sides AB and AC. If A is (1,-2),the equtaion of the line joining B and C is

[AP EAMCET 04-07-2022_Shift-2]

1. 6x+7y=0
2. 14x+23y-40=0
3. 2x-11y=0
4. 2x+y=0

121. Suppose P and Q lie on 3x + 4y – 4=0 and $5x-y-4=0$ respectively. If the midpoint of PQ is (1,5) then the slope of the line passing through P and Q is

[AP EAMCET 05-07-2022_Shift-1]

1. $\frac{83}{35}$
2. $\frac{63}{35}$
3. $\frac{-3}{4}$
4. $\frac{3}{4}$

122. The length of intercept of x + 1 = 0 between the lines $3x+2y=5$ and $3x+2y=3$ is

[AP EAMCET 05-07-2022_Shift-1]

1. 2
2. 1

3. 3 4. 4

123. Suppose that the three points A, B and C in the plane are such that their x–coordinates as well as y–coordinates are in GP with the same common ratio. Then the points A, B and C

[AP EAMCET 05-07-2022_Shift-1]

1. Constitute a right angled triangle
2. Form an isosceles triangle
3. Lie on straight line
4. Form an equilateral triangle

124. If two distinct points lying at a unit distance from $4x+3y-10=0$ and passing through $x+y=4$ are separated by a distance d, then the value of d *is* **[AP EAMCET 05-07-2022_Shift-2]**

1. $10\sqrt{2}$ 2. 10
3. $\sqrt{2}$ 4. 200

125. Suppose P(x, y) lying on $\sqrt{3}x-y+2=0$ *or* $\sqrt{3}x+y-2=0$ is at a distance of 5 units from their point of intersection. Then the distance from (0, 0) to the foot of the perpendicular of P onto the y–axis is

[AP EAMCET 05-07-2022_Shift-2]

1. $2+\dfrac{5\sqrt{3}}{2}$ 2. $\dfrac{5\sqrt{3}}{2}$
3. 2 4. $2-\dfrac{5\sqrt{3}}{2}$

126. If a point (α,β) of $3x+y=0$ *and* $(3,4)$ lie on the opposite sides of $3x-4y-8=0$ then which of the following is correct?

[AP EAMCET 06-07-2022_Shift-1]

1. $15\alpha-8>0$ 2. $\alpha\in(-\infty,\infty)$
3. $15\alpha-8=0$ 4. $\alpha=0$

127. If a particle moving along $x-2y-3=0$ getsreflected in a perpendicular direction upon hitting the line $3x-2y-5=0$, then the line of the movement of the particle after reflection is

[AP EAMCET 06-07-2022_Shift-1]

1. $2x+y+1=0$ 2. $2x+y-1=0$
3. $2x+y-3=0$ 4. $2x+y+3=0$

128. The family of lines, forming an isosceles triangle with the lines $3x-4y-2=0$ and $12x-5y+6=0$

[AP EAMCET 06-07-2022_Shift-1]

1. $9x+7y+c=0$ 2. $7x-9y+c=0$
3. $9x-7y+c=0$ 4. $x\pm y+c=0$

129. The straight line passing through $(-1, 1)$ and remaining parallel to the line common to the pairs of lines provided by $6x^2-xy-12y^2=0$ *and* $15x^2+14xy-8y^2=0$ is

[AP EAMCET 06-07-2022_Shift-1]

1. $5x-2y+7=0$ 2. $3x+4y-1=0$
3. $3x-4y+7=0$ 4. $2x-3y+5=0$

130. A variable line passing through (l,m) intersects the coordinate axes at the points A and B. If the lines drawn parallel to y-axis through A and parallel to x-axis through B meet at P, then the locus of P is

[AP EAMCET 06-07-2022_Shift-2]

1. $\dfrac{l}{x}+\dfrac{m}{y}=1$ 2. $\dfrac{x}{l}+\dfrac{y}{m}=1$
3. $\dfrac{m}{x}+\dfrac{l}{y}=1$ 4. $\dfrac{x}{m}+\dfrac{y}{l}=1$

131. For the three points A (2,0), B(0,2) and P(1,1) suppose d is the algebraic sum of the distances of A and B from a line that passes through P. Then which of the following is correct?

[AP EAMCET 06-07-2022_Shift-2]

1. $d>0$ for all lines
2. d=0 for at least one line
3. d =0 for all lines
4. d >0 at least for one line

132. Number of triangles formed by the lines x-y+3=0, 2x-y+3=0, 3x-y+2=0 and x+y-3=0 is

[AP EAMCET 06-07-2022_Shift-2]

1. 4 2. 6
3. 3 4. 2

133. The straight line passing through(0,0) and the foot of perpendicular from (2,4) onto x+y-1=0 is **[AP EAMCET 07-07-2022_Shift-1]**

1. y=3x 2. y=-3x
3. $y=\dfrac{1}{3}x$ 4. $y=\dfrac{-1}{3}x$

134. If $P(\sin\alpha, \cos\alpha)$ lies inside the triangle formed by the vertices (0,0), $\left(\frac{\sqrt{3}}{2}, 0\right)$ and $\left(0, \frac{\sqrt{3}}{2}\right)$, then α lies in the interval

[AP EAMCET 07-07-2022_Shift-1]

1. $\left(0, \frac{\pi}{3}\right)$
2. $\left(0, \frac{\pi}{4}\right)$
3. $\left(0, \frac{\pi}{6}\right)$
4. $\left(0, \frac{\pi}{12}\right)$

135. Suppose the hypotenuse and its opposite vertex of an isosceles right angled triangle are $3x+4y-4=0$ and (2,2) respectively. Then, which of the following is another side of the triangle?

[AP EAMCET 07-07-2022_Shift-2]

1. x-7y-12=0
2. x+7y+12=0
3. 7x+y-16=0
4. 7x+y+16=0

136. A point P on a lines is at a distance of 4 units from the origin (0,0). If the line makes 60^0 with the negative direction of the x-axis , then P is **[AP EAMCET 07-07-2022_Shift-2]**

1. $(2, 2\sqrt{3})$
2. $(2\sqrt{3}, 2)$
3. $(1, \sqrt{3})$
4. $(2\sqrt{3}, 1)$

137. Suppose ABOC is a rhombus in the first quadrant with O being the origin . If the vertices B and C of ΔABC lie respectively on $y=\frac{4}{3}x$ and y=0, and the side BC passes through $\left(\frac{2}{3}, \frac{2}{3}\right)$, then the midpoint of BC is

[AP EAMCET 07-07-2022_Shift-2]

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

138. Given two points Q(3, 4) and R(1, 2). What is the point P(x, y) on the line 2x – y – 1 = 0 for which PQ + PR = QR holds

[AP EAMCET 08-07-2022_Shift-1]

1. (-3, -7)
2. (-2, -5)
3. (2, 3)
4. (4, 7)

139. Suppose the vertices of a triangle are given by A (0, 3), B(-2, 0) and C(6, 1). For $(\alpha, \alpha+1)$ to lie inside the triangle, α should lie in the interval

[AP EAMCET 08-07-2022_Shift-1]

1. $\left(\frac{-6}{7}, 4\right)$
2. $\left(\frac{4}{5}, 4\right)$
3. $\left(-\infty, \frac{-6}{7}\right) U (4, \infty)$
4. $\left(\frac{-6}{7}, \frac{3}{2}\right)$

140. For a triangle formed by (0,0), (4, 0) and (3,4), the orthocentre is

[AP EAMCET 08-07-2022_Shift-1]

1. $\left(3, \frac{3}{4}\right)$
2. $\left(3, \frac{5}{4}\right)$
3. (3, 12)
4. (3, 9)

141. All points inside the triangle with vertices at $(1,3), (5,0)$ *and* $(-1,2)$ must necessarily satisfy

[AP EAMCET 08-07-2022_Shift-2]

1. $3x+2y \le 0$
2. $3x+2y > 0$
3. $2x-3y-12 > 0$
4. $2x+y-13 > 0$

142. The line on which the lines ax+by=1 and bx+ay=1(with $a \ne 0 \ne b$) intersect for any real values of a and b is

[AP EAMCET 08-07-2022_Shift-2]

1. x = -y
2. x = 2y
3. 2x = y
4. x = y

143. For x and y satisfying $|x|+|y|=|x-3|+|y-2|$, which of the following is correct?

[AP EAMCET 08-07-2022_Shift-2]

1. $x=\frac{1}{2}$ *for* $0 \le x < 3$ *and* $1 \le y < 2$
2. $x+y=\frac{5}{2}$ *for* $x \ge 3$ *and* $y \ge 2$

3. $x=\frac{1}{2}$ for $x\ge 2$ and $0\le y<3$

4. $x+y=\frac{5}{2}$ for $0\le x<3, 0\le y<2$

144. If θ is the acute angle between the lines $\frac{x}{a}+\frac{y}{b}=1, \frac{x}{b}+\frac{y}{a}=1$ then $\sin\theta=$

[TS EAMCET 18-07-2022_Shift-1]

1. $\left|\frac{2ab}{a^2+b^2}\right|$
2. $\left|\frac{a-b}{a+b}\right|$
3. $\left|\frac{a^2-b^2}{2b}\right|$
4. $\left|\frac{a^2-b^2}{a^2+b^2}\right|$

145. If the line $x-y+1=0$ cuts the lines $2x+2y+3=0$ and $3x+3y+2=0$ at the points A and B respectively, then AB =

[TS EAMCET 18-07-2022_Shift-1]

1. $\frac{5}{6\sqrt{2}}$
2. $\frac{1}{6\sqrt{2}}$
3. $\frac{5}{\sqrt{3}}$
4. $\frac{5}{6\sqrt{3}}$

146. If the incentre and the circumcentre of the triangle formed by the lines $x=2$, $4x+3y+7=0$ and $y=3$ are I and S respectively, then IS =

[TS EAMCET 18-07-2022_Shift-1]

1. 5
2. $\sqrt{5}$
3. $4\sqrt{2}$
4. $2\sqrt{5}$

147. If the line $2x-3y+4=0$ divides the line segment joining the points A (-2, 3) and B (3, -2) in the ratio m : n, then the point which divides AB in the ratio -4m : 3n is

[TS EAMCET 18-07-2022_Shift-2]

1. (-17, 18)
2. $\left(-\frac{59}{7},\frac{66}{7}\right)$
3. (-5, 6)
4. $\left(-\frac{5}{7},\frac{12}{7}\right)$

148. If the lines $L_1\equiv 2x+y+3=0, L_2\equiv kx+2y-3=0$ and $L_3\equiv 3x-2y+1=0$ are concurrent then the cosine of the acute angle between the lines $L_2=0$ and $2x-5y+7=0$ is

[TS EAMCET 18-07-2022_Shift-2]

1. $\frac{1}{\sqrt{2}}$
2. $\left(\frac{15}{2\sqrt{29}}\right)$
3. $\left(\frac{25}{29}\right)$
4. $\left(\frac{20}{29}\right)$

149. If Q is the image of the point P(1, 1) with respect to the straight line x + y + 1 = 0, then the length of tile perpendicular drawn from Q to the line 3x - 4y +3 = 0 is

[TS EAMCET 18-07-2022_Shift-2]

1. $\frac{5}{2}$
2. 2
3. 1
4. $\frac{1}{2}$

150. The centroid of the triangle formed by the lines x – 3y +3 = 0, x + 3y +3 = 0, x+y-1=0 is

[TS EAMCET 18-07-2022_Shift-2]

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

151. If the line $2x-y-4=0$ divides the line segment joining the point (2, -1) and (1, -4) at the point (a, b) in the ratio $m:n$ then $4\left(a-b\left(\frac{m}{n}\right)^2\right)=$

[TS EAMCET 19-07-2022_Shift-I]

1. -5
2. 14
3. 11
4. 10

152. The distance between the points of concurrency of the two families of straight lines given by $x+(5\lambda+1)y+1-3\lambda=0$ and $(5\mu+2)x-3y+3+6\mu=0$ is

[TS EAMCET 19-07-2022_Shift-I]

1. 4
2. $\frac{2\sqrt{2}}{5}$
3. $\frac{\sqrt{2}}{5}$
4. 6

153. Let the line L drawn perpendicular to the line $2x-3y+4=0$ and $6x-9y+7=0$ meet them at A and B respectively. If P(1, 1) is a point on L, then the ratio in which P divides AB is

[TS EAMCET 19-07-2022_Shift-I]

1. 9:4 internally
2. 9:4 externally
3. 4:9 internally
4. 4:9 externally

154. the orthocentre of the triangle formed by the points (1,3), (-3,5) and (5,-1) is

[TS EAMCET 19-07-2022_Shift-I]

1. (-8, -10)
2. (-3, 2)
3. $\left(-\frac{2}{3},\frac{4}{3}\right)$
4. (19, 27)

155. If a straight line L passing through the point (5,–3) is inclined at an angle of 60° to the line $\sqrt{3}x+y-9=0$ and L intersects X–axis then the equation of L is

[TS EAMCET 19-07-2022_Shift-2]

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

156. Let α,β,γ be three non–zero real constants and a,b,c be three arbitrary real numbers which satisfy $\alpha a+\beta b+\gamma c=0$ .Then the point of concurrence of the family of lines ax+by+c=0 is

[TS EAMCET 19-07-2022_Shift-2]

1. $\left(\frac{\alpha}{\beta},\frac{\beta}{\gamma}\right)$
2. $\left(\frac{\gamma}{\alpha},\frac{\beta}{\alpha}\right)$
3. $\left(\frac{\alpha}{\gamma},\frac{\gamma}{\beta}\right)$
4. $\left(\frac{\alpha}{\gamma},\frac{\beta}{\gamma}\right)$

157. If the algebraic sum of the perpendicular distancesfrom the point (2,0), (0,2) and (1,1) to a variable line is zero, then the variable line always passes through a fixed point. The coordinates of that point are

[TS EAMCET 19-07-2022_Shift-2]

1. (0,0)
2. (2,0)
3. (0,2)
4. (1,1)

158. For a,b,c$\in R$, If $6a^2-3b^2-c^2+7ab-ac+4bc=0$ and $|a|+|b|\neq 0$, then all the lines given by ax+by+c=0 are

[TS EAMCET 19-07-2022_Shift-2]

1. Concurrent at (3,1) or (1,3)
2. Parallel to each other $\forall a,b,c\in R$
3. Concurrent at (–2,–3) or (3,–1)
4. Concurrent at (2,3) or (–3,1)

159. A line makes intercepts 5 and 7 on the coordinate axes. The axes are rotated through an angle θ in the positive direction about the origin so that the line makes equal intercepts on the new axes, then $|\tan\theta|=$

[TS EAMCET 20-07-2022_Shift-1]

1. 6
2. $\frac{1}{6}$
3. $\frac{12}{35}$
4. $\frac{35}{12}$

160. L=7x–y+8=0 is one of the diagonals of a square for which (–4,5),(3,4) are two vertices. Then the coordinates of the two vertices lying on the diagonal L=0 are

[TS EAMCET 20-07-2022_Shift-1]

1. (0,8),(–1,1)
2. (–1,1),(0,8)
3. (–2,–6),(1,15)
4. (1,3),(–2,6)

161. In an isosceles triangle the ends of its base are (2a, 0), (0, a) and one of its two other sides is a horizontal line other than X-axis. If the third vertex is (x_1,y_1) then $x_1+y_1=$

[TS EAMCET 20-07-2022_Shift-2]

1. $\frac{9a}{2}$
2. $3a$
3. $\frac{9a}{4}$
4. $5a$

162. If the lines $L_1\equiv x-2y+3=0$, $L_2\equiv 2x+2y+1=0$

and $L_3 \equiv 3x+y+c=0$ are concurrent and θ is the acute angle between the lines $L_1=0$ and $L_3=0$, then tan θ =

[TS EAMCET 20-07-2022_Shift-2]

1. $c+2$
2. $c-5$
3. $c+5$
4. $c-2$

163. The equal sides of an isosceles triangle are given by $7x-y+3=0$ and $x+y-3=0$. If the slope m of the third side is an integer, then m =

[15th May 2023 Shift 1]

1. -3
2. 3
3. 4
4. -1

164. In ΔABC the coordinates of the vertex A are $(-3,1)$. If the equation of the median through B is $2x+y-3=0$ and the equation of the bisector of angle C is $7x-4y-1=0$, then the equation of the side BC is

[15th May 2023 Shift 1]

1. $7x-3y=6$
2. $18x-y=49$
3. $15x+y=50$
4. $4x-y=7$

165. If the lines given by $(x^2+y^2)\sin^2\alpha=(x\cos\alpha-y\sin\alpha)^2$ are perpendicular to each other, then $\sin^2\alpha+\tan^2\alpha=$

[15th May 2023 Shift 1]

1. $\frac{15}{4}$
2. 0
3. $\frac{3}{2}$
4. $\frac{7}{12}$

166. 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 **[15th May 2023 Shift 2]**

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

167. The diagonals AC and BD of a rhombus ABCD intersect at the point $(3,4)$. if $BD=2\sqrt{2}, A=(1,2)$, $B=(\alpha,\beta), D=(\gamma,\delta)$ *and* $\alpha<\delta<\gamma<\beta$, *then* $\beta+\gamma-\delta=$

[15th May 2023 Shift 2]

1. 0
2. α
3. 2α
4. 3α

168. 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 line L for

[15th May 2023 Shift 2]

1. Exactly one value of p
2. Exactly two values of p
3. More than two values of p
4. No value of p

169. The sides of a triangle are $3x+2y-6=0, 2x-3y+6=0$ and $x+2y+2=0$ If *P (0,b)* lies either on the triangle or inside the triangle then *b* lies in the interval **[16th May 2023 Shift 1]**

1. $[-1,3]$
2. $[2,3]$
3. $[-1,2]$
4. $[-2, 2]$

170. A point on the straight line 3x+5y = 15 which is equidistant from the coordinate axes will lie in **[16th May 2023 Shift 1]**

1. Either 1st quadrant or 2nd quadrant
2. 4th quadrant only
3. 3rd quadrant only
4. either in the 3rd or in the 4th quadrant

171. The equation of the line passing through the points $\left(ct_1,\frac{c}{t_1}\right)$ and $\left(ct_2,\frac{c}{t_2}\right)$

[16th May 2023 Shift 1]

1. $x+t_1t_2y=c(t_1+t_2)$
2. $y+t_1t_2x=c(t_1+t_2)$
3. $x-t_1t_2y=c(t_1+t_2)$
4. $y-t_1t_2x=c(t_1+t_2)$

172. The circumcentre of the triangle with vertices (-2,3). (2,-1) ,(4,0) is

[16th May 2023 Shift 2]

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

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

173. If PS is the median of the triangle with vertices P(2,2), Q(6,–1)and R(7,3).. then the equation of the line passing through (1,–1) and parallel to PS is

[16th May 2023 Shift 2]

1. $4x+7y+3=0$ 2. $2x-9y-11=0$

3. $4x-7y-11=0$ 4. $2x+9y+7=0$

174. Two sides of rhombus are along the lines x–y+1=0 and 7x–y–5=0. If its diagonals intersect at (–1,–2), then one f the vertices of this rhombus is

[16th May 2023 Shift 2]

1. (3,16) 2. (–1,–12)

3. $\left(\frac{1}{3},\frac{-8}{3}\right)$ 4. (2,9)

175. If the Y-intercept of the perpendicular bisector of the line segment joining P(1,4) and Q(k,3)is -4, then a possible value of k is **[17th May 2023 Shift 1]**

1. 2 2. -2

3. -4 4. 1

176. A straight line L at a distance of 4 units from the origin makes positive intercepts on the coordinate axes and the perpendicular drawn from the origin to this line makes an angle of 60^0 with the line x + y = 0. Then the equation of the line L is

[17th May 2023 Shift 1]

1. $\left(\sqrt{3}+1\right)x+\left(\sqrt{3}-1\right)y=8\sqrt{2}$

2. $\left(\sqrt{3}-1\right)x+\left(\sqrt{3}+1\right)y=8\sqrt{2}$

3. $\sqrt{3}x+y=8$

4. $x+\sqrt{3}y=8$

177. If p and q are the x and y-intercepts respectively of the line passing through the points $(a\cos\alpha, b\sin\alpha)$ *and* $(a\cos\beta, b\sin\beta)$, *then* $\frac{a^2}{p^2}+\frac{b^2}{q^2}=$

[17th May 2023 Shift 1]

1. $\sin^2\left(\frac{\alpha-\beta}{2}\right)$ 2. $\cos^2\left(\frac{\alpha-\beta}{2}\right)$

3. $\sec^2\left(\frac{\alpha-\beta}{2}\right)$ 4. $\operatorname{cosec}^2\left(\frac{\alpha-\beta}{2}\right)$

178. The centre of a square of side 4 units length is (3,7) and one of the diagonals is parallel to the line y=x. If $(x_1,y_1),(x_2,y_2),(x_3,y_3)$ and (x_4,y_4) are the vertices of this square, then $\frac{y_1y_2y_3y_4}{x_1x_2x_3x_4}=$ **[17th May 2023 Shift 2]**

1. 81 2. $\frac{245}{16}$

3. 25 4. $\frac{105}{2}$

179. The area (in square units) of the triangle formed by the lines x=0, y=0 and 3x+4y=12 is

[17th May 2023 Shift 2]

1. $\frac{288}{7}$ 2. $\frac{169}{7}$

3. $\frac{144}{7}$ 4. $\frac{72}{7}$

180. Let origin be the centroid of an equilateral triangle ABC and one of its sides be along the straight line $x+y=3$. If R and r are its circum radius and inradius respectively. The $R+r=$

[17th May 2023 Shift 2]

1. $2\sqrt{2}$ 2. $\frac{9}{\sqrt{2}}$

3. $7\sqrt{2}$ 4. $\frac{3}{\sqrt{2}}$

181. In ΔABC, if A=(1,2) and the equations of the medians through B and C are x+y=5 and x=4 respectively, then the area of ΔABC is

[18th May2023 shift -1]

1. 12
2. 9
3. 4
4. 5

182. The equation of the line, passing through the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ and perpendicular to the line x cosθ-y sinθ=a, is

[18th May2023 shift -1]

1. $2x\sin\theta + 2y\cos\theta = a\sin 2\theta$
2. $x\cos\theta - y\sin\theta = a\sin 2\theta$
3. $x\sin\theta + y\sin\theta = a\cos 2\theta$
4. $x\sin\theta - y\sin\theta = a\cos 2\theta$

183. A ray of light incident along a line, meets another line 7x-y+1=0 at the point (0, 1) and it is then reflected from this point along the line y+2x=1. Then the equation of the line of incidence of the ray of light is

[18th May2023 shift -1]

1. 41x-25y+25=0
2. 41x+38y+38=0
3. 41x-38y+38=0
4. 41x+25y-25=0

184. If a straight line L perpendicular to the line 3x-4y=6 forms a triangle of area 6 square units with coordinate axes, then the minimum perpendicular distance from the point (1,1) to the line L is **[18th May 2023 Shift 2]**

1. 1
2. $\sqrt{2}$
3. 2
4. $\sqrt{3}$

185. Let a, b, c and d be non –zero numbers. If the point of intersection of the lines 4ax+2ay+c=0 and 5bx+2by+d=0 lies in the fourth quadrant and is equidistant from the two coordinate axes, then **[18th May 2023 Shift 2]**

1. 3bc-2ad=0
2. 3bc+2ad=0
3. 2bc-3ad=0
4. 2bc+3ad=0

186. If the image of the point (3,8) in the line x+3y=7 is (α,β), then α+β =

[18th May 2023 Shift 2]

1. -1
2. 3
3. -5
4. -9

187. The point P(2, 1) is translated to a point Q parallel to the line $L \equiv x - y - 4 = 0$ by $2\sqrt{3}$ units. If the point Q lies in the third quadrant, then the equation of the line passing through Q and perpendicular to L is

[19th May 2023 Shift 1]

1. $2x + 2y = 1 - \sqrt{6}$
2. $x + y = 3 - 3\sqrt{6}$
3. $x + y = 2 - \sqrt{6}$
4. $x + y = 3 - 2\sqrt{6}$

188. If O is the origin and P, Q are points on the line $3x + 4y + 15 = 0$ such that $OP = OQ = 9$, then the area of ΔOPQ is

[19th May 2023 Shift 1]

1. $6\sqrt{2}$
2. $9\sqrt{2}$
3. $12\sqrt{2}$
4. $18\sqrt{2}$

189. The number of straight lines that can be drawn through the point (-3, 4) which are at a distance of 5 units from the point (2, -8) is

[19th May 2023 Shift 1]

1. 0
2. 1
3. 2
4. Infinite

190. If the slope of a straight line passing through A $(3,2)$ is 3/4, then the coordinates of the two points on the same line that are 5 units away from A are

[12TH MAY 2023 SHIFT-1]

1. $(-7,5),(1,-1)$
2. $(7,5),(-1,-1)$
3. $(6,9),(-2,3)$
4. $(6,3),(-2,-3)$

191. If each of the points $(a,4)$, $(-2,b)$ lies on the lies joining the points $(2,-1)$ and $(5,-3)$ then the point (a,b) lies on the line

[12TH MAY 2023 SHIFT-1]

1. $6x + 6y - 25 = 0$
2. $x + 3y + 1 = 0$
3. $2x + 6y + 1 = 0$
4. $2x + 3y - 5 = 0$

192. A line L has intercepts a and b on the coordinate axes. When the coordinate axes are rotated through an angle α keeping the origin fixed, the same line L has intercepts p and q on the new axes. Then

[12TH MAY 2023 SHIFT -2]

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

3. $\frac{1}{a^2}+\frac{1}{p^2}=\frac{1}{b^2}+\frac{1}{q^2}$ 4. $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{p^2}+\frac{1}{q^2}$

193. Two lines L_1 and L_2 passing through the point P(1,2) cut the line $x+y=4$ at a distance of $\frac{\sqrt{6}}{3}$ units from P. Then the angles made by L_1, L_2 with positive X–axis are

[12TH MAY 2023 SHIFT -2]

1. $\frac{\pi}{3},\frac{\pi}{6}$ 2. $\frac{\pi}{8},\frac{3\pi}{8}$

3. $\frac{\pi}{12},\frac{5\pi}{12}$ 4. $\frac{\pi}{4},\frac{\pi}{8}$

194. The equation of the straight line passing through the point (3,2) and inclined at an angle of 60^o with the line $\sqrt{3}x+y=1$ is

[12TH MAY 2023 SHIFT -2]

1. $\sqrt{3}x+y-\left(2+3\sqrt{3}\right)=0$

2. $\sqrt{3}x-y+\left(2-3\sqrt{3}\right)=0$

3. $-\sqrt{3}x+y-\left(2-3\sqrt{3}\right)=0$

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

195. An equilateral triangle is constructed between the lines $\sqrt{3}x+y-6=0$ and $\sqrt{3}x+y+9=0$ with base on one line and vertex on the other. The area (in sq. units) of the triangle so formed is **[12TH MAY 2023 SHIFT -2]**

1. $\frac{175}{6\sqrt{3}}$ 2. $\frac{225}{2\sqrt{3}}$

3. $\frac{225}{4\sqrt{3}}$ 4. $\frac{245}{4\sqrt{2}}$

196. If α is the angle made by the perpendicular drawn from origin to the line 3x-4y+5=0 with positive X-axis in positive direction and $ax+by=1$ is the equation of a line passing thorough the point (1, -1) with $\tan\alpha$ as its slope, then a+ab+b=

[13TH MAY 2023 SHIFT-1]

1. 11 2. 13

3. 17 4. 19

197. If L_1 is a line passing through the point P(4, -3) and perpendicular to the line $3x-4y+k=0$, then the distance of P from the line $5x-3y-2=0$ measured along the line L_1 is **[13TH MAY 2023 SHIFT-1]**

1. 5 2. $\sqrt{13}$

3. $\sqrt{41}$ 4. 13

198. Let the line L_1 passing through the point of intersection of the lines $2x+3y-5=0$ and $4x-5y+7=0$ divide the line segment joining the points $(2,3)\,and\,(1,-1)$ in the ratio 2:1 if the equation of L_1 is ax+by=1, then 33(a-b)=

[13TH MAY 2023 SHIFT-1]

1. -1 2. 0

3. 1 4. 2

199. Let ABC be a triangle and A=(1,2). If x-3y-5=0 and x+5y-9=0 are the perpendicular bisectors of the sides AB and BC respectively, then the length of the side AC is **[13TH MAY 2023 SHIFT-1]**

1. $\sqrt{34}$ 2. $2\sqrt{26}$

3. $2\sqrt{10}$ 4. $4\sqrt{2}$

200. If *(h ,k)* is the image of the point *(3, -4)* with respect to the line $2x-3y-5=0$ and *(l, m)* is the foot of the perpendicular from *(h ,k)* on to the line $3x+2y+12=0$, then $lh+mk+1=$

[EAPCET 14-05-23 SHIFT-1]

1. 5 2. $\frac{-1}{34}$

3. $\frac{-3}{34}$ 4. -3

201. A straight line parallel to the line $y=\sqrt{3}x$ passes through $Q(2,3)$ and cuts the line $2x+4y-27=0\,at\,P$, then the length of the line segment PQ is

[EAPCET 14-05-23 SHIFT-1]

1. $2\sqrt{3}+1$ 2. $\sqrt{3}+1$

3. $2\sqrt{3}-1$ 4. $\sqrt{3}-1$

202.If a line $ax+2y=k$ forms a triangle of area 3 sq. Units with the coordinate axis and is perpendicular to the line $2x-3y+7=0$, then the product of all the possible values of k is **[EAPCET 14-05-23 SHIFT-1]**

1. -36
2. 36
3. -64
4. 64

203.The orthocentre of the triangle whose sides are given by $x+y+10=0$, $x-y-2=0$ and $2x+y-7=0$ is

[EAPCET 14-05-23 SHIFT-1]

1. $(-4,-3)$
2. $(-4,-6)$
3. $(4,6)$
4. $(3,6)$

204.Two points $P(a,2)$ *and* $Q(1,b)$ lie on either side of the line $2x-3y+1=0$.If p is the point of intersection of the lines 4x+3y+k=0 and 3x+4y+k=0. Then the range of b is

[EAPCET 13-05-23 SHIFT-2]

1. $(-\infty,3)$
2. $(-\infty,1)$
3. $(1,\infty)$
4. $(3,\infty)$

205.Let the angle between the lines $x-2y+3=0$ and $kx-y+2=0$ be 45^0. If $k_1,k_2\,(k_1>k_2)$ are two distinct real values of k, then $k_1-2=$

[EAPCET 13-05-23 SHIFT-2]

1. k_2
2. $-k_2$
3. $-3k_2$
4. $3k_2$

206.If the lines $4x+3y-k=0$, $2x+y+3=0$ and $3x+2y+k=0$ are concurrent, then the perpendicular distance from the point of concurrency of these lines to the line 3x+4y+2=0 is **[EAPCET 13-05-23 SHIFT-2]**

1. 3/5
2. 1
3. 13/5
4. 3

207.Let A(1,3) and B(2,5) be two points and $C(h,k)$ be a point such that BC is perpendicular to AC. If $\angle CAB=\angle CBA$, then h= **[EAPCET 13-05-23 SHIFT-2]**

1. $\frac{24}{5}or\frac{7}{2}$
2. $\frac{2}{5}or\frac{7}{2}$
3. $\frac{1}{5}or\frac{5}{2}$
4. $\frac{24}{5}or\frac{2}{5}$

KEY

1)	3	2)	1	3)	2	4)	4	5)	2
6)	2	7)	4	8)	2	9)	1	10)	3
11)	2	12)	3	13)	3	14)	4	15)	1
16)	2	17)	1	18)	1	19)	2	20)	4
21)	2	22)	4	23)	2	24)	3	25)	2
26)	4	27)	4	28)	4	29)	3	30)	1
31)	1	32)	2	33)	2	34)	3	35)	4
36)	3	37)	4	38)	1	39)	2	40)	3
41)	1	42)	1	43)	3	44)	1	45)	2
46)	4	47)	1	48)	3	49)	4	50)	1
51)	4	52)	4	53)	2	54)	1	55)	3
56)	2	57)	1	58)	3	59)	3	60)	1
61)	2	62)	4	63)	3	64)	3	65)	2
66)	4	67)	2	68)	3	69)	1	70)	2
71)	2	72)	3	73)	3	74)	3	75)	2
76)	1	77)	1	78)	1	79)	2	80)	1
81)	2	82)	2	83)	2	84)	1	85)	4
86)	2	87)	1	88)	3	89)	3	90)	1
91)	3	92)	2	93)	2	94)	3	95)	3
96)	1	97)	3	98)	1	99)	1	100)	4
101)	3	102)	2	103)	2	104)	2	105)	1
106)	1	107)	1	108)	3	109)	2	110)	4
111)	3	112)	2	113)	4	114)	3	115)	1
116)	4	117)	1	118)	1	119)	1	120)	2
121)	1	122)	2	123)	3	124)	1	125)	1
126)	1	127)	2	128)	3	129)	2	130)	1
131)	3	132)	1	133)	2	134)	4	135)	3
136)	2	137)	1	138)	3	139)	4	140)	1
141)	2	142)	4	143)	4	144)	4	145)	1
146)	2	147)	1	148)	4	149)	3	150)	1
151)	4	152)	2	153)	2	154)	4	155)	2
156)	4	157)	4	158)	3	159)	2	160)	1
161)	3	162)	3	163)	1	164)	2	165)	3
166)	1	167)	4	168)	1	169)	3	170)	1
171)	1	172)	1	173)	4	174)	3	175)	3

176) 2	177) 3	178) 1	179) 3	180) 2
181) 2	182) 1	183) 3	184) 1	185) 1
186) 3	187) 4	188) 4	189) 3	190) 2
191) 3	192) 4	193) 3	194) 2	195) 3
196) 4	197) 1	198) 3	199) 4	200) 1
201) 3	202) 1	203) 2	204) 2	205) 3
206) 4	207) 3	208)	209)	210)

SOLUTIONS

1. Line is 2x+7y+6=0

-2x-7y=6

$$x\left(\frac{-2}{\sqrt{53}}\right)+y\left(\frac{-7}{\sqrt{53}}\right)=\frac{6}{\sqrt{53}}$$

Compare with $x\cos\theta + y\sin\theta = p$

$$\theta \in Q_3 \Rightarrow \theta = \pi + \tan^{-1}\left(\frac{7}{2}\right)$$

$$\sin\theta = \frac{-7}{\sqrt{53}}, \cos\theta = \frac{-2}{\sqrt{53}}$$

2. A(2,0),B(0,2),C(1,1)

Line is passes through the centroid of Triangle

Fixed point = $\left(\frac{2+0+1}{3},\frac{0+2+1}{3}\right)=(1,1)$

3. According to given condition

$$\frac{\frac{|\lambda-5|}{\sqrt{9+16}}}{\frac{|\lambda+5|}{\sqrt{9+16}}}=\frac{3}{7}\Rightarrow\frac{|\lambda-5|}{|\lambda+5|}=\frac{3}{7}$$

$$\Rightarrow\frac{5-\lambda}{5+\lambda}=\frac{3}{7} \qquad [\because \lambda\in(-5,5)]$$

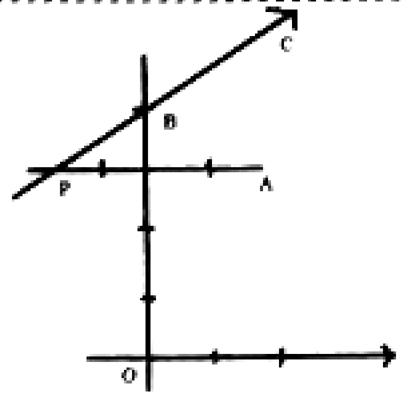
$$\Rightarrow 35-7\lambda=15+3\lambda$$

$$\Rightarrow 10\lambda=20$$

$$\Rightarrow \lambda=2$$

4. $$\begin{vmatrix} 3 & 4 & -5 \\ 2 & 3 & -4 \\ p & 4 & -6 \end{vmatrix}=0$$

$$\Rightarrow p=2$$

5. 

$A(2,3)\&C(5,10)$

$\text{Image of } A = P(-2,3)$

$\text{Slope } \overline{pc} = 1 = m$

equation of pc is

$$y-3=1(x+2)$$

$$\Rightarrow x-y+5=0$$

$$\text{put } x=0 \Rightarrow y=5$$

$$\therefore \text{point on } y-\text{axis } B(0,5)$$

6. given line $x+y=1$......(1)

and curve $y^3-6xy^2+11x^2y-6x^3=0$.....(2)

$y=(1-x)$ sub in (2)

$$\Rightarrow(1-x)^3-6x(1-x^2)+11x^2(1-x)-6x^3=0$$

$$\Rightarrow -24x^3+26x^2-9x+1=0$$

$$x_1+x_2+x_3=\frac{26}{24}=\frac{13}{12}$$

$$x_1x_2+x_2x_3+x_3x_1=\frac{9}{24}=\frac{3}{8}$$

$$x_1^2+x_2^2+x_3^2=(x_1+x_2+x_3)^2-2(x_1x_2+x_2x_3+x_3x_1)$$

$$=\frac{61}{144}$$

From (1) $x=1-y$ sub in (2)

$$\Rightarrow y^3-6y^2(1-y)+11(1-y^2)y-6(1-y)^3=0$$

$$\Rightarrow 24y^3-46y^2+29y-6=0$$

$$y_1+y_2+y_3=\frac{46}{24}=\frac{23}{12}$$

$$\sum y_1y_2=\frac{29}{24}$$

$$y_1^2+y_2^2+y_3^2=\left(\sum y_1\right)^2-2\left(\sum y_1y_2\right)=\frac{181}{144}$$

O(0,0), P(x_1,y_1), Q(x_2,y_2), R(x_3,y_3)

$OP^2 + OQ^2 + OR^2 = x_1^2 + y_1^2 + x_2^2 + y_2^2 + x_3^2 + y_3^2$

$= \frac{61}{144} + \frac{181}{144} = \frac{121}{72}$

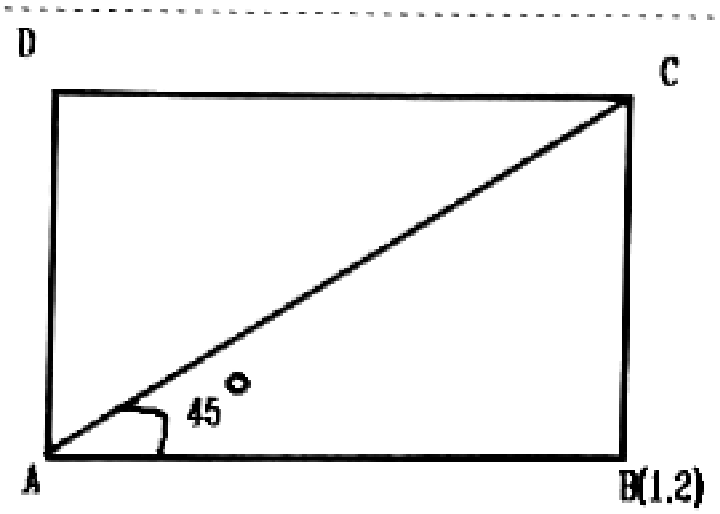
7. Given $P(3,8)$

Midpoint $\overline{PQ} = R(1,2)$

By verify point $R(1,2)$ satisfies line

$x + 3y = 7$

8.



$\overline{AC}$:8x-15y=0

Slope of $\overline{AC}$ is $m_1 = \frac{8}{15}$

Slope of $\overline{AB}$ is $m_2 = m$

$$\tan\theta = \left|\frac{m_1 - m_2}{1 + m_1 m_2}\right| \Rightarrow \tan 45^0 = \left|\frac{\frac{8}{15} - m}{1 + \frac{8}{15}m}\right|$$

$\frac{8 - 15m}{15 + 8m} = \pm 1$

$m = \frac{-7}{23} (or) \frac{23}{7}$

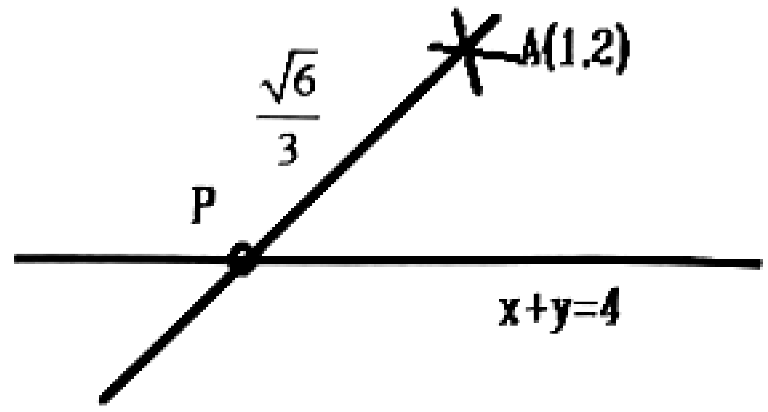
Remaining two sides passes through B(1,2)

Required lines are (AB,BC)

$y - 2 = \frac{-7}{23}(x-1),\ y - 2 = \frac{23}{7}(x-1)$

$7x + 23y - 53 = 0$, $23x - 7y - 9 = 0$

9. Let P be a point of intersection of line passing through A(1,2) and $x + y = 4$



$P\left(1 + \frac{\sqrt{6}}{3}\cos\theta, 2 + \frac{\sqrt{6}}{3}\sin\theta\right)$ *lie on* $x + y = 4$

$1 + \frac{\sqrt{6}}{3}\cos\theta + 2 + \frac{\sqrt{6}}{3}\sin\theta = 4$

$3 + \frac{\sqrt{6}}{3}(\cos\theta + \sin\theta) = 4$

$\cos\theta + \sin\theta = \frac{3}{\sqrt{6}}$

S.O.B.S

$1 + \sin 2\theta = \frac{9}{6} \Rightarrow \sin 2\theta = \frac{1}{2}$

$2\theta = 30^0\ (or)\ 150^0$

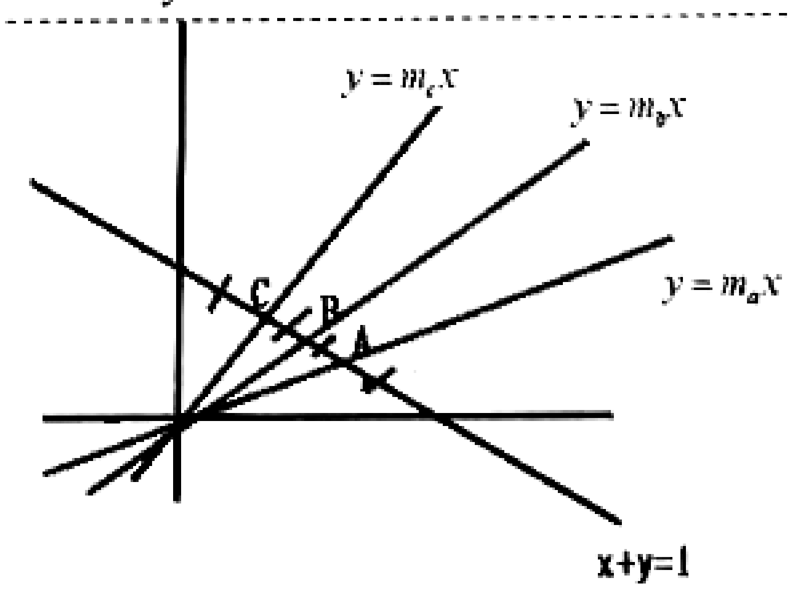
$\theta = 15^0\ (or)\ 75^0$

10. Required combined equation of a lines is

$\left(y - \frac{2}{3}x\right)\left(y + \frac{2}{3}x\right) = 0$

$\Rightarrow 4x^2 - 9y^2 = 0$

11.



$B = \frac{A + C}{2}$

$2B = A + C$

$$A=\left(\frac{1}{m_a+1},\frac{m_a}{m_a+1}\right), B=\left(\frac{1}{m_b+1},\frac{m_b}{m_b+1}\right)$$

$$C=\left(\frac{1}{m_c+1},\frac{m_c}{m_c+1}\right)$$

$$\left(\frac{2}{m_b+1},\frac{2m_b}{m_b+1}\right)=\left(\frac{1}{m_a+1},\frac{m_a}{m_a+1}\right)+\left(\frac{1}{m_c+1},\frac{m_c}{m_c+1}\right)$$

$$\frac{2}{m_b+1}=\frac{1}{m_a+1}+\frac{1}{m_c+1}$$

$$\frac{2}{m_b+1}=\frac{m_a+m_c+2}{(m_a+1)(m_c+1)}$$

$$2(1+m_a)(1+m_c)=(1+m_b)(2+m_a+m_c)$$

12. Equation of a line joining (2,5) and (4,-1) is $3x+y-11=0$

(a,8) lie on $3x+y-11=0$

$\Rightarrow 3a+8-11=0$

$\Rightarrow 3a=3\Rightarrow a=1$

13. Eq. of L_1 is $(y-1)=m(x-3)$

$\Rightarrow mx-y+(1-3m)=0\rightarrow(1)$

$d=\perp^r$ distance from (0,0) to (1)

let $f(m)=\dfrac{1-3m}{\sqrt{1+m^2}}$

$f'(m)=0\Rightarrow m=-3$

$\therefore$ eq. of L_1 is

$3x+y-10=0$

$\therefore$area of ΔOPQ is $\dfrac{c^2}{2|ab|}=\dfrac{50}{3}$

14. Req. eqn is $x-2y+k=0$

It passes through the point (5,3)

$\Rightarrow k=1$

$x-2y+1=0$

15. $\dfrac{-a}{3-a}=7\Rightarrow a=3.5$

$[a]=3$

16. det=0

17. $L_1+\lambda L_2=0$

$(3x-4y+1)+\lambda(5x+y-1)=0$

$(3+5\lambda)x+(-4+\lambda)y+1-\lambda=0$

$$\frac{x}{\left(\frac{\lambda-1}{3+5\lambda}\right)}+\frac{y}{\left(\frac{\lambda-1}{\lambda-4}\right)}=1$$

given $\dfrac{\lambda-1}{3+5\lambda}=\dfrac{\lambda-1}{\lambda-4}$

$\Rightarrow \lambda=\dfrac{-7}{4}$ then

$23x+23y-11=0$

18. Let A(3,4) ,B(-1,2)

Midpoint of AB is C=(1,3)

Slope of AB=$\dfrac{2}{4}=\dfrac{1}{2}$

$\perp^{er}$ line slope = -2

Req. line eq. is

$y-3=-2(x-1)$

$2x+y-5=0$

19. Given lines $3x+4y=9....(1)$

$6x+8y=15....(2)$

$(1)\times 2\Rightarrow 6x+8y-18=0$

The distance between parallel lines

$$=\frac{|c_1-c_2|}{\sqrt{a^2+b^2}}=\frac{3}{\sqrt{100}}=\frac{3}{10}$$

20. Given:

$y=ax$ & $y=2$

$2=ax\Rightarrow x=\dfrac{2}{a}\ \therefore A(\dfrac{2}{a},2)$

And

$y=ax$ & $y=6$

$6=ax\Rightarrow x=\dfrac{6}{a}\ \therefore B(\dfrac{6}{a},6)$

Given:

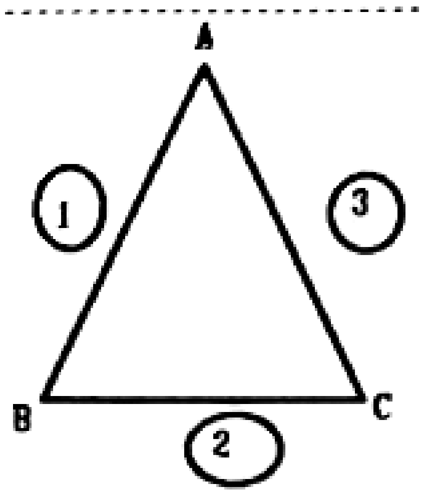
$$\sqrt{\left(\frac{6}{a}-\frac{2}{a}\right)^2+(6-2)^2}<5$$

$\Rightarrow 9a^2-16>0$

$\Rightarrow (3a-4)(3a+4)>0$

$\therefore a<-\dfrac{4}{3}$ or $a>\dfrac{4}{3}$

21.



A triangle can be uniquely determined by its 3 sides

22. Given 3a+5b+6c=0

$\Rightarrow c = \frac{-3a}{6} - \frac{5b}{6} \rightarrow (1)$

& line $ax+by+c=0 \rightarrow (2)$

Sub 'c' value in (2), we get

$ax + by + \left(\frac{-3a}{6} - \frac{5b}{6}\right) = 0$

$a\left(x - \frac{1}{2}\right) + b\left(y - \frac{5}{6}\right) = 0$

$x - \frac{1}{2} = 0 \Rightarrow x = \frac{1}{2}$

$y - \frac{5}{6} = 0 \Rightarrow y = \frac{5}{6}$

$\therefore$ The point $(x,y) = \left(\frac{1}{2}, \frac{5}{6}\right)$

23. $\begin{vmatrix} 2 & 1 & 1 \\ 3 & 2 & 2 \\ k & 3 & 3 \end{vmatrix} = 0$

$2(6-6) - 1(9-2k) + 1(9-2k) = 0$

$\therefore$ Infinite solutions.

24. y-3=m(x-2)

$y = 0 \Rightarrow x = 2 - \frac{3}{m}$

$x = 0 \Rightarrow y = -2m + 3$

$|xy| = 24$

$\left(2 - \frac{3}{m}\right)(-2m+3) = \pm 24$

m=3

25. Conceptual

26. P,M,Q are collinear

27. Given pair of lines

$xy + x + y + 1 = 0 \Rightarrow (x+1)(y+1) = 0$

$xy + 3x + 3y + 9 = 0 \Rightarrow (x+3)(y+3) = 0$

form a SQUARE

28 $y = 3x + 1 \ldots.(1)$

$y = \frac{x}{2} + 3 \ldots.(2)$

$y = mx + 4 \ldots.(3)$

$\tan\theta_1 = \tan\theta_2$

$\left|\frac{m-3}{1+3m}\right| = \left|\frac{m - \frac{1}{2}}{1 + \frac{m}{2}}\right|$

take '−'

$\Rightarrow \frac{m-3}{1+3m} = -\left(\frac{2m-1}{2+m}\right)$

$\Rightarrow 7m^2 - 2m - 7 = 0$

$\Rightarrow m = \frac{2 \pm \sqrt{200}}{14} = \frac{1 \pm 5\sqrt{2}}{7}$

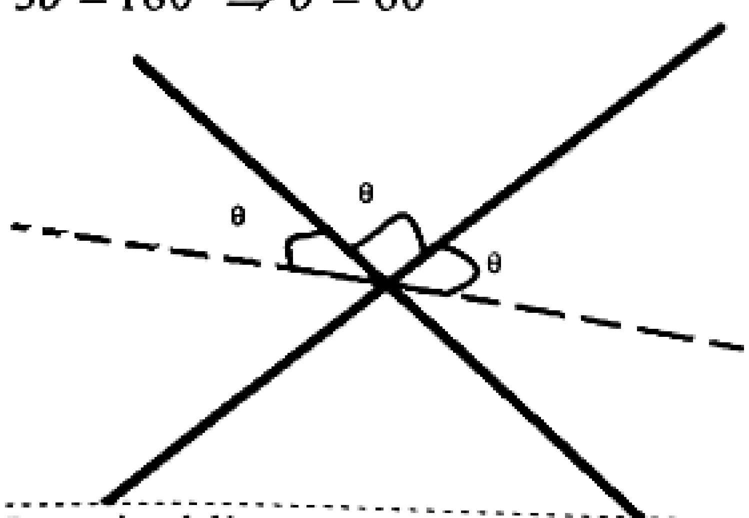
29. $x + y = 1$

$x = 1, y = 1$

$incentre = \left(\frac{ax_1 + bx_2 + cx_3}{a+b+c}, \frac{ay_1 + by_2 + cy_3}{a+b+c}\right)$

$I = \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

30. $3\theta = 180^0 \Rightarrow \theta = 60^0$



31. Required line is

$2x - y + 2 + \lambda(x + y + 4) = 0$

$\lambda = -2$

$y + 2 = 0$

32. $\dfrac{|ax_1+by_1+c|}{\sqrt{a^2+b^2}}=\dfrac{65}{13}=5$

33. The image of (6,5) in the line x-3=0

$$\frac{h-x_1}{a}=\frac{k-y_1}{b}=\frac{-2(ax_1+by_1+c)}{a^2+b^2}$$

$\therefore$ image of (6,5) = (0,5)

34. $\dfrac{a_1}{a_2}=\dfrac{b_1}{b_2}=\dfrac{c_1}{c_2}=\lambda$

$$(\lambda a_2+ca_2)x+(\lambda b_2+cb_2)y+(\lambda k_2+ck_2)=0$$

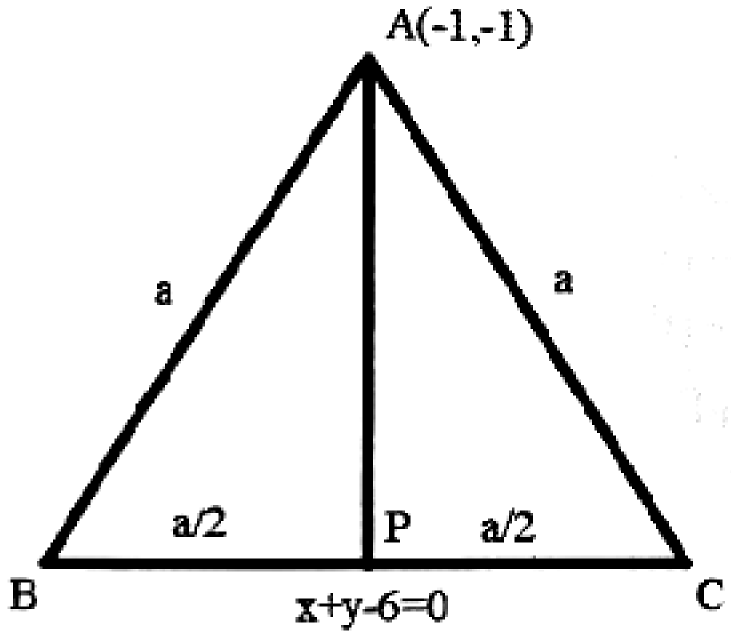
$$(\lambda+c)(a_2x+b_2y+c_2)=0$$

Same as the line P=0

35. Distance between parallel lines

$$=2\sqrt{\frac{g^2-ac}{a(a+b)}}=\frac{2}{\sqrt{10}}$$

36.



From ΔAPC

$$AP^2+PC^2=AC^2$$

$$AP^2=a^2-\frac{a^2}{4}$$

$$AP=\frac{\sqrt{3}a}{2}\,.......(1)$$

Now perpendicular distance from A(-1, -1) to $x+y-6=0$ is

$$AP=\frac{|-1-1-6|}{\sqrt{1+1}}=4\sqrt{2}\,.......(2)$$

From (1) & (2), $\dfrac{\sqrt{3}}{2}a=4\sqrt{2}\Rightarrow a=\dfrac{8\sqrt{2}}{\sqrt{3}}$

Area $\Delta=\dfrac{\sqrt{3}}{4}a^2=\dfrac{32}{\sqrt{3}}$

37. $x+2y+1=0 \qquad 2y=-x-1$

$-x-2y=1 \qquad y=\dfrac{-1}{2}x-\dfrac{1}{2}$

$x\left(\dfrac{-1}{\sqrt{5}}\right)+y\left(\dfrac{-2}{\sqrt{5}}\right)=\dfrac{1}{\sqrt{5}} \qquad m=\dfrac{-1}{2},c=\dfrac{-1}{2}$

$\tan\theta=2$

$\tan^{-1}(\tan\theta+m+c)=\tan^{-1}(1)=\dfrac{\pi}{4}$

38. $2a=-3b+4c$

$2ax+2by+2c=0$

$b(-3x+2y)+c(4x+2)=0$

$3x=2y \qquad 4x=-2$

y =-3/4

$P(l,m)=\left(\dfrac{-1}{2},\dfrac{-3}{4}\right)$

$$\frac{h+\frac{1}{2}}{1}=\frac{k+\frac{3}{4}}{1}=\frac{1}{8}$$

$(h,k)=\left(\dfrac{-3}{8},\dfrac{-5}{8}\right)$

39. Diagram

$O(0,0),A(-3,-1),B(-1,-3)$

D is the foot of the perpendicular from A to OB

$D=\left(\dfrac{-3}{5},\dfrac{-9}{5}\right)$

P divides AD in the ratio 3:4 internally

$P=\left(\dfrac{-69}{35},\dfrac{-47}{35}\right)$

The equation of the line parallel to OB and passing through P is 21x-7y+32=0

40. $AC=r_2, AB=r_1$

$B(-5+r_1\cos\theta,-4+r_1\sin\theta)$ *lies on* $x+3y+2=0$

$$\frac{225}{r_1^2}=(\cos\theta+3\sin\theta)^2$$

$C(-5+r_2\cos\theta,-4+r_2\sin\theta)$ *lies on* $2x+y+4=0$

$$\frac{100}{r_2^2}=(2\cos\theta+\sin\theta)^2$$

$$\frac{100}{r_2^2}-\frac{225}{r_1^2}=(2\cos\theta+\sin\theta)^2-(\cos\theta+3\sin\theta)^2$$

$$=4\cos 2\theta+\sin 2\theta$$
$$-\cos^2\theta-4\sin^2\theta=2\sin 2\theta$$
$$(2\tan\theta+1)^2=0$$
$$\tan\theta=-\frac{1}{2}$$

41. Equation of side

$A\vec{B}$ *is* $x-3y=0----(1)$

$A\vec{C}$ *is* $3x-y=0-----(2)$

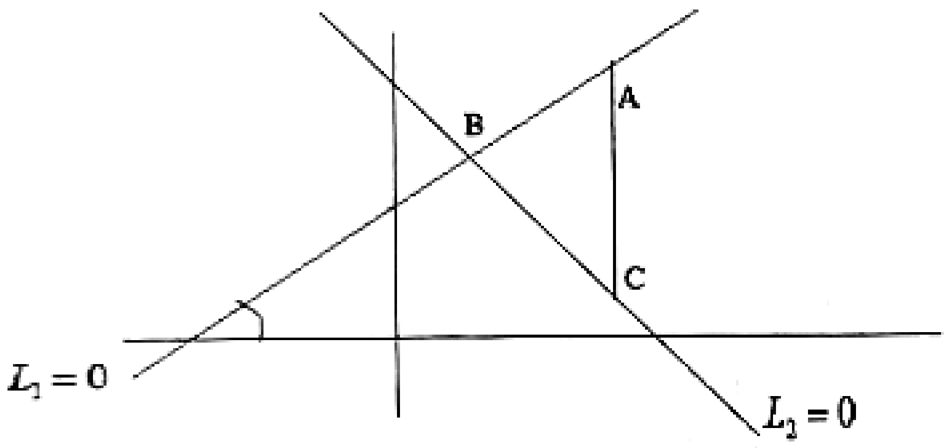
$B\vec{C}$ *is* $x+y+4=0----(3)$

solve $1\&3$ *we get* $(-3,-1)$

substitute in $3x-y+k=0$

$K=8$

42.



Equation of line through (3,4) is

$y-4=1(x-3)$

$L_1\equiv x-y+1=0\rightarrow(1)$

$L_2\equiv 2x-y+4=0\rightarrow(2)$

Solving (1) & (2) we get B=(-3,-2)

Let C=$(x,2x+4)$

AB=AC

$(x-3)^2+4x^2=72$

$(5x-21)(x+3)=0$

$x=\frac{21}{5}$

$\therefore C=\left(\frac{21}{5},\frac{62}{5}\right)$

Equation of AC$\Rightarrow y-4=7(x-3)$

$\Rightarrow 7x-y-17=0$

43. $(x,y)=\left(1+\frac{\sqrt{6}}{3}\cos\theta,2+\frac{\sqrt{6}}{3}\sin\theta\right)$

(x,y) *lies on* $x+y=4$

$$1+\frac{\sqrt{6}}{3}\sin\theta+2+\frac{\sqrt{6}}{3}\cos\theta=4$$
$$\cos\theta+\sin\theta=\frac{\sqrt{3}}{\sqrt{2}}$$
$$\frac{1}{\sqrt{2}}\cos\theta+\frac{1}{\sqrt{2}}\sin\theta=\frac{\sqrt{3}}{2}$$
$$\sin\left(\theta+\frac{\pi}{4}\right)=\frac{\sqrt{3}}{2}$$
$$\sin\left(\theta+\frac{\pi}{4}\right)=\sin\frac{\pi}{3}$$
$$\theta=\frac{\pi}{12}$$

$$\cos\left(\theta-\frac{\pi}{4}\right)=\frac{\sqrt{3}}{2}$$
$$\cos\left(\theta-\frac{\pi}{4}\right)=\cos\frac{\pi}{6}$$
$$\theta=\frac{5\pi}{12}$$

44. $x+3y-9=0.....(1)$

$4x+5y-1=0.....(2)$

$px+qy+10=0.....(3)$

Solving (1) &(2) we get $(x,y)=(-6,5)$

$(3)\Rightarrow p(-6)+q(5)+10=0$

$5q-6p+10=0$

It passes through $(q,-p)$

45. $f(x)=a^x\Rightarrow f(1)=a$

$a=2$

$\therefore f(x)=2^x$

Area of $\Delta^{le}OAB=\frac{1}{2}\times\frac{4}{5}\times 2=\frac{4}{5}$

Required area $=4\left(\frac{4}{5}\right)=\frac{16}{5}=\frac{2^4}{1+2^2}=\frac{f(4)}{1+f(2)}$

46. $m_1=\frac{-3}{4},\ m_2=\frac{4}{3}$

$m_1m_2=-1$

$Tan45^0=\left|\frac{m_1-m_2}{1+m_1m_2}\right|$

$1+m_1m_2 = |m_1 - m_2|$

Case(i) $1-\frac{3m_2}{4}=\frac{-3}{4}-1$

$m_2=-7$

Equation is $y-2=-7(x-1)$

$7x+y-9=0$

Case(ii) $1-\frac{3m_2}{4}=\frac{3}{4}+m_2$

$m_2=\frac{1}{7}$

Required equation is $y-2=\frac{1}{7}(x-1)$

$x-7y+13=0$

47. $\tan\theta=\left|\frac{m_1-m_2}{1+m_1m_2}\right|$

$\pm\sqrt{3}=\frac{m+1}{1-m}$

Case(i) $(1-m)\sqrt{3}=m+1$

$m=\frac{\sqrt{3}-1}{\sqrt{3}+1}$

Required equation is $y-1=\frac{\sqrt{3}-1}{\sqrt{3}+1}(x-1)$

$\left(1-\sqrt{3}\right)x+\left(\sqrt{3}+1\right)y-2=0$

Case(ii) $(1-m)\left(-\sqrt{3}\right)=m+1$

$m=\frac{-\left(1+\sqrt{3}\right)}{1-\sqrt{3}}$

Required equation is $y-1=\frac{-\left(1+\sqrt{3}\right)}{1-\sqrt{3}}(x-1)$

$\left(1+\sqrt{3}\right)x+\left(1-\sqrt{3}\right)y-2=0$

48. Given

$P(x,y)=(3,4)$

$and\ \theta=\frac{\pi}{6}$

w.k.t $x=x_1\pm r\cos\theta\ and\ \ y=y_1\pm r\sin\theta$

$Q(x,y)=(x_1-r\cos\theta,\ y_1-r\sin\theta)$

$\left(3-\frac{r\sqrt{3}}{2},4-\frac{r}{2}\right)$

$Q(x,y)$ lies on the st.line $12x+5y+10=0$ on simplifying, we get $r=\frac{132}{12\sqrt{3}+5}$

49. Given

$L_1 \cong x+2y-19=0$

$L_2 \cong x-2y-3=0$

Equation of st.line passing through P.O.I of $L_1\ and\ L_2$ is $L_1+\lambda L_2=0\ldots(1)$

w.k.t perpendicular distance from point $P(-2,4)$ to (1) is 5

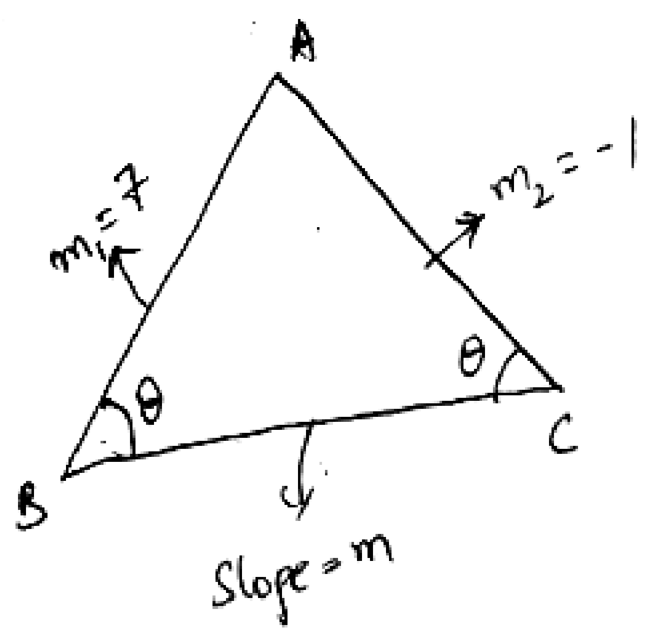
on simplifying we get $5x-12y-7=0$ is required line

comparing with $5x+by+c=0$

$b=-12, c=-7$

$\therefore 5+b+c=5-12-7=-14$

50. Let 'm' be the slope of the third side,



$\tan\theta=\left|\frac{m-7}{1+7m}\right|$ and $\tan\theta=\left|\frac{1+m}{1-m}\right|$

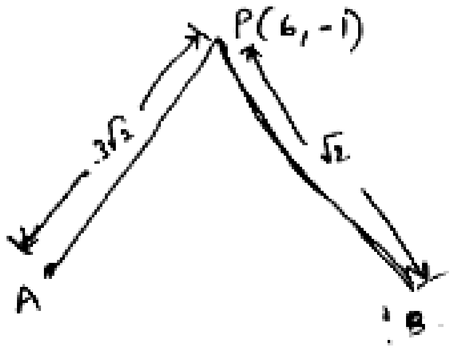
w.k.t ΔABC is isosceles triangle,

$\frac{m-7}{1+7m}=\frac{1+m}{m-1}$

On simplifying $m=\frac{1}{3},-3$

Equation of third side with point $(2,-5)$ and slope $\frac{1}{3}$ is $x-3y=17$

51.



Given lines $L_1 \equiv x-y-7=0$.

$L_2 \equiv x+y-5=0$

Point of intersection of

$L_1=0, L_2=0$ is $P(6,-1)$

$A(x_1,y_1)=\left(6\pm3\sqrt{2}\left(\frac{1}{\sqrt{2}}\right),-1\pm3\sqrt{2}\left(\frac{1}{\sqrt{2}}\right)\right)$

$=(9,2)(or)(3,-4)$

$B(x_2,y_2)=\left(6\pm\sqrt{2}\left(\frac{-1}{\sqrt{2}}\right),-1\pm\sqrt{2}\left(\frac{1}{\sqrt{2}}\right)\right)$

$=(5,0)(or)(7,-2)$

Now take $\left.\begin{array}{l} A(x_1,y_1)=(9,2) \\ \text{and } B(x_2,y_2)=(5,0)\end{array}\right\}$ $[\because x_1y_1\ge0, x_2y_2\ge0]$

w.k.t O(0,0)

slope of OA $(m_1)=\frac{2}{9}$ and slope of OB $(m_2)=0$

$\tan\theta=\left|\frac{m_1+m_2}{1-m_1m_2}\right|=\frac{2}{9}$

Now $\cos\theta=\frac{9}{\sqrt{85}} \Rightarrow \theta=\cos^{-1}\left(\frac{9}{\sqrt{85}}\right)$

52. $3x+y-4=0$ and $x-ay-10=0$

$bx+2y+9=0$ are 3 successive sides of rectangle

$3x+y-4=0$ and $x-ay-10=0$ are perpendicular lines $\Rightarrow a=3$

4^{th} side passes $(1,2)$ and having slope $\frac{1}{3}$ *is* $x-3y+5=0$

Length $=\frac{15}{\sqrt{10}}$, *breadth* $=\frac{17}{2\sqrt{10}}$

Area of the rectangle $=\frac{15\times17}{2\times10}=\frac{51}{4}$

53. $A(2,1),\ B(3,-2), C(a,b), P(3,4)$

Slope of AB $\times$ slope of BC $=-1$

$3b+6=a-3 \Rightarrow a-3b-9=0...(1)$

Slope of AB = slope of CP

$\Rightarrow -3a+9=b-4 \Rightarrow 3a+b-13=0....(2)$

Solve (1) *and* (2) then

$a=\frac{24}{5}, b=\frac{-7}{5}$

$5a+10b=10$

54. $5x-2y=10 \Rightarrow \frac{x}{2}+\frac{y}{-5}=1$, $a=2, b=-5$

$a^2+b^2=29$

55. $a=2n-1, b=2n+1, c=2n+3, n\in Z$

$ax+by+c=0 \Rightarrow (2n-1)x+(2n+1)y+(2n+3)=0$

$2n(x+y+1)-(x-y-3)=0$

P.I of lines $x+y+1=0, x-y-3=0$ is $(1,-2)$.

56. $y=\sqrt{x} \Rightarrow \frac{dy}{dx}=\frac{1}{2}\frac{1}{\sqrt{x}} \Rightarrow Tan\theta=Tan45^0=1$

$\frac{1}{2}\frac{1}{\sqrt{x}}=1 \Rightarrow x=\frac{1}{4}, y=\left(\frac{1}{4}\right)^{1/2}=\frac{1}{2}$

Line is $y=\frac{1}{2}$

57. $B(\alpha,\beta)$ is image of $A(1,2)$ w.r.t

$2x+3y+4=0$. $\alpha=\frac{-35}{13}, \beta=\frac{-46}{13}$

58. I.P.E

59. Ratio $=-\frac{L_{11}}{L_{22}}$

60. Verification .

61. $L_1=2x+3y-1=0, L_2=x+2y+1=0$,

$L_3=ax+by-1=0$.

Equations of altitudes

$(a_1a_2+b_1b_2)L_3=(a_2a_3+b_2b_3)$

$L_1=(a_3a_1+b_3b_1)L_2$

$(2+6)(ax+by-1)$

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

G.T O.C is origin

$\therefore 8(-1)=(a+2b)(-1)=(2a+3b)(1)$

$a+2b-8=0, 2a+3b+8=0 \Rightarrow a=-40, b=24$

$\frac{1}{a}+\frac{1}{b}=\frac{1}{60}$

62. I.P.E

63. I.P.E

64. $h=\frac{1}{\sqrt{2}}$, side $=\frac{2h}{\sqrt{3}}$

65. Slope of given line $=\frac{-\sec\theta}{\cos ec\theta}=\frac{-\sin\theta}{\cos\theta}$

Slope of $\perp^r$ line $=\frac{\cos\theta}{\sin\theta}$

Line is $y-a\sin^3\theta=\frac{\cos\theta}{\sin\theta}(x-a\cos^3\theta)$

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

66. I.P.E

67. $C=(2,2), P=\left(\frac{-1}{5},\frac{2}{5}\right)$ Line $\overline{CP}$ is

$8x-11y+6=0$.

$(-9,-6)$ lies on $\overline{CP}$.

68. $m=3, Tan\theta=3, \sin\theta=\frac{3}{\sqrt{10}}, \cos\theta=\frac{1}{\sqrt{10}}$

Line is $x+y+5=0, (x_1,y_1)=(1,2)$

Distance $=\left|\frac{ax_1+by_1+c}{a\cos\theta+b\sin\theta}\right|$

69. $m=\frac{\cos\theta}{\sin\theta}$, Slope of $\perp^r$ line $=\frac{-\sin\theta}{\cos\theta}$

Line is $y-2\sin^3\theta=\frac{-\sin\theta}{\cos\theta}(x-2\cos^3\theta)$

$\Rightarrow x\sec\theta+y\cos ec\theta=2$.

70. I.P.E

71. Line $\overline{AB}$ is $L\equiv 2x-3y-1=0$

Ratio $=\frac{-L_{11}}{L_{22}}$.

72. $a(x+y-1)+b(2x-3y+1)=0$

Solving $x+y-1=0, 2x-3y+1=0$

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

73. I.P.E

74. $(0,-4)$ lies on perpendicular bisector $\overline{PQ}$

75. I.P.E

76. I.P.E

77. $m_1=3, m_2=\frac{-1}{3}$.

78. A line through $A(-5,-4)$ with slope $\tan\theta$ is

$\frac{x+5}{\cos\theta}=\frac{y+4}{\sin\theta}=r$ Any point on the line is

$=(-5+r\cos\theta, -4+r\sin\theta)$

If this lies on $x+3y+2=0$, we have

$-5+r\cos\theta+3(-4+r\sin\theta)+2=0$

$\therefore r=\frac{15}{AB}=\cos\theta+3\sin\theta$

Similalry, we get, $\frac{10}{AC}=2\cos\theta+\sin\theta$

And $\frac{6}{AD}=\cos\theta-\sin\theta$ from conditions,

$(\cos\theta+3\sin\theta)^2+(2\cos\theta+\sin\theta)^2=(\cos\theta-\sin\theta)^2$

$\Rightarrow(2\cos\theta+3\sin\theta)^2=0 \Rightarrow \tan\theta=-\frac{2}{3}$

79. $\frac{x}{a}-\frac{y}{b}=1....(1)$ which passes through $(8,6)$.

$\Rightarrow a=\frac{8b}{b+6}......(2)$

(1) meets axes at $A(a,0), B(0,-b)$

G.T $\frac{1}{2}|ab|=12 \Rightarrow ab=\pm 24$

Case-1: $ab=24 \Rightarrow \left(\frac{8b}{b+6}\right)b=24$ by (2)

$\Rightarrow b^2-3b-18=0 \Rightarrow b=6, b=-3$

If $b=6, a=4 \Rightarrow 3x-2y=12$

If $b=-3, a=-8 \Rightarrow 3x-8y+24=0$

Case-2: If $ab=-24$. 'b' has no real roots.

80. $\theta=45^0, (x_1,y_1)=(1,2)$. Line is

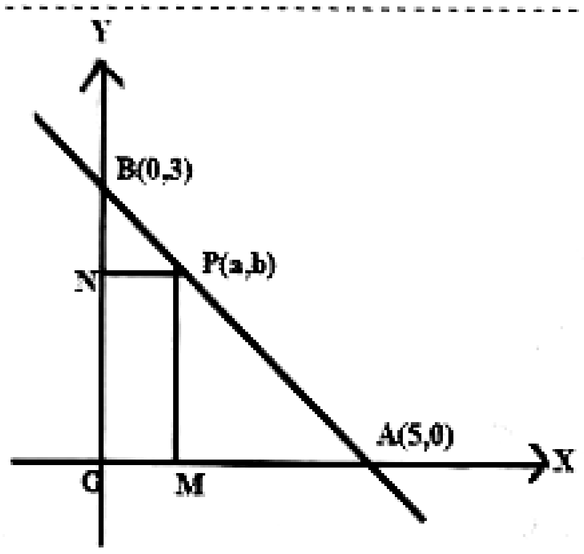
$3x+4y+5=0$, $PQ=\left|\frac{ax_1+by_1+c}{a\cos\theta+b\sin\theta}\right|$.

81. I.P.E

82. $A=(4,-5), B=(1,3), d=10, AB<d$

No. of lines passing through $(4,-5)$ is '0'.

83.



$\frac{x}{5}+\frac{y}{3}=1$. $P(a,b)$ is a point which equidistant from the axes. $\therefore |a|=|b|$

$\therefore \left(a, \frac{15-3a}{5}\right)$ is lies on $3x+5y=15$

$\left(\because |a|=\left|\frac{15-3a}{5}\right|\right)$

Take +ve sign: $\therefore a=+ve, b=+ve$

Take –ve sign : $b=+ve, a=-ve$

$\therefore P$ lies in either in first (or) in third quadrant.

84. $|x+y|=4 \Rightarrow x+y=4, x+y=-4$

$\Rightarrow a>-2, a<2$

$\Rightarrow -2<a<2 \Rightarrow |a|<2$

85. I.P.E

86. I.P.E

87. Slope of $\overline{BC}$ is $m_1=-1$, slope of $\overline{AB}$ is

$m_2=\frac{2}{3}$, Slope of $\overline{AC}=m$

$\left|\frac{m_1-m_2}{1+m_1m_2}\right|=\left|\frac{m-m_1}{1+mm_1}\right| \Rightarrow$ we get $m=\frac{3}{2}$

$\overline{AC}$ is $y-3=\frac{3}{2}(x-2) \Rightarrow 3x-2y=0$.

88. I.P.E

89. I.P.E

90. $y=mx+c$ which passes though $(1,2)$

$2=m+c \Rightarrow c=2-m$

$y=mx+2-m.....(1) \Rightarrow mx-y+2-m=0$

$d=\left|\frac{3m+2-m-1}{\sqrt{m^2+1}}\right| \Rightarrow d=\frac{2m+1}{\sqrt{m^2+1}}$

$\therefore S=\frac{2m+1}{\sqrt{m^2+1}} \Rightarrow \frac{dS}{dm}=0 \Rightarrow m=2$

$\therefore$ (1) becomes $y=2x$.

91. $2x+3y+7=0$, $m=\frac{-2}{3}, Tan\theta=\frac{-2}{3}$

$(x_1,y_1)=(1,-3), r=3$

$\cos\theta=\frac{-3}{\sqrt{13}}, \sin\theta=\frac{2}{\sqrt{13}}$

Required point $=(x_1+r\cos\theta, y_1+r\sin\theta)$

$=\left(\frac{\sqrt{13}-9}{\sqrt{13}}, \frac{-3\sqrt{13}+6}{\sqrt{13}}\right)$.

92. P.I of lines $2x-3y+4=0, 3x+4y-5=0$ is $\left(\frac{-1}{17}, \frac{22}{17}\right)$.

Require path is the equation $\perp^r$ to $6x-7y+8=0$ and passing through $\left(\frac{-1}{17}, \frac{22}{17}\right)$, which

$7\left(x+\frac{1}{17}\right)+6\left(y-\frac{22}{17}\right)=0$

$\Rightarrow 119x+102y-225=0$

93. $\frac{3}{2}x+(2a-1)y=3 \qquad 2x+a^2y=-3$

$m_1=\frac{-3}{2(2a-1)} \qquad m_2=\frac{-2}{a^2}$

$m_1m_2=-1$

$\frac{3}{a^2(2a-1)}=-1$

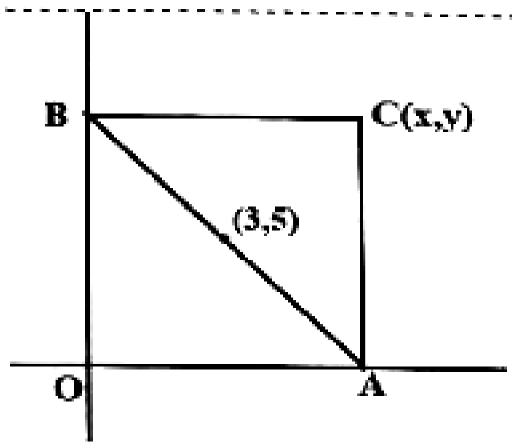
$2a^3-a^2+3=0 \Rightarrow a=-1$

Lines are $x-2y-2=0, 2x+y+3=0$

Point of intersection is $P\left(\frac{-4}{5},\frac{-7}{5}\right), Q(1,1)$

$PQ=3$

94.



Let l,m are X,Y intercepts of line AB

$\frac{x}{l}+\frac{y}{m}=1$ which passes through $(3,5)$

$\frac{3}{l}+\frac{5}{m}=1$

$3m+5l=lm....(1)$

Let $C(x,y)$ be locus

From diagram $\frac{1}{2}xy=\frac{1}{2}lm$

$xy=lm$

$xy=3m+5l$ where $m=y, l=x$

$5x+3y-xy=0$

$a+b+h=5+3-\frac{1}{2}=\frac{15}{2}$

95. $\alpha x+\beta y+\sqrt{\alpha\beta}=0$

Area of triangle $=\frac{c^2}{2|ab|}$

$=\frac{\alpha\beta}{2\alpha\beta}=\frac{1}{2}=$ constant

96. Equation of L_1 is $3x-2y-4=0$

Equation of L_2 is $y+1=\frac{-2}{3}(x-4)$

$2x+3y-5=0$

P.I of L_1 & L_2 is $A\left(\frac{22}{3},\frac{7}{3}\right)$

P.I of L_1 and y-axis is $B(0,-2)$

P.I of L_2 and y-axis is $C(0,5/3)$

Area of $\Delta ABC=\frac{121}{39}$

97. $P'(a,b)$ is image of the point $P(-1,2)$

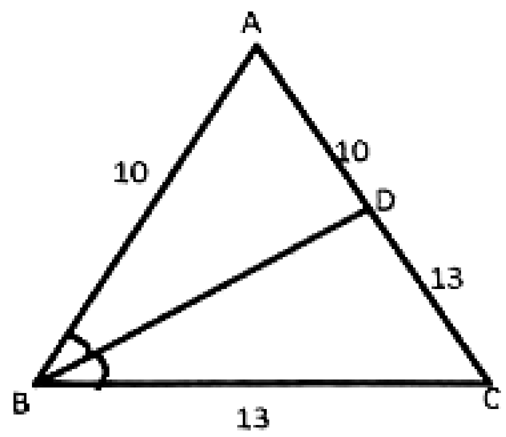
$\frac{a+1}{1}=\frac{b-2}{-2}=\frac{-2(-1-4+3)}{5}$

$a=\frac{-1}{5}, b=\frac{2}{5}$

Perpendicular distance from $P'\left(\frac{-1}{5},\frac{2}{5}\right)$ to(2)

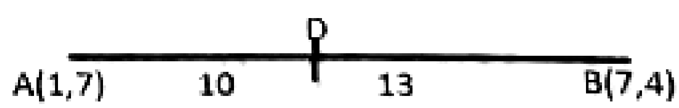
$=\frac{\left|2\left(\frac{-1}{5}\right)+\frac{2}{5}-7\right|}{\sqrt{4+1}}=\frac{7}{\sqrt{5}}$

98.



$BC=13, BA=10$

$AB:BC=AD:DC=10:13$



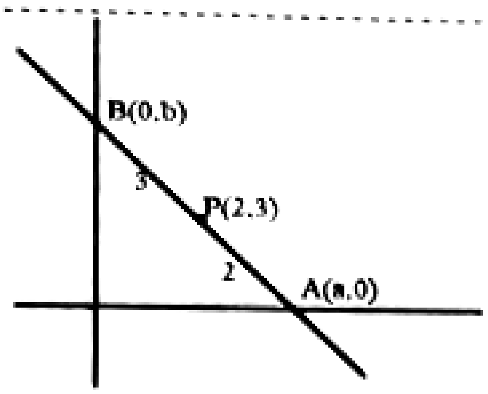
$D\left(\frac{83}{23},\frac{131}{23}\right)$

Since $B(-5,-1)$

$$m=\frac{\frac{131}{23}+1}{\frac{83}{23}+5}=\frac{154}{198}$$

$$y+1=\frac{154}{198}(x+5)\Rightarrow 7x-9y+26=0$$

99.



Let equation of line be $\frac{x}{a}+\frac{y}{b}=1$

$A(a,0),B(0,b),P(2,3)$

$$P=\left(\frac{3a}{5},\frac{2b}{5}\right)$$

$$(2,3)=\left(\frac{3a}{5},\frac{2b}{5}\right)$$

$$\Rightarrow a=\frac{10}{3},b=\frac{15}{2}$$

Product of intercepts $=ab=\frac{10}{3}\times\frac{15}{2}=25$

100. Slope of a line L is 2

Let m be the slope of other line.

$$Tan\frac{\pi}{6}=\left|\frac{2-m}{1+2m}\right|$$

$$\frac{1}{\sqrt{3}}=\left|\frac{2-m}{1+2m}\right|$$

S.O.B.S

$$\frac{1}{3}=\frac{4+m^2-4m}{1+4m^2+4m}$$

$$\Rightarrow m^2+16m-11=0$$

m_1,m_2 are roots.

$$\therefore m_1+m_2=-16$$

101. Let $B(h,k)$

B is the image of A w.r.t $2x+3y+1=0$

$$\frac{h-3}{2}=\frac{k-2}{3}=\frac{-(6+6+1)}{2^2+3^2}$$

$h=1,k=-1$

$B(1,-1)$

$C(\alpha,\beta)$

C is the image of A w.r.t $x+2y-12=0$

$$\frac{\alpha-3}{1}=\frac{\beta-2}{2}=\frac{-(3+4-12)}{1^2+2^2}$$

$\alpha=4,\beta=4$

$C(4,4)$

Slope of $\overline{BC}=\frac{4+1}{4-1}=\frac{5}{3}$

102. Required line slope m$(m\in Z)$

Slope of given line $x+y-3=0$

$m_1=-1$

$$Tan\theta=\left|\frac{m_1-m_2}{1+m_1m_2}\right|$$

$$Tan\left(Tan^{-1}\frac{5}{7}\right)=\left|\frac{m+1}{1-m}\right|$$

$$\frac{5}{7}=\left|\frac{m+1}{1-m}\right|$$

S.O.B.S

$$\frac{25}{49}=\frac{m^2+1+2m}{1+m^2-2m}$$

$m=-1/6,(or)\ m=-6$

But m is an integer

$\therefore m=-6$

Equation of the line passing through $(1,1)$.

$y-1=-6(x-1)$

$6x+y-7=0$

Compare with $ax+by+c=0$

$a=6,c=-7,ac=-42$

103. Conceptual

104. Given lines $10x-8y-10=0...(1)$

$\frac{x}{4}-\frac{y}{5}+1=0....(2)$

Let straight line passes through $O(0,0)$ is

$y=mx...(3)$

$(1)\perp(2)\Rightarrow m_1m_2=-1$

$\Rightarrow \frac{5m}{4}=-1\Rightarrow m=\frac{-4}{5}$

$y=\frac{-4}{5}x\Rightarrow x=\frac{-5y}{4}$

$P.O.I\,of\,(1)\&(3)$ $\quad$ $P.O.I\,of\,(2)\&(3)$

$P\left(\frac{25}{41},\frac{-20}{41}\right)$ $\quad$ $Q\left(\frac{-100}{41},\frac{80}{41}\right)$

'O' divides $\overline{PQ}$ in the ratio $\frac{25}{41}-0:0+\frac{100}{41}$

$\Rightarrow 25:100\Rightarrow 1:4$

105. Let 'O' be the origin

P.O.I of $L_1=0, L_2=0$ is $A(-1,2)$

P.O.I of $L_1=0, L_3=0$ is $B\left(\frac{-4}{19},\frac{26}{19}\right)$

Slope $(\overline{OA})=m_1=-2$

Equation $\overline{OA}\, is\, 2x+y=0$

Equation $\overline{OB}\, is\, 13x+2y=0$

$\overline{OA}.\overline{OB}=(2x+y)(13x+2y)=0$

$=26x^2+17xy+2y^2=0$

106. Image of A w.r.to line $x-y=0$ is $B(3,2)$

Image of B w.r.to $\frac{x}{2}+\frac{y}{2}=1$ is $(-1,0)$

Slope of BC $=1/2$

Equation of $\overline{BC}$ is $x-2y+1=0$

107.

$\tan 45^0=\left|\frac{m+\frac{3}{4}}{1-\frac{3m}{4}}\right|\Rightarrow 1=\left|\frac{4m+3}{4-3m}\right|$

$\Rightarrow 4-3m=\pm(4m+3)$ $\quad$ $4-3m=-4m-3$

$\Rightarrow 1=7m\Rightarrow m=1/7$ $\quad$ $m=-7$

108. $y-y_1=\frac{\sin\theta}{\cos\theta}(x-x_1)$

Slope of this line $=Tan\theta$

Slope of a line $\frac{x}{a}+\frac{y}{b}=1$ is $\frac{-b}{a}$

Given that $\frac{-b}{a}=\frac{-1}{Tan\theta}\Rightarrow\frac{b}{a}=\cot\theta$

109. $L_1=x+2y-5=0, L_2=3x-4y+5=0$

$\left[(\alpha-1)^2,\alpha\right]$ between the region $L_{11}L_{22}<0$

$\left[(\alpha-1)^2+2\alpha-5\right]\left[3(\alpha-1)^2-4\alpha+5\right]<0$

$(\alpha+2)(3\alpha-4)(\alpha-2)^2<0$

By wavy curve method, $\alpha\in(-2,4/3)$

$\alpha=-1,0,1$

110. $A(1,1)$, $x+2y+1=0$

$B(-1,-3)$ is image of A w.r.t to $x+2y+1=0$

$C=(2,1)$ is foot of perpendicular from 'B' to $3x+4y-1=0$, $AC=1$

111. $B(-3,4)$ is image of A w.r.t to $2x-3y+5=0$.

Equation of AB is $3x+2y+1=0$

Let $Q(h,k)$ is foot of perpendicular from $P(-4,-1)$ to line joining AB is

$\frac{h+4}{3}=\frac{k+1}{2}=\frac{-(-13)}{13}=1$

$(h,k)=(-1,1)$

112. Given the distance between parallel lines $3x-2y+5=0$ and $3x-2y+c=0$ is 5

$\Rightarrow\frac{|c-5|}{\sqrt{9+4}}=5$

$\Rightarrow c^2-10c-300=0$

$c=5\left(\pm\sqrt{13}+1\right)$

113. Let P.O I of $2x+3y+1=0$ and $x+y-3=0$ is P.

$\therefore P=(10,-7)$

Angle $\theta = \text{Tan}^{-1}\left(\frac{2}{3}\right)$

$\Rightarrow slope\ m = \frac{2}{3}$

Required equation of line L is $y+7 = \frac{2}{3}(x-10)$

$\Rightarrow \frac{x}{41/2} + \frac{y}{-41/3} = 1$

Sum of the intercepts of L is $\frac{41}{6}$

114. A) Let ratio of intercepts $= 5a:3a$

Required line passes through $(-4,3)$ is

$\frac{x}{5a} + \frac{y}{3a} = 1 \Rightarrow a = \frac{1}{5}$

Required line is $3x+5y=3$

Answer is (II).

B) Line passing through $P(2,-5)$ and Pbisects the part intercepted between the axes.

P is mid-point of line $\Rightarrow \left(\frac{a}{2},\frac{b}{2}\right) = (2,-5)$

$a=4, b=-10$

Required line is $5x-2y-20=0$.

C) Let line parallel to $2x-3y+5=0$ is

$2x-3y+c=0$ with x-intercept is $\frac{2}{5}$.

$\Rightarrow c = -\frac{4}{5}$

Required line is $10x-15y=4$

Option-IV.

D) Let line perpendicular to $5x+2y+7=0$ is

$2x-5y+c=0$ with y- intercept is $\frac{4}{5}$

$\Rightarrow c=4$

Required line is $2x-5y+4=0$

Option- I.

115. (h,k) is the image of the point $(2,-3)$ w.r.t the line $5x-3y=2$ then

$$\frac{h-x_1}{a} = \frac{k-y_1}{b} = \frac{-2(ax_1+by_1+c)}{a^2+b^2}$$

$\Rightarrow h=-3, k=0$

$\therefore h+k = -3+0 = -3$

116. Given,

$x-y+3=0\ldots(1)$

Inclination of (1)= $\theta = 45^0$

$r=2, (x_1 y_1) = (0,3)$

Req. point= $(x_1 \pm r\cos\theta, y_1 \pm r\sin\theta)$

$= (\pm\sqrt{2}, 3\pm\sqrt{2})$

For least distance take

$P = \left(\sqrt{2}, 3-\sqrt{2}\right)$

$OP^2 = 13-6\sqrt{2}$

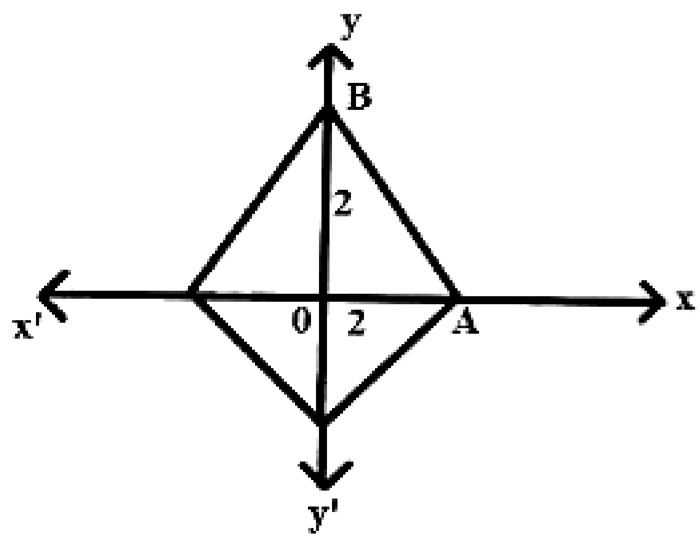
117. conceptual

118. If $x+y=n,\ n\in N$

No. of such points $\Sigma(n-2)$

$= \frac{(n-2)(n-1)}{2}$

119. $|x \pm y| = 2$



Area of a rhombus $= 4Ar(\Delta OAB)$

$= 4\times\frac{1}{2}\times 2\times 2$

$= 8 sq.units$

120. The image of A w.r.to $x-y+5=0$ and $x+2y=0$ respectively are

B=(-7,6)

$C = \left(\frac{11}{5},\frac{2}{5}\right)$

121. $P = \left(a, \frac{4-3a}{4}\right)$

$Q = (b, 5b-4)$

Mid point of PQ=(1,5)=R

a+b=2 ....(1)

-3a+20b=52.....(2)

By solving 1 & 2, $b=\frac{58}{23}$

$Q=\left(\frac{58}{23},\frac{198}{23}\right)$

Slope of PQ=slope of RQ

122. $x+1=0$ ....(1)

$3x+2y=5$ .....(2)

$3x+2y=3$ .....(3)

By solving 1,2 & 1,3

We get P=(-1,4),Q=(-1,3)

$\therefore PQ=1$

123. Common ratio =r

$\therefore A=(a,b),B=(ar,br),c=(ar^2,br^2)$

$\therefore$ slope of AB=slope of $BC=\frac{b}{a}$

124. Any point on $x+y=4$ *is* $p(x,4-x)$

P lies a unit distance from

$4x+3y-10=0$

$$\frac{|4x+3(4-x)-10|}{\sqrt{4^2+3^2}}=1$$

$\Rightarrow x=3,-7$

$\therefore$ the two points are (3,1) and (-7,11)

$\therefore d=10\sqrt{2}=$ distance between the above two points.

125. $\sqrt{3}x-y+2=0$ .....(1)

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

By solving 1 & 2 we get P.O.I

Q=(0,2)

$\therefore$ the point which is at a distance 5 units from Q are $\left(\pm\frac{5}{2},2\pm\frac{5\sqrt{3}}{2}\right)$

$\therefore |y|=\left|2\pm\frac{5\sqrt{3}}{2}\right|$

Since, y>0

$\therefore$ req. distance $=2+\frac{5\sqrt{3}}{2}$

126. (α,β) lies on $3x+y=0\Rightarrow\beta=-3\alpha$

$(\alpha,\beta),(3,4)$ lie on opp. Sides of

$L=3x-4y-8=0$

$L_{11}.L_{22}<0$

$(3\alpha-4\beta-8)(-15)<0$

$\boxed{15\alpha-8>0}$ $(\because\beta=-3\alpha)$

127. $x-2y-3=0$ ......(1)

$3x-2y-5=0$ ......(2)

Equation of a line perpendicular to (1) and passing through P.O.I. of 1 & 2

128. Let m be the slope of the req. line.

The req. line makes same angles with given two lines.

So, $\frac{m-m_1}{1+mm_1}=\frac{m_2-m}{1+mm_2}$

$$\Rightarrow\frac{m-\frac{3}{4}}{1+\frac{3}{4}m}=\frac{\frac{12}{5}-m}{1+\frac{12}{5}m}$$

$\Rightarrow(4m-3)(3+12m)=(12-5m)(4+3m)$

$\Rightarrow 63m^2-32m-63=0$

$\Rightarrow m=\frac{9}{7}$ *or* $\frac{-7}{9}$

129. Given, $6x^2-xy-12y^2=(2x-3y)(3x+4y)$

$15x^2+14xy-8y^2=(3x+4y)(5x-2y)$

Equation of a line through (-1,1) & parallel to common line $3x+4y=0$

130. Equation of a line through $A(a,0),B(0,b)$ is

$\frac{x}{a}+\frac{y}{b}=1$

Let P(a,b) be locus point

Equation $\overline{AB}$ passing through (l,m)

$\frac{l}{a}+\frac{m}{b}=1$

$\therefore$ the locus of p is $\frac{l}{x}+\frac{m}{y}=1$

131. The line is: $ax+by+c=0$

Which is passing through P (1,1)

$\Rightarrow\boxed{a+b+c=0}$

D= algebraic sum of distance from B,C to the line $ax+by+c=0$

$$=\frac{2a+c}{\sqrt{a^2+b^2}}+\frac{2b+c}{\sqrt{a^2+b^2}}$$

$$=\frac{2(a+b+c)}{\sqrt{a^2+b^2}}=0$$

132. No two of the lines are parallel & no three of the lines are concurrent so, no. of triangles=4

133. The foot of triangle from (2,4) onto the line $x+y-1=0$ is $\left(-\frac{1}{2},\frac{3}{2}\right)$

$\therefore$ equation of a line through $(0,0)m\left(\frac{-1}{2},\frac{3}{2}\right)$ is

$y=-3x$

134. $p(\sin\alpha,\cos\alpha)\in Q_1$

$\sin\alpha>0,\cos\alpha>0$

o, p lies same side of the line

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

$\therefore L_{11}L_{22}>0$

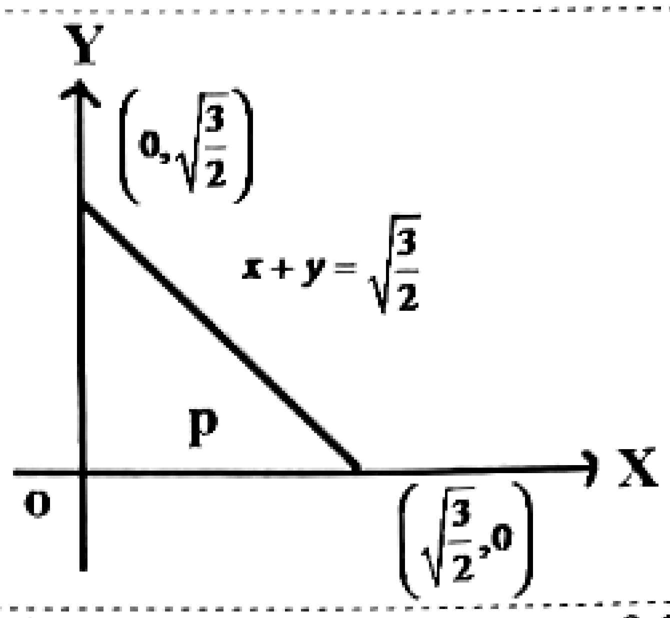
$$\left(0+0-\sqrt{\frac{3}{2}}\right)\left(\cos\alpha+\sin\alpha-\sqrt{\frac{3}{2}}\right)>0$$

$$\cos\alpha+\sin\alpha<\sqrt{\frac{3}{2}}$$

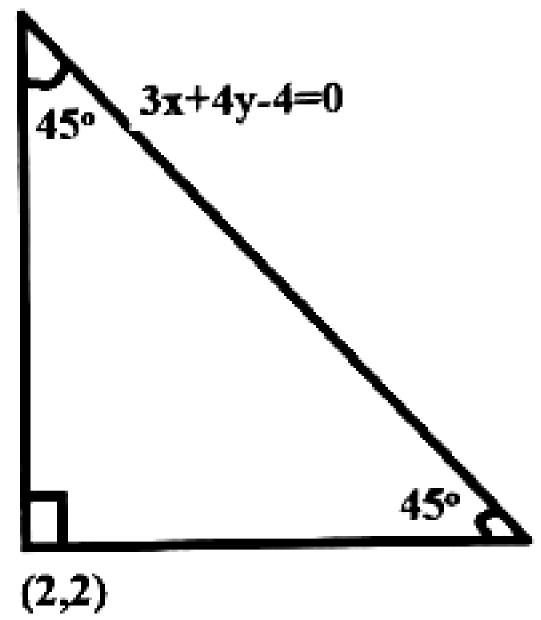
$$0<\sin\left(\alpha+\frac{\pi}{4}\right)<\sin\frac{\pi}{3}$$

$$0<\alpha<\frac{\pi}{3}-\frac{\pi}{4}$$

$$0<\alpha<\frac{\pi}{12}$$



135. Slope of the remaining one of the line be m.



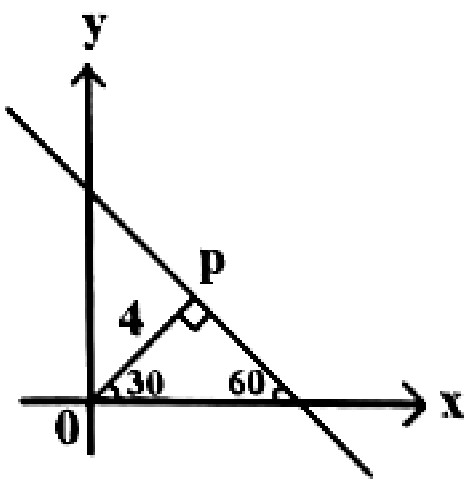
$$\tan 54^o=\left|\frac{m+\frac{3}{4}}{1-\frac{3}{4}m}\right|\Rightarrow m=\frac{1}{7}\,or-7$$

Equation of req. lines are

$$y-2=\frac{1}{7}(x-2)\,or\,y-2=-7(x-2)$$

$$x-7y+12=0\;or\;7x+y-16=0$$

136. Inclination of $\overline{OP}=30^o$



$r=OP=4$

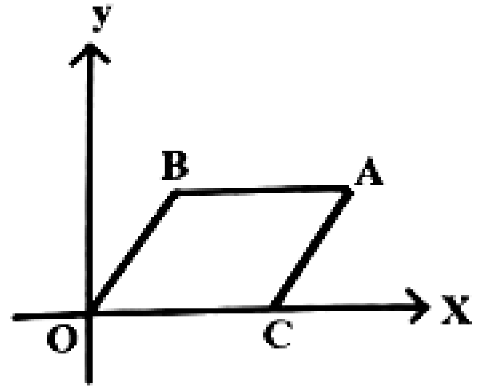
$O=(0,0)=(x_1,y_1)$

$\therefore P=(x_1\pm r\cos\theta,\ y\pm r\sin\theta)$

$=(0\pm4\cos30^o,0\pm4\sin30^o)$

$=\left(\pm4.\frac{\sqrt{3}}{2},14.\frac{1}{2}\right)=\left(\pm2\sqrt{3},\pm2\right)$

137. B lies on $y=\frac{4}{3}x$



$\therefore B=\left(P,\frac{4P}{3}\right)$

$OC=OB=\frac{5P}{3}$

$\therefore C=\left(\frac{5P}{3},0\right)$

Equation of $\overline{BC}$

$2x+y-\frac{10P}{3}=0$

Which contains $\left(\frac{2}{3},\frac{2}{3}\right)$

$\frac{4}{3}+\frac{2}{3}-\frac{10P}{3}=0\Rightarrow P=3/5$

$\therefore$ mid point of BC$=\left(\frac{4}{5},\frac{2}{5}\right)$

138. $P=(x,2x-1)$

$PQ+PR=QR$

$\Rightarrow PQ=QR-PR$

$S.o,B.s$

$\Rightarrow PQ^2=QR-PR^2-2QR.PR$

$\Rightarrow x^2-6x+9+4x^2-20x+25$

$=8+x^2-2x+1+4x^2-12x+9-2\sqrt{8}PR$

$\Rightarrow -3x+4=-\sqrt{2}PR$

$S.O.B.S$

$\Rightarrow 9x^2-24+16=2+2x^2-4x+18+8x^2-24x$

$\Rightarrow x=2$

$\therefore P=(2,3)$

139. $p(\alpha,\alpha+1)$

The locus of p is

$y=x+1$.................(1)

$Eq.\ of\ \overline{AC}: y-3=\frac{1-3}{6-0}(x-0)\Rightarrow 3y-9=-x$

$x+3y-9=0$.......................(2)

$Eq.\ of\ \overline{BC}: y-0=\frac{1-0}{6+2}(x-0)$

$x-8y+2=0$.......................(3)

solving $(1)\&(2)$

put $y=x+1$ *in*(2)

$x+3x+3-9=0$

$x=\frac{3}{2}$

solving $(1)\&(3)$

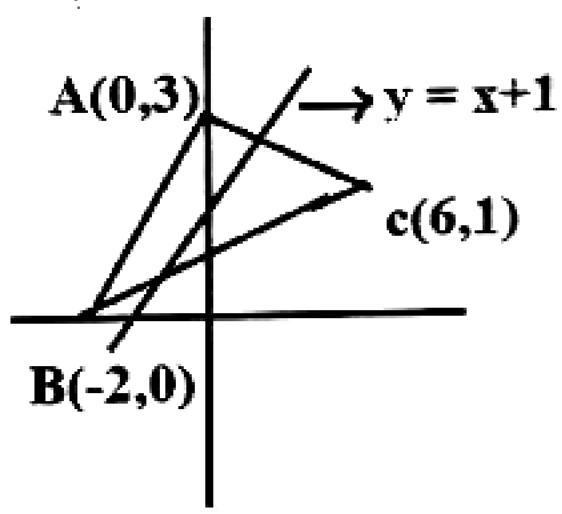
put $y=x+1$ *in* (3)

$x-8x-8+2=0$

$-7x=6$

$x=\frac{-6}{7}$

$\therefore \alpha\in\left(\frac{-6}{7},\frac{3}{2}\right)$



140. Let $O=(0,0), A(4,0), B(3,4)$

The altitudes through A,B are

$x=3\ \&\ 3x+4y-12=0$

$\therefore$ orthocentre $=(3,3/4)$

141. By verification given points satisfies the option (2).

142. $ax+by=1$....(1)

$bx+ay=1$.....(2)

On solving (1) and (2) we get

$(x,y)=\left(\frac{1}{a+b},\frac{1}{a+b}\right)$

The locus of $\left(\frac{1}{a+b},\frac{1}{a+b}\right)$ is $x=y$

143. For $0\le x<3 \Rightarrow |x|=x, |x-3|=3-x$

For $0\le y<2 \Rightarrow |y|=y, |y-2|=2-y$

Given eq. becomes

$x+y=5/2$

144. Given lines

$bx+ay=ab, ax+by=ab$

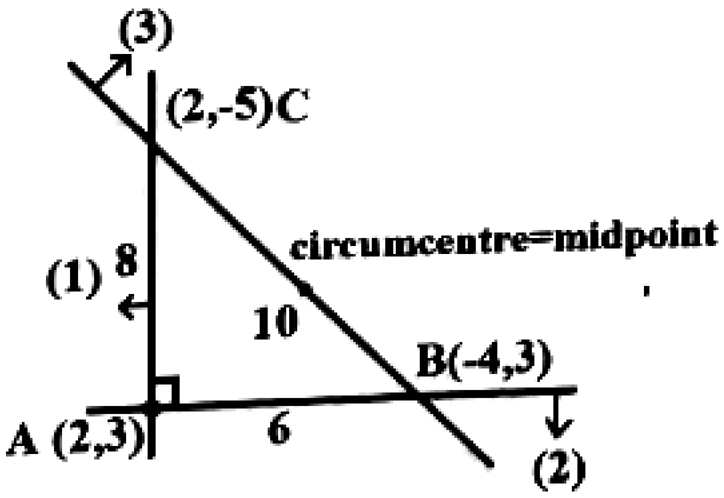
$\cos\theta=\left|\frac{a_1a_2+b_1b_2}{\sqrt{a_1^2+b_1^2}\sqrt{a_2^2+b_2^2}}\right|=\frac{2ab}{a^2+b^2}$

$\sin\theta=|\sqrt{1-\cos^2\theta}|=\left|\frac{a^2-b^2}{a^2+b^2}\right|$

145. The distance between parallel lines $ax+by+c_1=0$ and $ax+by+c_2=0$ along the line L=0 having inclination 'θ' is

$\left|\frac{C_1-C_2}{a\cos\theta+b\sin\theta}\right|$

146.



Given,

$x=2$ ......(1)

$y=3$ ......(2)

$4x+3y+7=0$ .....(3)

$I=\left(\frac{ax_1+bx_2+cx_3}{a+b+c},\frac{ay_1+by_2+cy_3}{a+b+c}\right)$

$=\left(\frac{20-32+12}{10+8+6},\frac{30+24-30}{10+8+6}\right)$

$=(0,1)$

S= mid point of BC=(-1,-1)

$\therefore IS=\sqrt{5}$

147. $m:n=-L_{11}:L_{22}=9:16$

$-4m:3n=-3:4$

Let p be a req. point

$P=\frac{3B-4A}{3-4}$

$=\frac{3(3,-2)-4(-2,3)}{-1}$

$=(-17,18)$

148. $L_1=0, L_2=0, L_3=0$ are concurrent

$\therefore \begin{vmatrix}2 & 1 & 3\\ k & 2 & -3\\ 3 & -2 & 1\end{vmatrix}=0 \Rightarrow k=-5$

$\therefore \cos\theta=\frac{|a_1a_2+b_1b_2|}{\sqrt{a_1^2+b_1^2}\sqrt{a_2^2+b_2^2}}=\frac{20}{29}$

149. $\frac{h-1}{1}=\frac{k-1}{1}=\frac{-2(1+1+1)}{2}$

$\therefore Q=(-2,-2)$

d=perpendicular distance from Q to

$3x-4y+3=0$

$=\frac{1-6+8+31}{\sqrt{9+16}}=\frac{5}{5}=1$

150. By solving given equations we get

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

$\therefore G=\frac{A+B+C}{2}$

151. $m:n=-L_{11}:L_{22}=-1:2$

$(a,b)=(3,2)$

$4\left[a-b\left(\frac{m}{n}\right)^2\right]=10$

152. $(x+y+1)+\lambda(5y-3)=0$

$\therefore P.O.C=\left(\frac{-8}{5},\frac{3}{5}\right)=A$

$(2x-3y+3)+\mu(5x+6)=O$

$\therefore P.O.C=\left(\frac{-6}{5},\frac{1}{5}\right)=B$

$\therefore AB=\frac{2\sqrt{2}}{5}$

---

153. $2x-3y+4=0$ ....(1)

$6x-9y+7=0$.........(2)

Equation of a line perpendicular to (1) passing through p is $3x+2y-5=0$ .....(3)

p.o.I of 1 & 3 $A=\left(\frac{7}{13},\frac{22}{13}\right)$

p.o.I of 2 & 3 $B=\left(\frac{31}{39},\frac{17}{13}\right)$

$AP:PB=\frac{7}{13}-1:1-\frac{31}{39}=-9:4$

---

154. $A=(1,3),b=(-3,5),c=(5,-1)$

The attitudes through A,B are

$4x-3y+5=0$....(1)

$x-y+8=0$ ....(2)

Solving 1 & 2

$\therefore 0=(19,27)$

---

155. Let m be the slope of L

$\tan 60=\left|\frac{m+\sqrt{3}}{1-\sqrt{3}m}\right|$

$\pm\sqrt{3}(1-\sqrt{3}m)=m+\sqrt{3}$

S.O.B.S

$8m^2-3\sqrt{3}m=0$

$m\neq 0$

Then $m=\sqrt{3}$.

Equation of L is

$y+3=\sqrt{3}(x-5)$

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

---

156. Condition: $\alpha a+\beta b+rc=0$

Given, $ax+by+c=0$

$\Rightarrow rax+rby+rc=0$

$\Rightarrow rax+rby-\alpha a-\beta b=0$

$\Rightarrow a(rx-\alpha)+b(ry-\beta)=0$

$\therefore P.O.C=\left(\frac{\alpha}{r},\frac{\beta}{r}\right)$.

---

157. Variable line : $ax+by+c=0$

$A(2,0),B(0,2),C(1,1)$

Algebraic sum of distances from A,B,C to variable line is zero

$\Rightarrow \frac{2a+c}{\sqrt{a^2+b^2}}+\frac{2b+c}{\sqrt{a^2+b^2}}+\frac{a+b+c}{\sqrt{a^2+b^2}}=0$

$\Rightarrow a+b+c=0$

$\therefore ax+by+c=0$ always passes through $(1,1)$

---

158. $6a^2-3b^2-c^2+7ab-ac+4bc=0$

$3a-b+c=0$ or $2a+3b-c=0$

$a(3)+b(-1)+c=0$.....(1)

The line $ax+by+c=0$ passing through $(3,-1)$

Now, $a(-2)+b(-3)+c=0$....(2)

The line $ax+by+c=0$ passing through $(-2,-3)$

---

159. The original equation is $7x+5y-35=0$

the transformed equation is

$7(x\cos\theta-y\sin\theta)+5(x\sin\theta+y\cos\theta)-35=0$

intercepts equal

$7\cos\theta+5\sin\theta=-7\sin\theta+5\cos\theta$

$\Rightarrow|\tan\theta|=\frac{1}{6}$.

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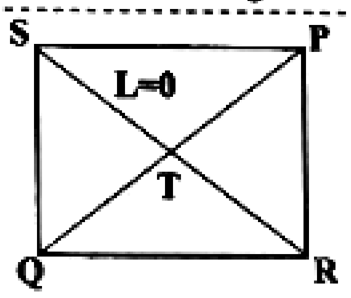
160. 

$L=7x-y+8=0$

$P(-4,5),Q(3,4)$

$T=\frac{P+Q}{2}=\left(\frac{-1}{2},\frac{9}{2}\right)$

$x_1 \quad y_1$

$r=TS=TR=\frac{1}{2}PQ=\frac{5}{\sqrt{2}}$

Slope of L is 7 &□ be the inclination of L.

then $\tan\theta=7$

$\sin\theta = \frac{7}{5\sqrt{2}}, \quad \cos\theta = \frac{1}{5\sqrt{2}}$

$R \,\&\, S = (x_1 \pm r\cos\theta, y_1 \pm r\sin\theta)$

$= (0,8), (-1,1)$

161. Third vertex $c = (x, a)$

ΔABC is isosceles

$\Rightarrow AC = BC$

$\Rightarrow AC^2 = BC^2$

$\Rightarrow x_1 = \frac{59}{4}$

$\therefore (x_1, y_1) = \left(\frac{59}{4}, a\right)$

162. conceptual

163. AB:7X-Y+3=0 $\quad m_{AB}=7$

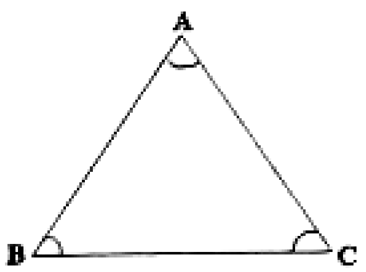
AC:X+Y-3=0 $\quad m_{AC}=-1$

$\underline{|B} = \underline{|C}$

$\Rightarrow$ Tan B = Tan C

$\Rightarrow \left|\frac{7-m}{1+m}\right| = \left|\frac{-1-m}{1-m}\right|$

$\Rightarrow \frac{7-m}{1+m} = \pm\left(\frac{m+1}{m-1}\right)$



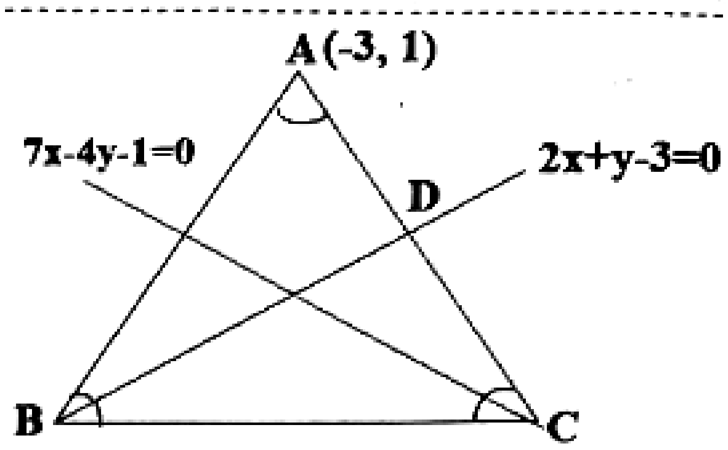
$\Rightarrow \frac{7-m}{1+7m} = \frac{m+1}{m-1} \Rightarrow m^2 = -1 \textit{ does not exist}$

$\Rightarrow \frac{7-m}{1+7m} = \frac{m+1}{m-1} \Rightarrow m = \frac{1}{3}, \; m = -3$

164. $C = \left(t, \frac{7t-1}{4}\right)$

Let C in parametric line is

D=midpoint of AC lies on 2x+y-3=0



$\Rightarrow$ D=$\left(\frac{t-3}{2}, \frac{7t+3}{8}\right)$ lies on 2x+y-3=0

$\Rightarrow \frac{2(t-3)}{2} + \frac{7t+3}{8} - 3 = 0$

$\Rightarrow 8t - 24 + 7t - 3 - 24 = 0$

$\Rightarrow 15t = 45$

$\Rightarrow t = 3$

$\therefore C = (3,5)$

Let 'E' (h, k) is inverse of A(-3, 1) w.r.t 7x-4y-1=0 lies on BC

$\Rightarrow \frac{h+3}{7} = \frac{k-1}{-4} = \frac{-2(-21-4-1)}{49+16}$

$\Rightarrow \frac{h+3}{7} = \frac{k-1}{-4} = \frac{2 \times \cancel{26}^{\,2}}{\cancel{65}_{\,5}}$

$\Rightarrow \frac{h+3}{7} = \frac{4}{5}, \; \frac{k-1}{-4} = \frac{4}{5}$

$\Rightarrow (h,k) = \left(\frac{13}{5}, \frac{-11}{5}\right)$

Equation BC is $y - 5 = \frac{36}{2}(x-3)$

$\Rightarrow 18x - y = 49$

165. $(x^2+y^2)\sin^2\alpha = (x\cos\alpha - y\sin\alpha)^2$

$\Rightarrow x^2\sin^2\alpha + \cancel{y^2\sin^2\alpha} = x^2\cos^2\alpha + \cancel{y^2\sin^2\alpha}$

$\Rightarrow x^2\cos 2\alpha - 2xy\cos\alpha\sin\alpha = 0$

$\Rightarrow x(x\cos 2\alpha - y\sin 2\alpha) = 0$

$\Rightarrow x = 0, \quad x\cos 2\alpha - y\sin 2\alpha = 0$

$\Rightarrow y = x\cot 2\alpha$

Given lines are $\perp^r$

$\Rightarrow \cot 2\alpha = 0$

$\Rightarrow 2\alpha = 90 \Rightarrow \alpha = 45^\circ$

$\therefore \sin^2\alpha + \tan^2\alpha = \frac{1}{2} + 1 = \frac{3}{2}$

166. $P(-1,0), Q(0,0), R\left(3, \sqrt[3]{3}\right)$

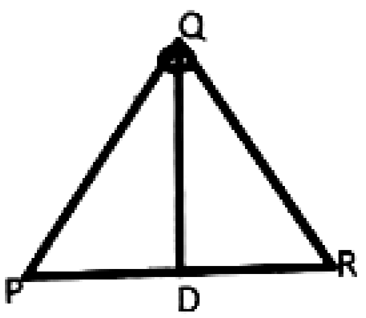
$PQ = 1, QR = 6$

Let D divideds $\overline{PR}$ *in the ratio* $1:6$

$$D = \left(\frac{3-6}{7,}\frac{\sqrt[3]{3}}{7}\right) = \left(\frac{-3}{7}, \frac{\sqrt[3]{3}}{7}\right)$$

Equation of $\overline{AD}$ *is*

$$y - 0 = \frac{\frac{\sqrt[3]{3}}{7}}{\frac{-3}{7}}(x-0) \Rightarrow \sqrt{3}x + y = 0$$



167 $\text{point}\,(3,4), BD = 2\sqrt{2}, \theta = 45^0.\ \theta \in Q_2$

$$\cos\theta = \frac{-1}{\sqrt{4}}, \sin\theta = \frac{1}{\sqrt{2}}$$

the points are $\left(x_1 \pm r\cos\theta, y_1 \pm r\sin\theta\right)$

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

$\Rightarrow (2,5)(4,3)$

$\therefore \alpha = 2, \beta = 5\ , \gamma = 4,\ \delta = 3$

$\beta + \gamma - \delta = 5 + 4 - 3 = 6$

$3(2) = 3\alpha$

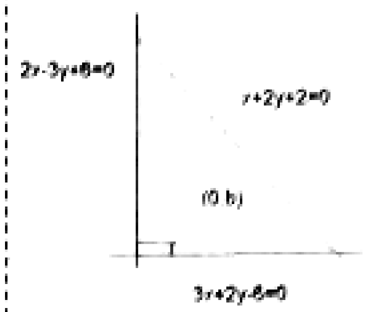
168. $m_1 = m_2 \Rightarrow P\left(p^2+1\right) = -\left(P^2+1\right)$

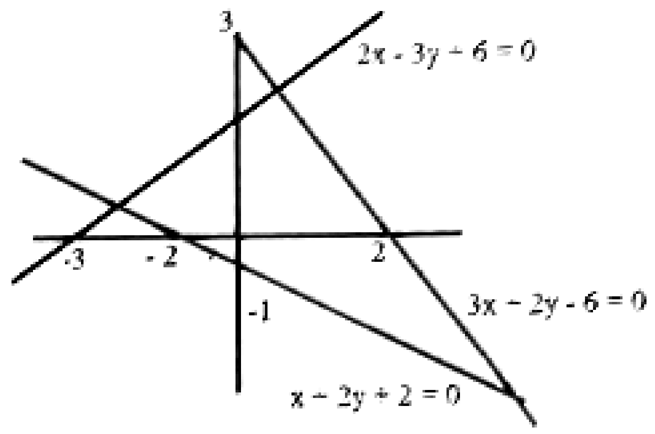
$\Rightarrow \left(p^2+1\right)\left(P+1\right) = 0$

$p = -1$

$\therefore$ *Exactly one value of P*

169.

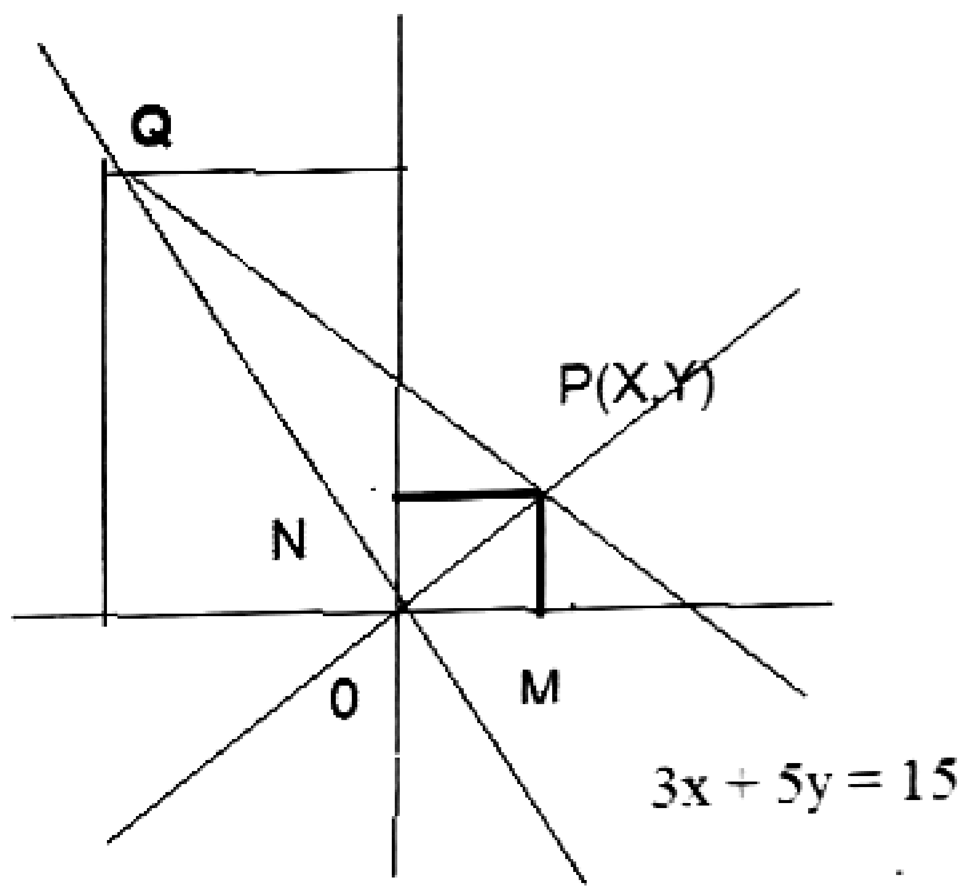




(0,b) lies on the triangle or inside the triangle

b∈ [-1,2] (from diagram)

170.



$PN = PM$

$|x| = |y|$

$x = \pm y$

$3x + 5y = 15$

by solving we get $P = \left(\frac{15}{8}, \frac{15}{8}\right) \in Q_1$ *and* $Q = \left(\frac{-15}{2}, \frac{15}{2}\right) \in$

171. Eq of line passing through

$\left(ct_1, \frac{c}{t_1}\right)$ *and* $\left(ct_2, \frac{c}{t_2}\right)$ *is*

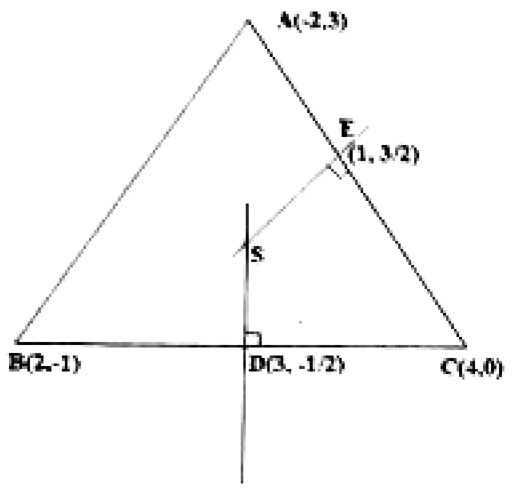
$$y-\frac{c}{t_1}=\frac{\frac{c}{t_2}-\frac{c}{t_1}}{ct_2-ct_1}(x-ct_1)$$

$x+yt_1t_2=c(t_1+t_2)$

172. $m_{BC}=\frac{1}{2}$, $\perp^r$ $m_{BC}=m_{SD}=-2$

Eqn of SO : $4x-2y-11=0-(1)$

$m_{AC}=-1/2, m_{SE}=2$



Eqn of SE :

$4x-2y-1=0-(2)$

$(1)+(2)$ $x=3/2$ and $y=5/2$

circumcentre S(3/2, 5/2)

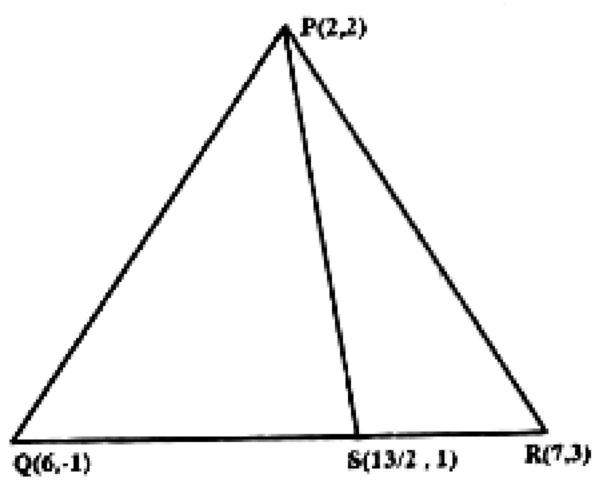
173. $m_{ps}=-\frac{2}{9}$

Eqn . of line passing through P(1,-1)

$m=-\frac{2}{9}$ is

$y+1=\frac{-2}{9}(x-1)$

$2x+9y+7=0$



174. $L_1: x-y+1=0$

$L_2: 7x-y-5=0$

P . O. I of L_1 & L_2 is A(1,2)

$m_{AO}=2$

Slope of normal $=\frac{-1}{2}$

$m_{Bo}=2$

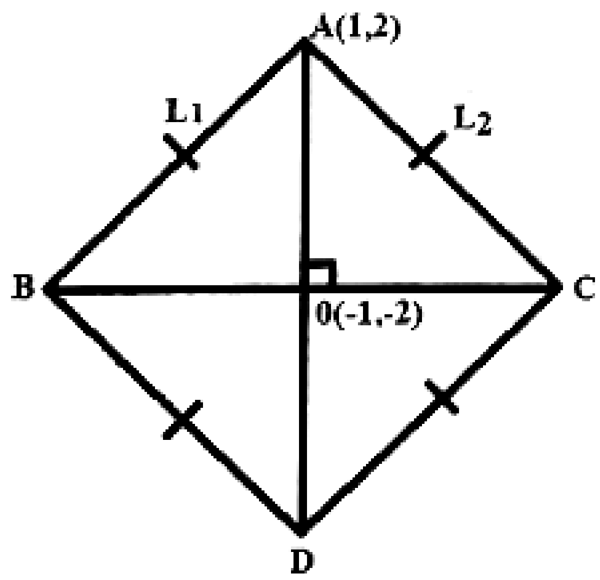
Equation of normal, $y+2=\frac{-1}{2}(x+1)$

$x+2y+5=0$

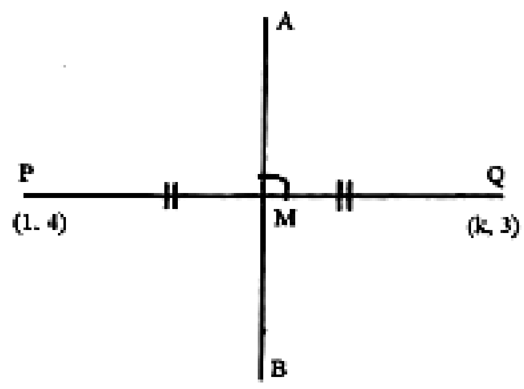
$\therefore$ By opt verification $\frac{1}{3}-\frac{16}{3}+5=0$

(satisfied) $\frac{1}{3}-\frac{16}{3}+5=0$

Options (3) $\Rightarrow\left(\frac{1}{3},\frac{-8}{3}\right)$



175.



$M=\left(\frac{k+1}{2},\frac{7}{2}\right)$

eqn of $\overline{AM}$ *is*

$y-\frac{7}{2}=(k-1)\left[x-\left(\frac{k+1}{2}\right)\right]$

$x=0$

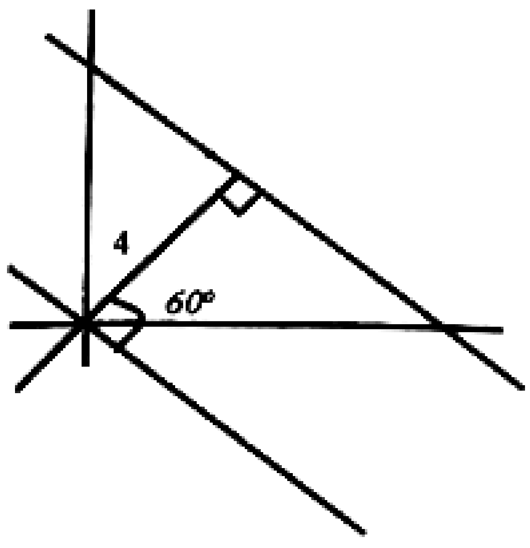
$y=-4$

for y intercept put

$-4-\frac{7}{2}=-(k-1)\left(\frac{k+1}{2}\right)$

$\Rightarrow k^2-1=15,\quad k^2=16,\quad k=\pm 4$

176.



$m=-1$

$$Tan60^o=\left|\frac{-1-m_2}{1+(-1)m_2}\right|$$

$$\sqrt{3}=\frac{1+m_2}{1-m_2}$$

$$\sqrt{3}-\sqrt{3}m_2=m_2+1$$

$$\sqrt{3}-1=m_2\left(1+\sqrt{3}\right)$$

$$m_2=\frac{\sqrt{3}-1}{\sqrt{3}+1}$$

$$m_2=2-\sqrt{3}$$

Equation of line $x\cos 15^o+y\sin 15^o=4$

$$x\left(\frac{\sqrt{3}-1}{2\sqrt{2}}\right)+y\left(\frac{\sqrt{3}+1}{2\sqrt{2}}\right)=4$$

$$x\left(\sqrt{3}-1\right)+y\left(\sqrt{3}+1\right)=8\sqrt{2}$$

177.
$$y-b\sin\alpha=\frac{b\sin\beta-b\sin\alpha}{a\cos\beta-a\cos\alpha}(x-a\cos\alpha)$$

$$y-b\sin x=\frac{b2\cos\left(\frac{\beta+\alpha}{2}\right)\sin\left(\cancel{\frac{\beta-\alpha}{2}}\right)}{-a2\sin\left(\frac{\beta+\alpha}{2}\right)\sin\left(\cancel{\frac{\beta-\alpha}{2}}\right)}(x-a\cos\alpha)$$

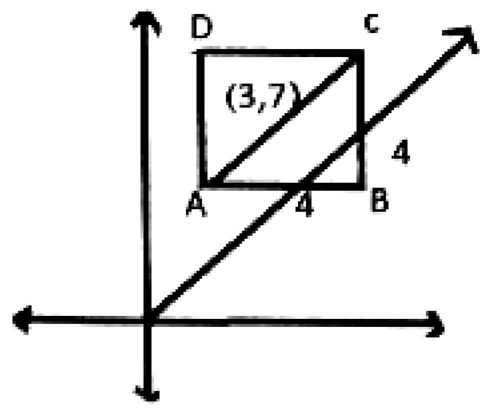
Convert it into intercept form

$$\frac{x}{a\sin\left(\frac{\alpha+\beta}{2}\right)}+\frac{y}{b\cos\left(\frac{\alpha+\beta}{2}\right)}=\frac{\cos\alpha}{\sin\left(\frac{\alpha+\beta}{2}\right)}+\frac{\sin\beta}{\cos\left(\frac{\alpha+\beta}{2}\right)}$$

$$\frac{a}{p}=\frac{\cos\left(\frac{\alpha+\beta}{2}\right)}{\cos\left(\frac{\alpha-\beta}{2}\right)}\qquad\frac{b}{q}=\frac{\sin\left(\frac{\alpha+\beta}{2}\right)}{\cos\left(\frac{\alpha-\beta}{2}\right)}$$

$$\frac{a^2}{p^2}+\frac{b^2}{q^2}=\sec^2\left(\frac{\alpha-\beta}{2}\right)$$

178.



$$\theta=45^0,135^0\Rightarrow\left(3\pm 2\sqrt{2}\frac{1}{\sqrt{2}},7\pm 2\sqrt{2}\frac{1}{\sqrt{2}}\right)$$

$$=(5,9)\ (1,5)$$

$$and\ (3\mp 2\sqrt{2}\frac{1}{\sqrt{2}},7\pm 2\sqrt{2}\frac{1}{\sqrt{2}})=(1,9)\ (5,5)$$

$$\frac{y_1y_2y_3y_4}{x_1x_2x_3x}=\frac{9\times5\times9\times5}{5\times1\times5\times1}=81$$

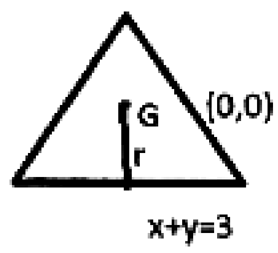
179. $3x+4y-12=0$

$$\text{Area of }\Delta^{le}=\frac{c^2}{2|ab|}$$

$$=\frac{144}{2(12)}$$

$$=6\ sq.\text{units}$$

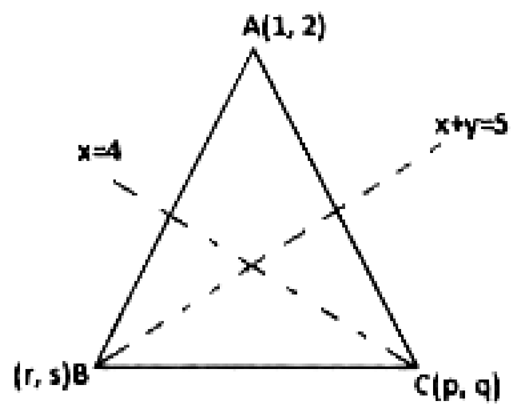
180.



$$r=\frac{|-3|}{\sqrt{2}}=\frac{3}{\sqrt{2}}$$

$$R=2r\Rightarrow R+r=3r=3\left(\frac{3}{\sqrt{2}}\right)=\frac{9}{\sqrt{2}}$$

181.



E=Midpoint of AC

$$=\left(\frac{p+1}{2},\frac{q+2}{2}\right)$$

F= Midpoint of AB

$=\left(\frac{1+r}{2},\frac{2+s}{2}\right)$

From diagram p=4 and mid point of AC lies on x + y = 5

$P + q=7 \Rightarrow q = 3$

C(4, 3) and mid point lies on x=4

r=7

r + s=5

s= -2

B(7, -2)

Now find area

182. Let $\theta = 45^o, a = \sqrt{2}$

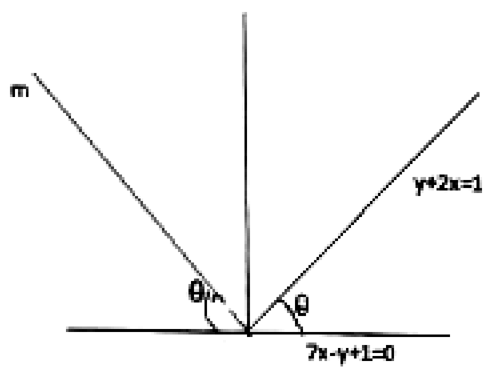
Point $\left(\frac{1}{2},\frac{1}{2}\right)$

line is $x - y = 2$

$m = 1$

Now line is $y - y_1 = \frac{-1}{m}(x - x_1)$

183.



Angle of I.R=angle of reflection

$\left|\frac{m-7}{1+7m}\right| = \left|\frac{-2-7}{1-14}\right|$

$\Rightarrow m = \frac{-1}{2}, \frac{41}{38}$

Take $m = \frac{41}{38}$, point (0, 1)

184. Equation of line $\perp$ 3x – 4y – 6 = 0 is

4x + 3y + a = 0

$\frac{a^2}{2.4.3} = 6 \Rightarrow a = \pm 12$

4x + 3y + 12 = 0 (or) 4x + 3y – 12 = 0

$d = \frac{|4+3+12|}{5} = \frac{19}{5}\ (or)$

$d = \frac{|4+3-12|}{5} = \frac{|-5|}{5} = 1$

min = 1

185.

$$\begin{array}{cccc} x & y & 1 & \\ 2a & c & 4a & 2a \\ 2b & d & 5b & 2b \end{array}$$

$$\frac{x}{2ad-2bc} = \frac{y}{5bc-4ad} = \frac{1}{8ab-10ab}$$

Given (x, y) $\in$ Q_4

$(x, y) = \left(\frac{2ad-2bc}{-2ab}, \frac{4ad-5bc}{-2ab}\right)$

x = y

2ad – 2bc = 4ad – 5bc

$5bc - 2bc + 2ad - 4ad = 0$

3bc – 2ad = 0

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

$\frac{\alpha-3}{1} = \frac{\beta-8}{3} = \frac{-2(1(3)+3(8)-7)}{1^2+3^2}$

$\alpha-3 = \frac{\beta-8}{3} = \frac{-2(27-7)}{10}$

$\alpha-3 = \frac{\beta-8}{3} = -4$

$\alpha-3=-4\ \beta-8=-12$

$\alpha=-1\ \beta=-4$

$\alpha+\beta=-1-4=-5$

187. $P \xrightarrow[p(2,1)]{2\sqrt{3}} Q$

$\xrightarrow[pX-Y-Y=0]{Q}$

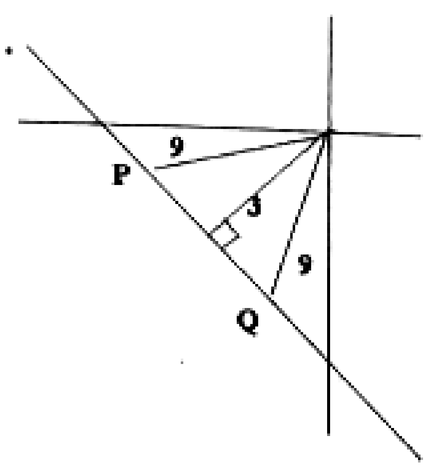
$Q(2\pm\sqrt{6}, 1\pm\sqrt{6}) \Rightarrow Q \in Q3 \Rightarrow Q = (2-\sqrt{6}, 1-\sqrt{6})$

$\tan\theta = 1, \sin\theta = cas\theta = \frac{1}{\sqrt{2}}$

equation is $y - 1 + \sqrt{6} = -1(x - 2 + \sqrt{6})$

$x + y = 3 - 2\sqrt{6}$

188.



$$d=\frac{15}{\sqrt{3^2+4^2}}=3$$

$$x^2=9^2-3^2=72$$

$$x=\sqrt{36}\times 2=6\sqrt{2}$$

$$\Delta=18\sqrt{2}$$

189. Let us the slope.

Equation of a use passing through (-3,4) is

y - 4= m (x+3)

xm-y+3m+4=0----(1)

$\perp^r$ distancefrom (2,-8) to (1) is 5

$$5=\left|\frac{5m-4}{\sqrt{1+m^2}}\right|$$

$\therefore$ two line

190. Slope m= $\frac{3}{4}$

$$\tan\theta=\frac{3}{4}$$

$$\Rightarrow Sin\theta=\frac{3}{5},\cos\theta=\frac{4}{5}$$

$$(x_1,y_1)=(3,2)$$

$$r=5$$

$$\text{required points}=(x_1\pm r\cos\theta,\ y_1\pm r\sin\theta)$$

$$=\left(3\pm\cancel{5}.\left(\frac{4}{\cancel{5}}\right),2\pm\cancel{5}.\left(\frac{3}{\cancel{5}}\right)\right)$$

$$=(7,5),(-1,-1)$$

191. $\overline{AB}$ line equation is $2x+3y-1=0\rightarrow(1)$

Eq (1) lies on $P(a,4)$, $Q(-2,b)$

We get $a=\frac{-11}{2},b=\frac{5}{3}$

By verification(3)option: $2x+6y+1=0$

$$\cancel{2}\left(\frac{-11}{\cancel{2}}\right)+\cancel{6}^2\left(\frac{5}{\cancel{3}}\right)+1=1\cancel{1}-1\cancel{1}=0$$

192. Given that a, b be the intercept of the line L w. r. t original axes so, $\frac{x}{a}+\frac{y}{b}=1---(1)$

Given that p, q be the intercept of the line L w. r. t new axes so, $\frac{x}{p}+\frac{y}{q}=1----(2)$

By data $\frac{|-1|}{\sqrt{\frac{1}{p^2}+\frac{1}{q^2}}}=\frac{|-1|}{\sqrt{\frac{1}{a^2}+\frac{1}{b^2}}}$

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

193.

Given that $P(1,2)$, $r=\frac{\sqrt{6}}{3}=\frac{\sqrt{2}}{\sqrt{3}}$

$$\therefore x=1+\frac{\sqrt{2}}{\sqrt{3}}\cos\theta,\ y=2+\frac{\sqrt{2}}{\sqrt{3}}\sin\theta$$

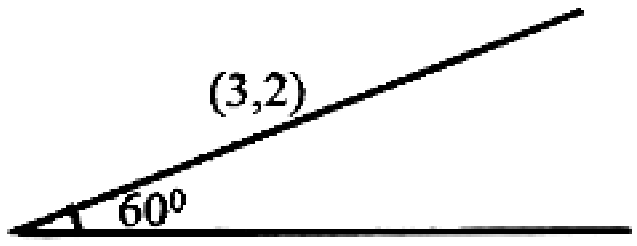
This point lies on the time x + y = 4

$$3+\frac{\sqrt{2}}{\sqrt{3}}(\cos\theta+\sin\theta)=4$$

$$\cos\theta+\sin\theta=\frac{\sqrt{3}}{\sqrt{2}}$$

$$\therefore\theta=\frac{\pi}{12},\frac{5\pi}{12}$$

194.



$$\sqrt{3}x+y=1$$

$m_1=-\sqrt{3}$ Let $m_2=m$

$$Tan\theta=\left|\frac{m_1-m_2}{1+m_1m_2}\right|$$

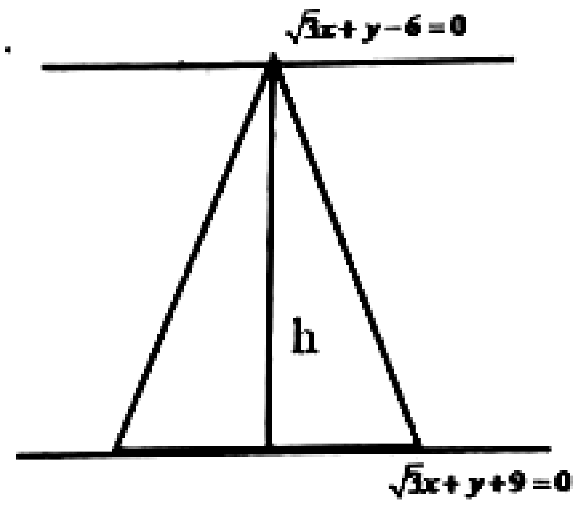
$$\sqrt{3}=\left|\frac{-\sqrt{3}-m}{1-\sqrt{3}m}\right|$$

$$\therefore m=\sqrt{3},(3,2)$$

Equation of a line is

$$y-2=\sqrt{3}(x-3)\Rightarrow\sqrt{3}x-y+2-3\sqrt{3}=0$$

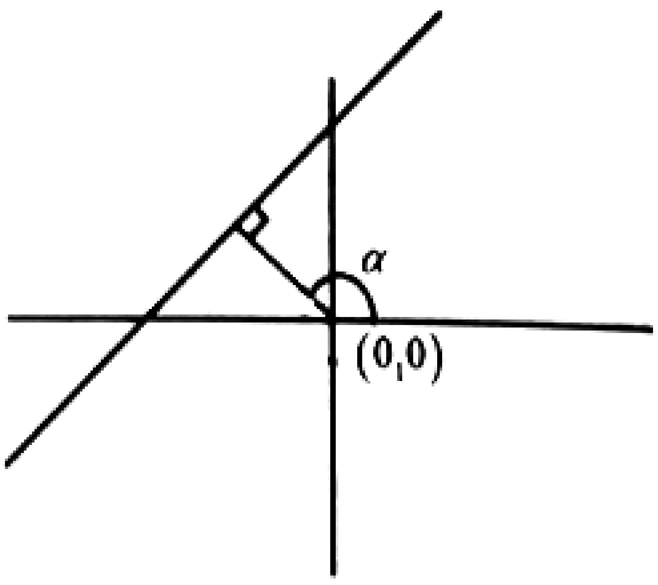
195.



$$h=\frac{|c_1-c_2|}{\sqrt{a^2+b^2}}=\frac{|-6-9|}{\sqrt{3+1}}=\frac{15}{2}$$

Area of the equilateral $\Delta^{le}=\frac{h^2}{\sqrt{3}}=\frac{225}{4\sqrt{3}}$

196.



$y=\frac{-4}{3}x$

$4x+3y=0, Tan\alpha=\frac{-4}{3}$

line passes thrush $(1,-1)$ having

Slope $\frac{-4}{3}$

$y+1=\frac{-4}{3}(x-1)$

$\boxed{4x+3y=1}, a=4, b=3$

$a+ab+b=4+12+3=19$

197. *Equation of* L_1 *is* $y+3=\frac{-4}{3}(x-4)$

$\Rightarrow 4x+3y-7=0$

$4x-3y-2=0$

$x=1, y=1$

$Q=(1,1), P(4,-3), PQ=\sqrt{9+16}=\sqrt{25}=5$

198. *Equation of* L_1 *is* $(2x+3y-5)+\lambda(4x-5y+7)=0$.....(1)

$$P=\left(\frac{2(1)+1(2)}{3},\frac{2(-1)+3(1)}{3}\right)=\left(\frac{4}{3},\frac{1}{3}\right)$$

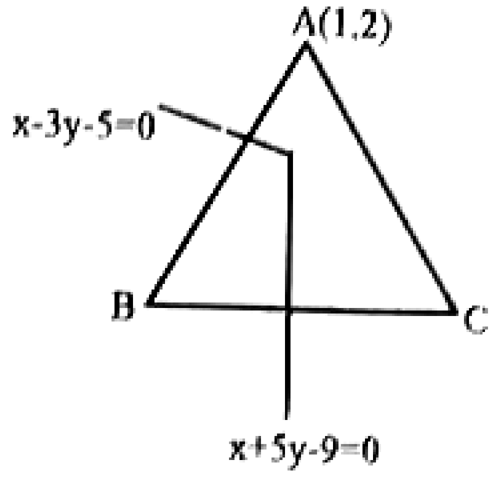
(1) is passes through PThen $\lambda=1/8$

From (1) $\Rightarrow 21=20x+19y-33=0$

$\Rightarrow \frac{20}{33}x+\frac{19}{33}y=1$

Now $33(a-b)=\frac{3\cancel{3}(20-19)}{3\cancel{3}}=1$

199. By image theorem



$$\frac{h-x_1}{a}=\frac{k-y_1}{b}=\frac{-2(ax_1+by_1+c)}{a^2+b^2}$$

$B(h,k)=(3-4)$

$C(h,k)=(5,6)$

$B(3-4), C(5,6)$

$A(1,2), C(5,6)$

$AC=\sqrt{16+16}=\sqrt{32}=4\sqrt{2}$

200. (h,k) is the image of $(3,-4)$ with respect to th

time $2x-3y-5=0$

$$\frac{h-3}{2}=\frac{k+4}{-3}=\frac{-2(6+12-5)}{4+9}$$

$h=-1,\ k=2$

$(h,k)\ =\ (-1,2)$

(l,m) is the foot of the perpendicular from (h,

k) on the line $3x+2y+12=0$

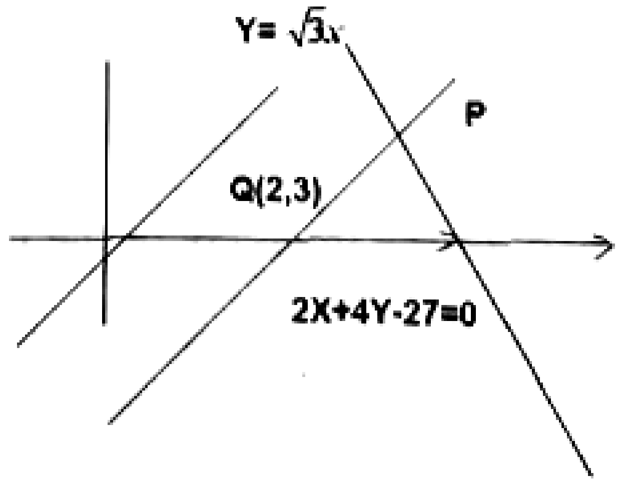
$$\frac{l+1}{3}=\frac{m-2}{2}=\frac{-(-3+4+12)}{9+4}$$

$(l,m)\ =(-4,\ 0)$

$lh+mk+1\ =\ 4+1=5$

201. $y=\sqrt{3}\ x$, $Q=(2,3)$

$2x+4y-27=0$



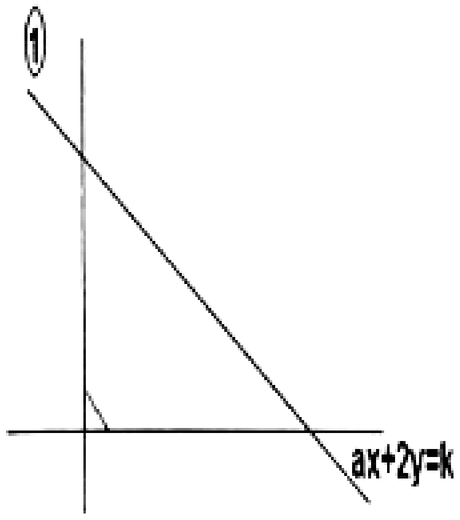
$Tan\theta=\sqrt{3}$

$\theta = 60^0$

$\cos 60^0 = \frac{1}{2}$, $\sin 60^0 = \frac{\sqrt{3}}{2}$

PQ=$\frac{|ax_1 + by_1 + c_1|}{|a\cos\theta + b\sin\theta|} = 2\sqrt{3} - 1$

202. $ax + 2y = k$......(1)



Area =3=$\frac{k^2}{4|a|}$

(1) is $\perp$ to $2x - 3y + 7 = 0$

$\frac{-a}{2} \times \frac{2}{3} = -1 \Rightarrow a = 3$

$12|a| = k^2 \Rightarrow k^2 - 36 = 0$

Product of all possible values of k

$k_1.k_2 = -36$

203. $x + y + 10 = 0 \to 1$

$x - y - 2 = 0 \to 2$

$2x + y - 7 = 0 \to 3$

Ortho centre is the point of inter section

Of (1) & (2)

i.e, $(-4, -6)$

204.P(a, 2), Q(1 , b) lie on either side of the line

2x – 3y +1= 0

$L_{11} . L_{22} < 0$

(2a – 5) (-2b + 3) < 0

(2a – 5) (b – 1)>0

$\therefore$ 4x + 3y+k = 0 ----------(1)

3x +4y+k= 0 ---(2)

Slove(1) , (2)

Po I $x = \frac{-k}{7}, y = \frac{-k}{7}$

$\therefore$ p (a,2) is the po I of (1) &(2)

P(a , 2) is the = p($\frac{-k}{7}$, $\frac{-k}{7}$)

$\therefore$k = -14 , a = 2

$\therefore$ (2a – 5) (b-1) > 0

(4 -5) (b – 1) > 0

b – 1 < 0

b < 1

b $\in$ (-∞ , 1)

205.
$$\cos\theta = \frac{a_1a_2 + b_1b_2}{\sqrt{a_1^2 + b_1^2}\sqrt{a_2^2 + b_2^2}}$$

$\theta = 45^0$

$\frac{1}{\sqrt{2}} = \frac{k+2}{\sqrt{5}\sqrt{k^2+1}}$

$5(k^2 + 1) = 2(k^2 + 4 + 4k)$

$3k^2 - 8k - 3 = 0$

$3k^2 - 9k + k - 3 = 0$

$3k(k - 3) + (k - 3) = 0$

K = 3 , $-\frac{1}{3}$

$\therefore k_1 > k_2$

$3 > -\frac{1}{3}$

$K_1 = 3$, $k_2 = -\frac{1}{3}$

$\therefore k_1 - 2 = 3 - 2 = 1$ $(-\frac{1}{3}) = 1 = -3k_2$

206. $\begin{vmatrix} 4 & 3 & -k \\ 2 & 1 & 3 \\ 3 & 2 & k \end{vmatrix} = 0$

4 (k – 6) -3 (2k – 9)- k (1) = 0

4k – 24 – 6k + 27 – k = 0

-3k + 3 = 0

K = 1

$\therefore$ 4x + 3y – 1 = 0

2x + y + 3 = 0

x		y	1
3	-1	4	3

1 3 2 1

$$\frac{x}{9+1}=\frac{y}{-2-12}=\frac{1}{4-6}$$

$$\frac{x}{10}=\frac{y}{-14}=\frac{1}{-2}$$

x = -5 , y= 7

$\perp^r$ distance from (-5 , 7) to 3x +4y+2 = 0

$$\left|\frac{-15+28+2}{\sqrt{9+16}}\right|=\frac{15}{5}=3$$

207. $\underline{\lfloor CAB} = \underline{\lfloor CBA}$

CA = CB

$CA^2 = CB^2$

2h +4k – 19 = 0 ______ (1)

$\therefore$ $CA^2 + CB^2 = AB^2$

$\Rightarrow$ $h^2 + k^2 - 2h - 6k + 10 + h^2 + k^2 - 4h - 10k + 29 = 5$

$\Rightarrow 2h^2 + 2k^2 - 6h - 16k + 34 = 0$

$\Rightarrow h^2 + k^2 - 3h - 8k + 17 = 0$

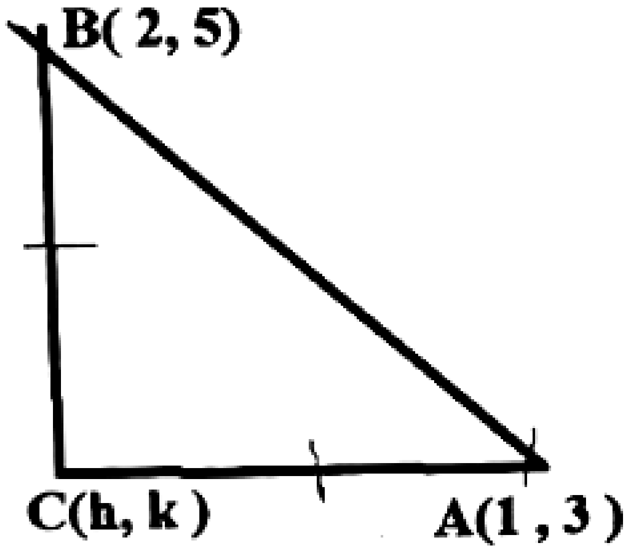
$$h^2+\left(\frac{19-2h}{4}\right)^2-3h-8\left(\frac{19-2h}{4}\right)+17=0(by 1)$$

$\Rightarrow 4h^2 - 12h + 5 = 0$

$\Rightarrow 4h^2 - 10h - 2hy + 5 = 0$

$\Rightarrow 2h (2h - 5) - 1(2h - 5) = 0$

$(2h - 5) (2h - 1) = 0$



$$h=\frac{5}{2} \text{ or } h=\frac{1}{2}$$