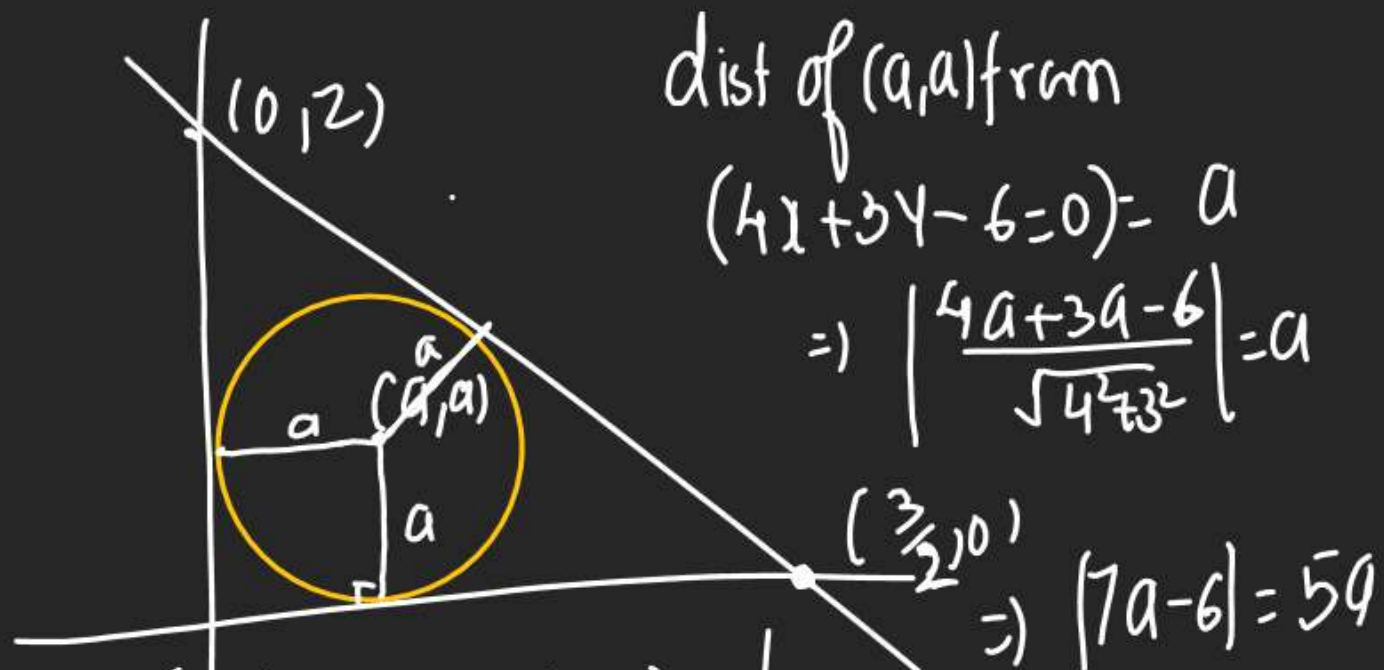


Q Find Eq<sup>n</sup> of Circle  
15

touching Both axes  
lie exactly under Line  
 $4x+3y=6$ .



① Center  $(a, a) = (\frac{1}{2}, \frac{1}{2})$   
 rad =  $\frac{1}{2}$

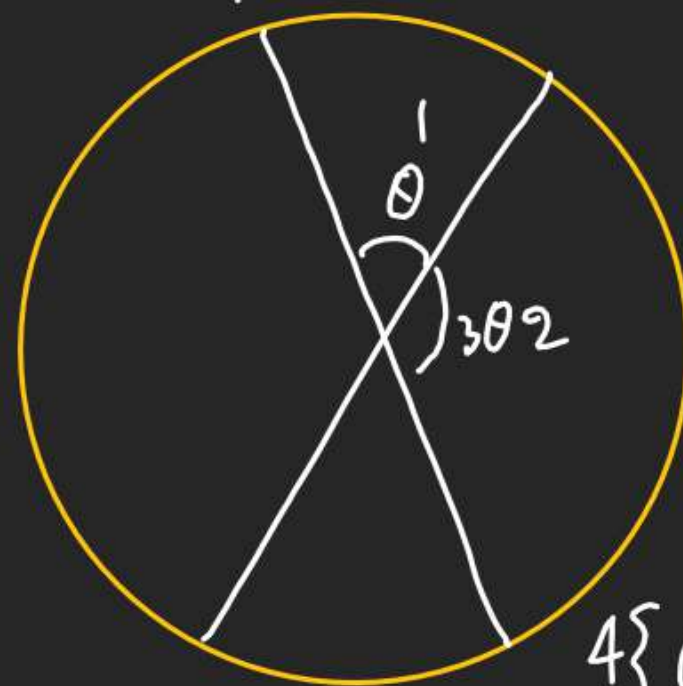
②  $(x - \frac{1}{2})^2 + (y - \frac{1}{2})^2 = (\frac{1}{2})^2$

$7a-6=5a$  &  $7a-6=-5a$

$2a=6$   $12a=6$   
 $a=3$   $a=\frac{1}{2}$  ✓

Q If Pair of Lines  $ax^2+2(a+b)xy+by^2=0$  lie along  
16

dia. of circle & divide the circle into 4 sectors  
 $a=a$  such that area of one of the sector is thrice  
 $b=b$  the area of another sector then  $3a^2+3b^2=?$   
 $h=(a+b)$



$4\theta = 180^\circ \Rightarrow \theta = 45^\circ$

Pair of lines &  
Angle.

$\tan \theta = \frac{2\sqrt{h^2-ab}}{a+b} = 1$

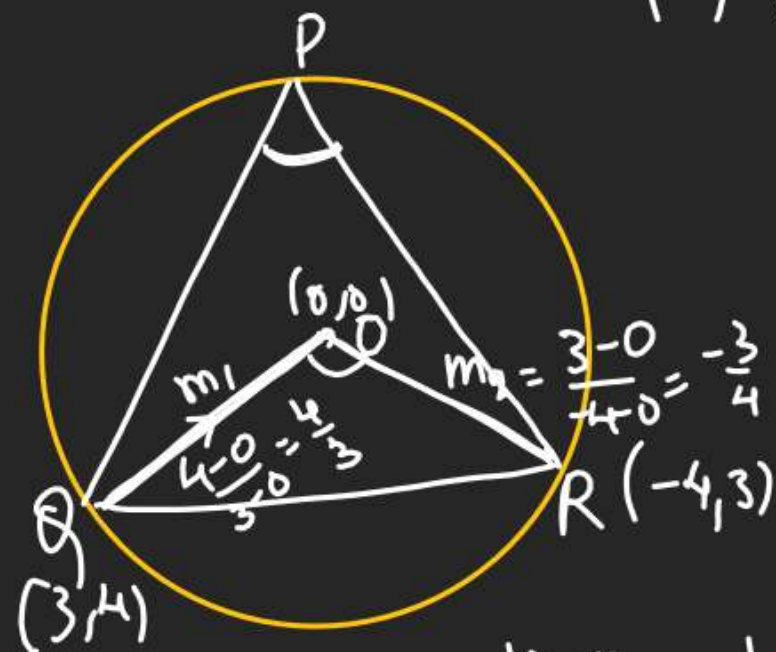
$2\sqrt{(a+b)^2-ab} = (a+b)$

$4\{a^2+b^2+2ab\} = (a+b)^2$

$3a^2+3b^2+2ab=0$

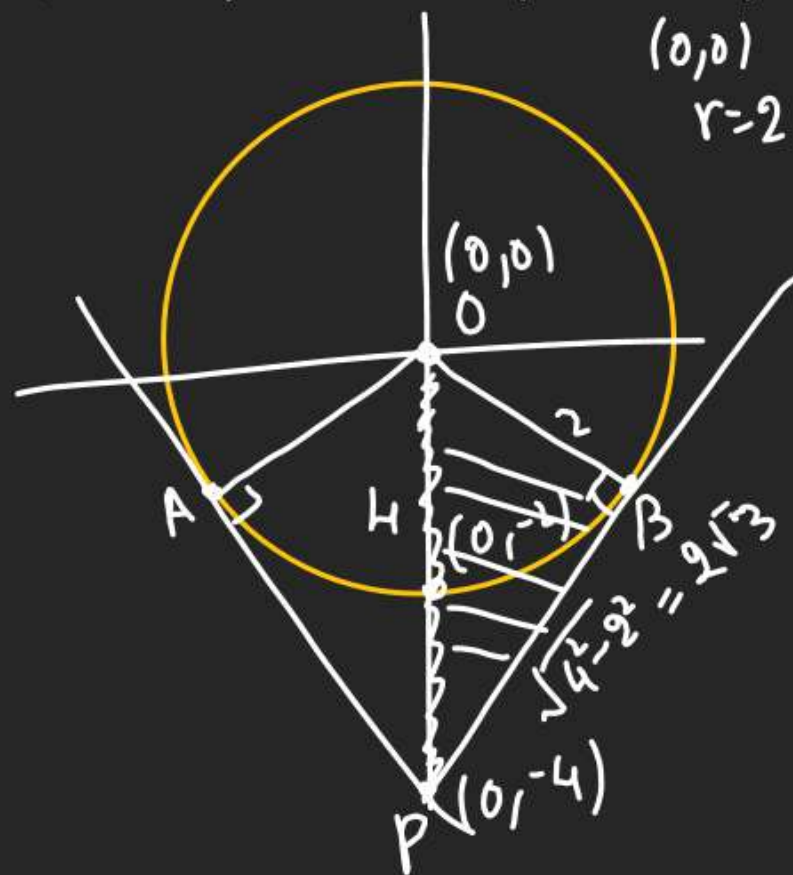
$\therefore 3a^2+3b^2=-2ab$

Q A  $\Delta PQR$  inside Circle  $x^2 + y^2 = 25$   
 Such that Q & R are  $(3, 4)$  &  $(-4, 3)$   
 find  $\angle QPR$ .  
 $(0, 0), \text{rad} = 5$



$m_1 m_2 = -1$   
 $\angle QOR = 90^\circ$   
 $\therefore \angle QPR = 45^\circ$

Q 18 If 2 tangents are drawn  
 on Circle  $x^2 + y^2 = 4$  from  
 P  $P(0, -4)$  meet Circle at  
 A & B then Area  $\Delta ABP = ?$



Area  $\Delta_{\text{max}} = 2 \times \frac{1}{2} \times 2\sqrt{3} \times 2$   
 $= 4\sqrt{3}$

Q 19 Find Circumcircle eqn  
 to  $\Delta$  made by Lines

$xy + 2x + 2y + 4 = 0$  &  $x + y + 2 = 0$

$x(y+2) + 2(y+2) = 0$

$(y+2)(x+2) = 0$

$\downarrow$   
 $x+2=0$  or  $y+2=0$

$x=-2$  or  $y=-2$

$x+y=-2$

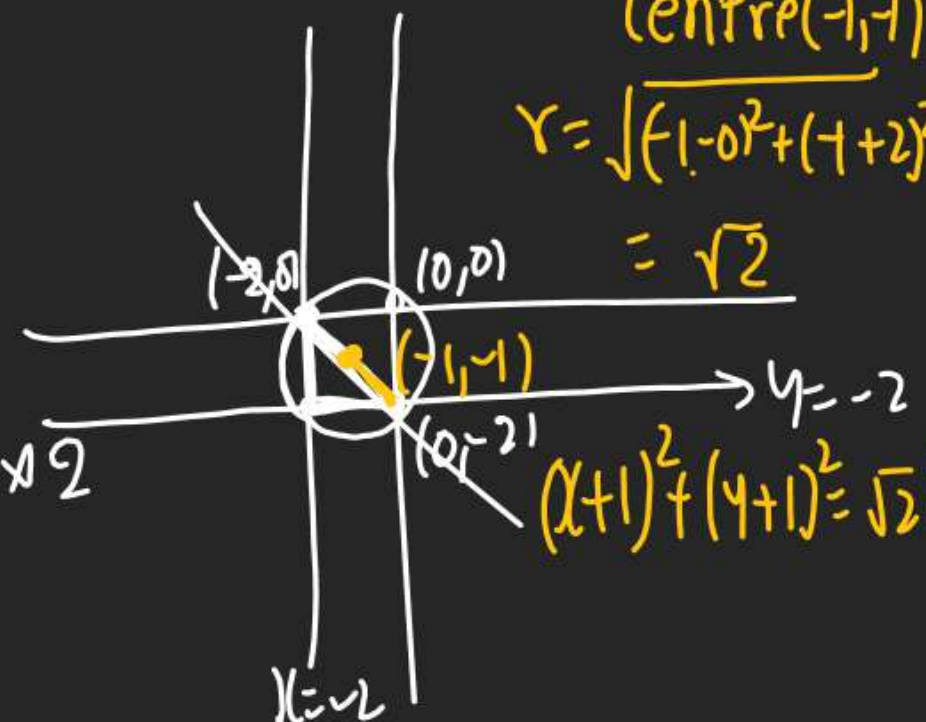
$\frac{x}{-2} + \frac{y}{-2} = 1$

$\downarrow$   
 $(-2, 0), (0, -2)$

Centre  $(-1, -1)$

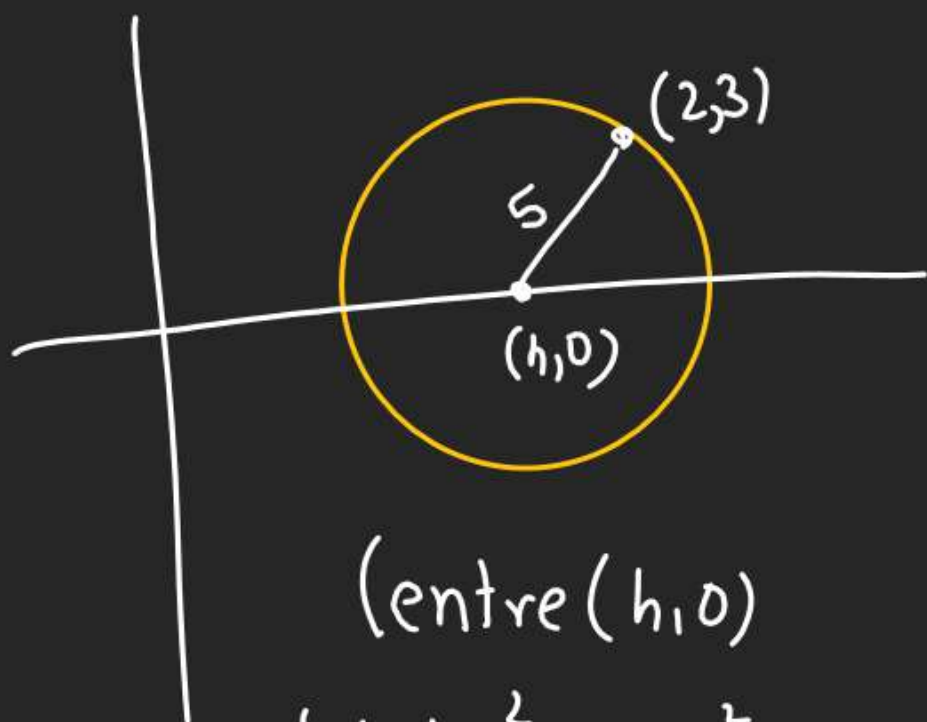
$r = \sqrt{(-1-0)^2 + (-1+2)^2}$

$= \sqrt{2}$



$(x+1)^2 + (y+1)^2 = (\sqrt{2})^2$

Q Find EOC having centre  
at x Axis & rad=5 P.T. (2,3)



centre  $(h, 0)$   
 $(x-h)^2 + (y-0)^2 = 25$

P.T.  
(2,3)

$$(2-h)^2 + (3)^2 = 25$$

$$(2-h)^2 = 16$$

$$2-h = 4 \quad | \quad 2-h = -4$$

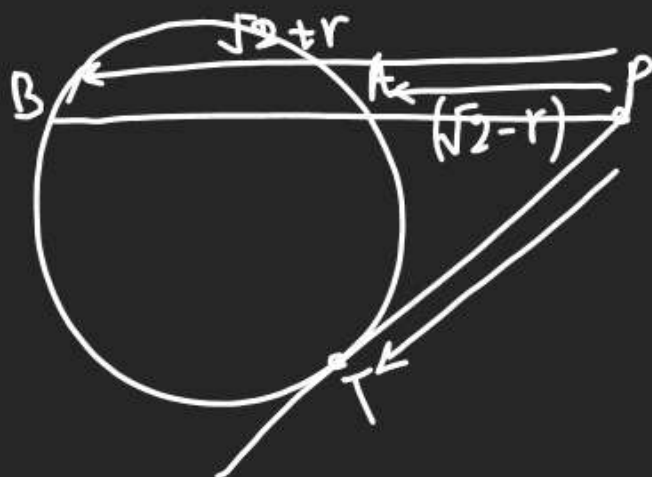
$$h = -2 \quad | \quad h = 6$$

$$(x+2)^2 + y^2 = 25 \quad | \quad (x-6)^2 + y^2 = 25$$

Q Eqn of chord AB to Circle

$$x^2 + y^2 = r^2 \text{ P.T. } P(1,1)$$

such that  $\frac{PB}{PA} = \frac{\sqrt{2}+r}{\sqrt{2}-r}$  ( $0 < r < \sqrt{2}$ )

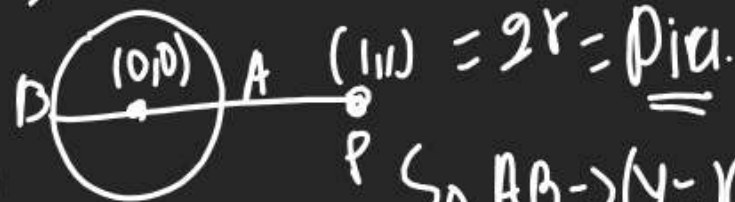


①  $PA \times PB = PT^2$

$$(\sqrt{2}+r)(\sqrt{2}-r) = PT^2$$

$$\Rightarrow PT^2 = 2 - r^2$$

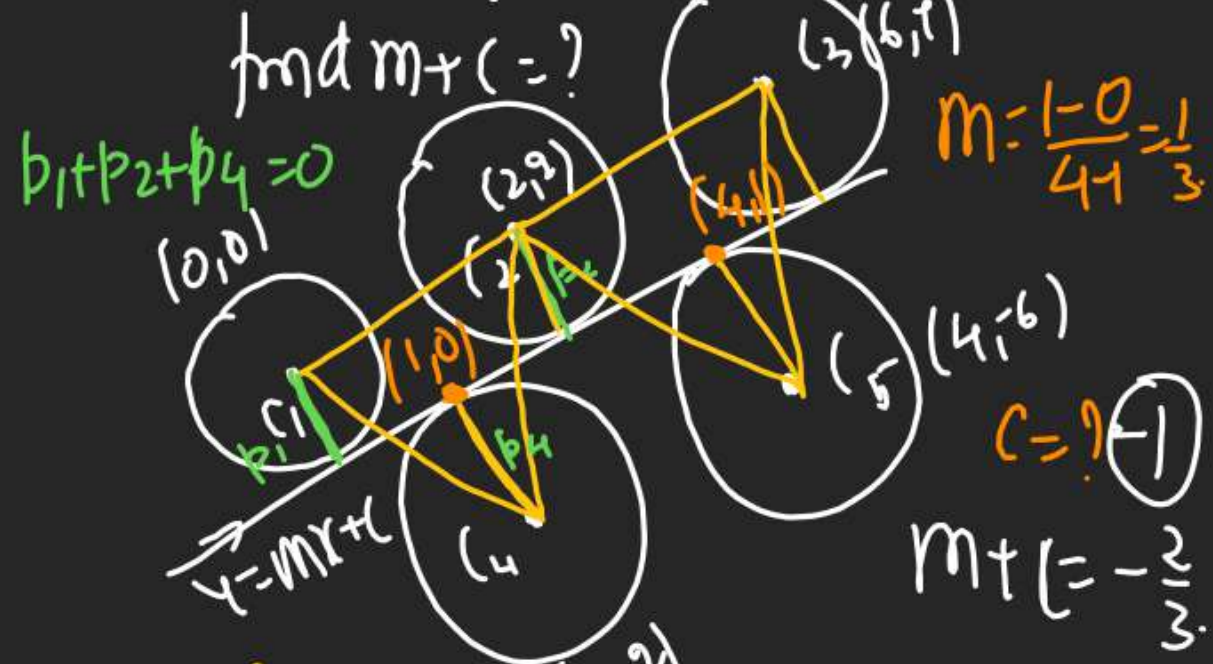
②  $AB = PB - PA = (\sqrt{2}+r) - (\sqrt{2}-r)$



So  $AB \Rightarrow (y=x)$

Q If Line  $y = mx + c$  is common tangent  
to given circles (See diagram)

Radius of  $C_4$  is sum of Radius of  $C_1$  &  $C_2$   
 & Radius of  $C_5$  is sum of Radii of  $C_2$  &  $C_3$



$\Delta C_1 C_2 C_4$   
 Line will pass  
 from centroid  
 centroid =  $(1, 0)$

Line will pass  
 from centroid  
 $\Delta C_2 C_3 C_5 = (4, 2)$

Q If Circle P.T. Pth where

Lines  $3Kx - 2y - 1 = 0$

&  $4x - 3y + 2 = 0$  meet

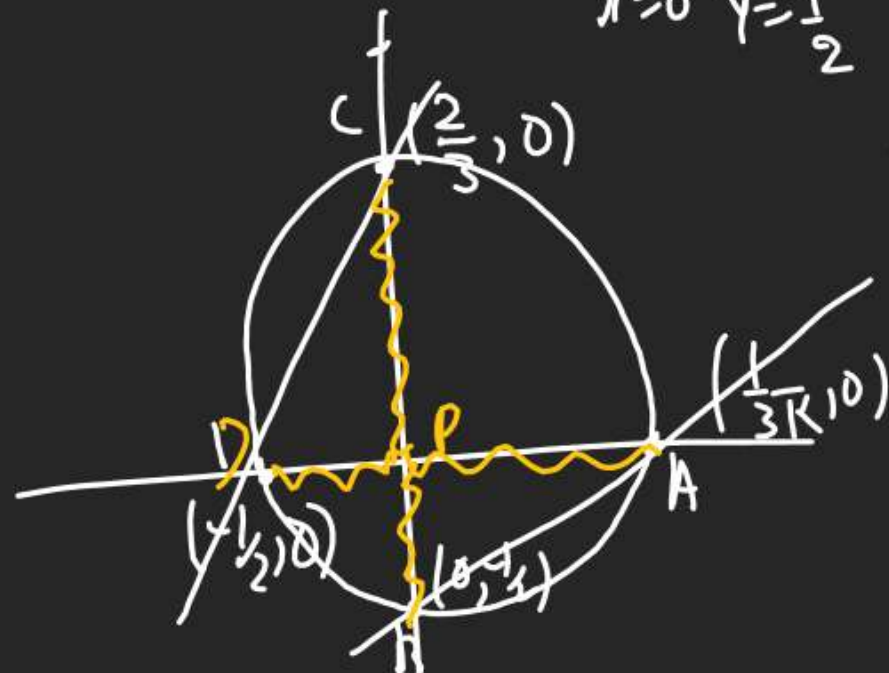
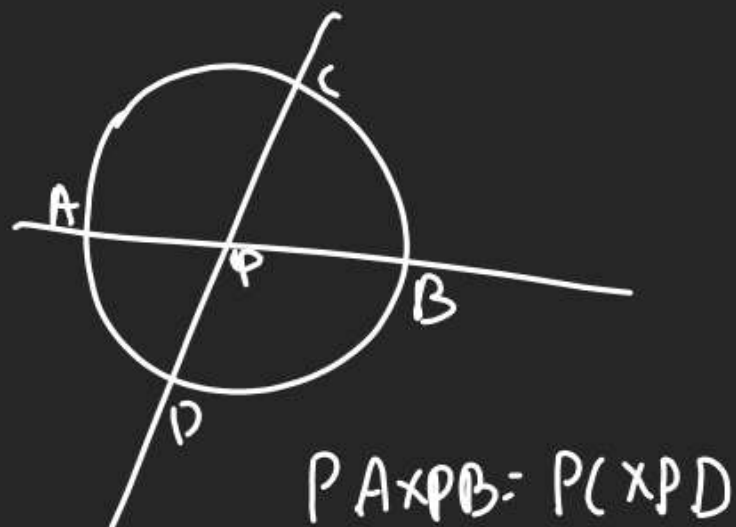
(on axes then  $K = ?$ )

$L_1: 3Kx - 2y - 1 \rightarrow y = 0, x = \frac{1}{3K}$   
 $x = 0, y = \frac{1}{2}$

$P(x)PB = PA \times PD$

$\frac{2}{3} \times \frac{1}{2} = \frac{1}{3K} \times \frac{1}{2}$

$K = \frac{1}{2}$



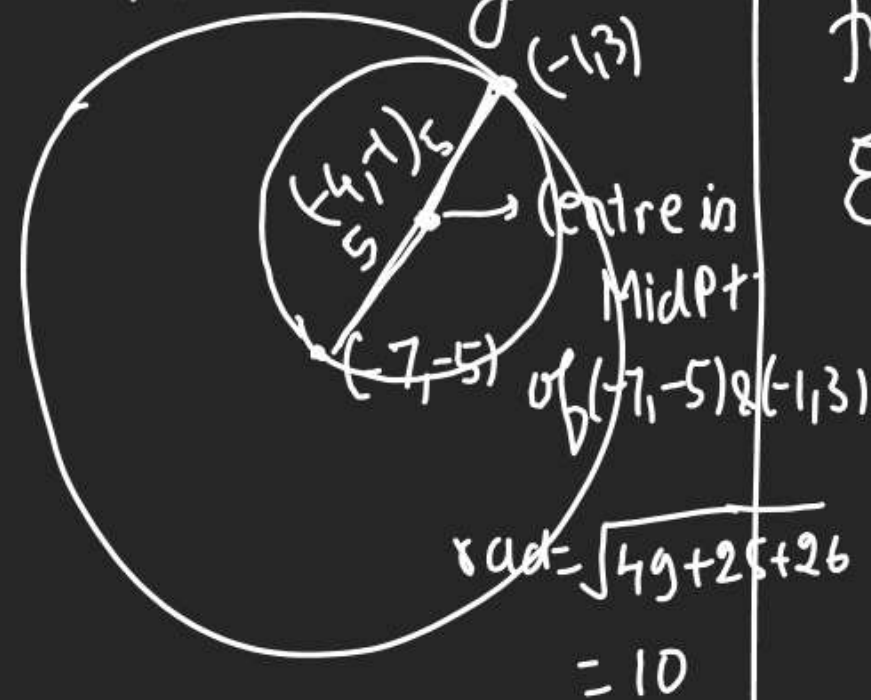
$L_2: 4x - 3y = -2$

$\frac{x}{-1/2} + \frac{y}{2/3} = 1$

Q Find EO (who touches

circle  $x^2 + y^2 + 14x + 10y - 26 = 0$

at  $(-1, 3)$  Internally & Rad = 5



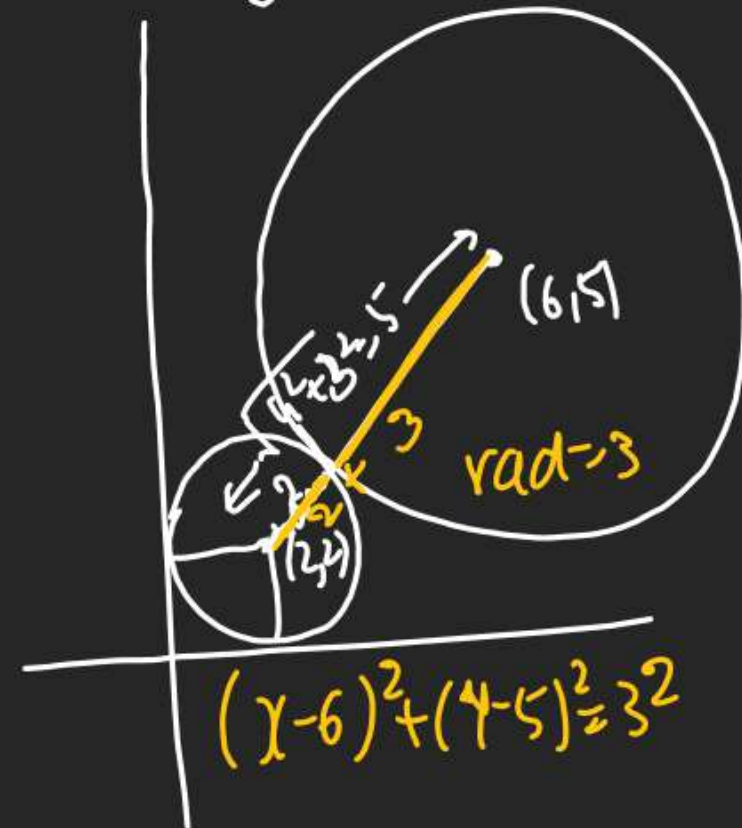
$(x+4)^2 + (y+1)^2 = 5^2$

Q A Circle of Radius 2 in 1st

Quadrant touches both axes

find EO (who touches 1st circle

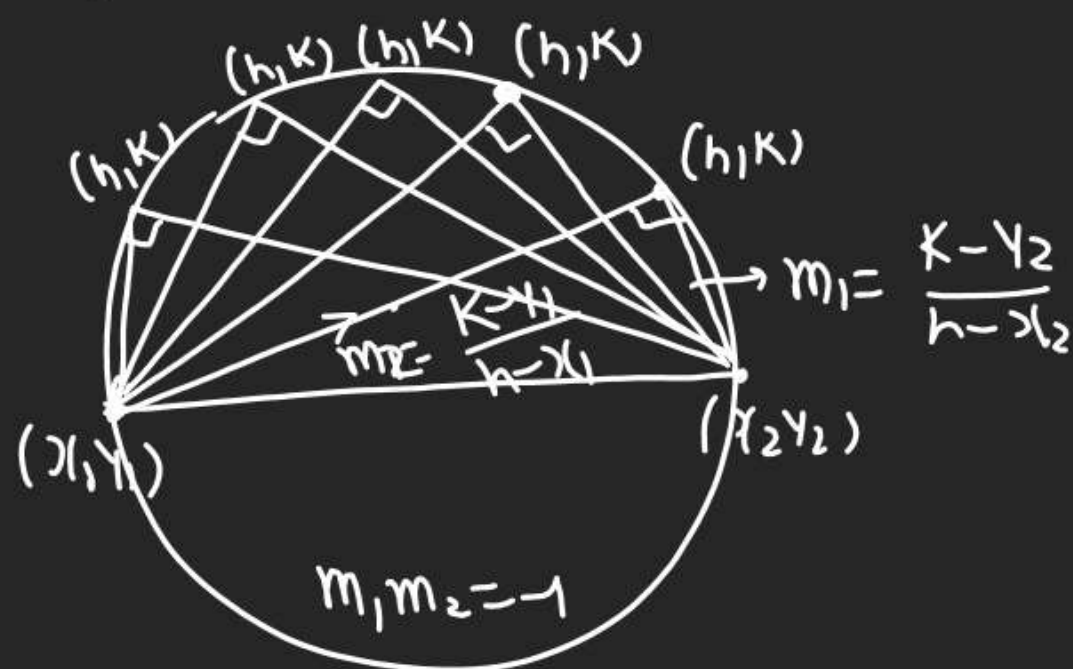
Externally. having center (6, 5)



$(x-6)^2 + (y-5)^2 = 3^2$

# Diametric form of a circle.

Here we will find End Pts of diameter  $\Rightarrow (x_1, y_1) (x_2, y_2)$



$$\frac{k - y_2}{h - x_2} \times \frac{k - y_1}{h - x_1} = -1$$

this is known as  $(x - x_1)(x - x_2) + (y - y_1)(y - y_2) = 0$  diametric form of circle

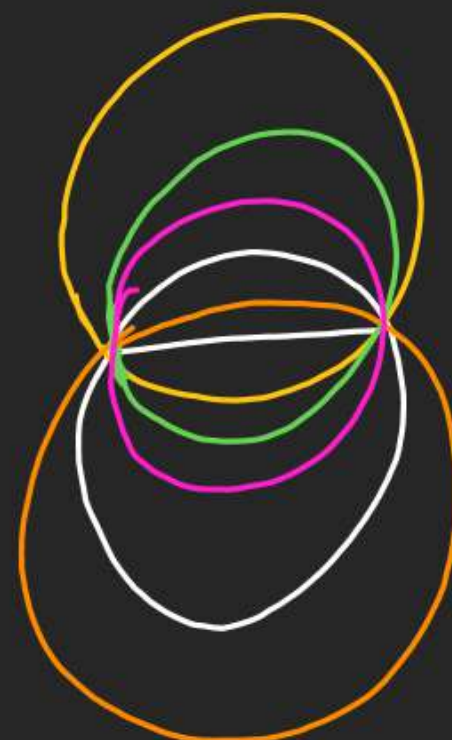
$$(2) \underbrace{(x - x_1)(x - x_2)}_{\text{Quad Eqn in } x} + \underbrace{(y - y_1)(y - y_2)}_{\text{Quad Eqn in } y} = 0$$

(3) Language of Qs.

EOC P.T. chord AB whose Circumference is Min.

Area in Min.  $(x - 1)(x - 3) + (y - 2)(y - 4) = 0$

Rad in Min.  $x^2 + y^2 - 4x - 6y + 11 = 0$



In Qs he will give Q If Abscissa & Ordinate of end Pts of diameter can be found by Roots of Q Eqn  $x^2 - 2ax + a^2 = 0$   $y^2 - 2by + b^2 = 0$  find EOC

Just add Q Eqn  $x^2 + y^2 - 2ax - 2by + a^2 + b^2 = 0$

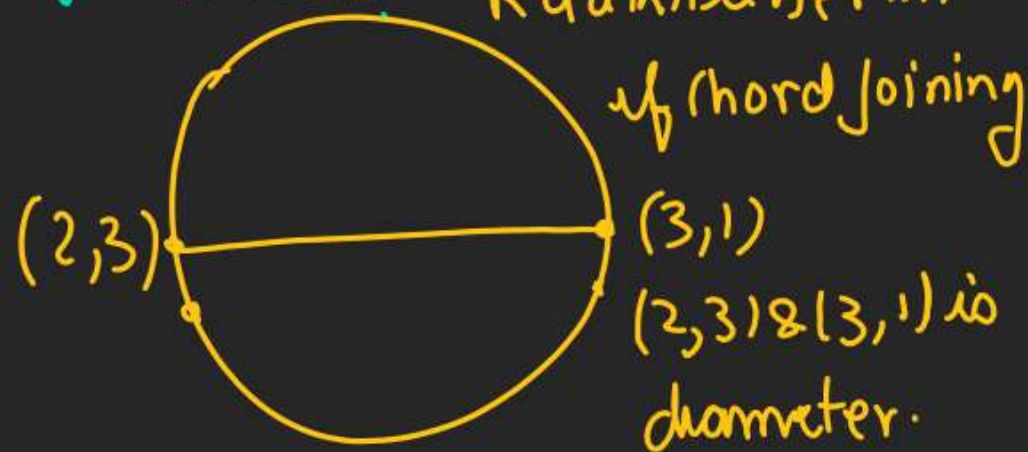
If 2 End Pts of Dia. are (1, 2), (3, 4) find EOC.

$$(x_1, y_1) = (1, 2)$$

$$(x_2, y_2) = (3, 4)$$

Q Find EOC Which Passing thru.  
28 (2,3) & (3,1) Whose Radius is

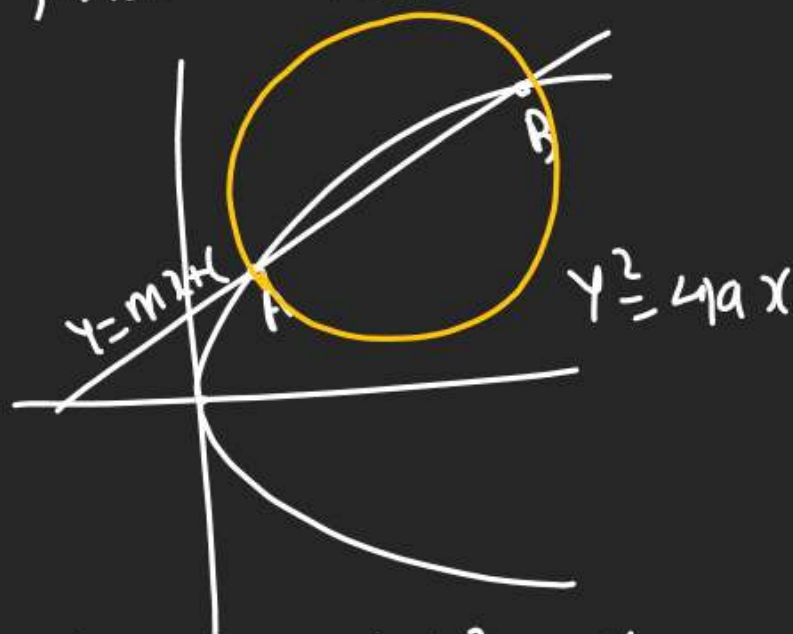
Minimum? Rad will be Min<sup>m</sup>  
if chord joining



$$(x-2)(x-3) + (y-3)(y-1) = 0$$

$$x^2 + y^2 - 5x - 4y + 9 = 0$$

Q If Line  $y = mx + c$  (wts  
29 Curve  $y^2 = 4ax$  at A & B  
Find EOC taken AB as Diameter.



(i)  $y = mx + c$  &  $y^2 = 4ax$   
Put  $y$  in curve  
 $(mx + c)^2 = 4ax$   
 $m^2x^2 + x(2mc - 4a) + c^2 = 0$   
 $x \neq 0$  quad

$$m^2x^2 + mx^2 + x(2mc - 4a) - 4ay + c^2 + 4a = 0$$

Put  
 $x = \frac{y-c}{m}$  in  $y^2 = 4ax$   
 $y^2 = 4a\left(\frac{y-c}{m}\right)$   
 $my^2 - 4ay + 4ac = 0$   
 $y \neq 0$