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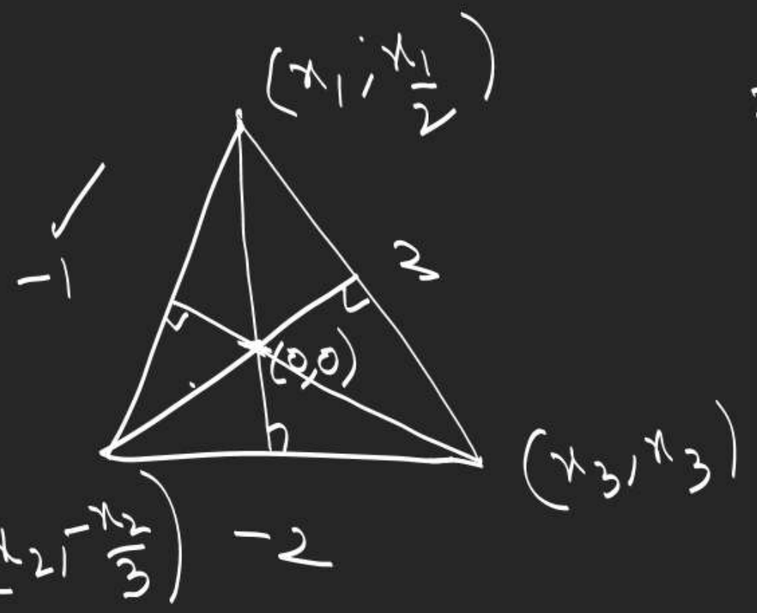

$$3h = x_1 + x_2 + x_3 = \lambda x_1$$

$$3k = \frac{x_1}{2} - \frac{x_2}{3} + x_3 = \mu x_1$$

$$\frac{\frac{x_1}{2} + \frac{x_2}{3}}{x_1 - x_2} = -1 \Rightarrow x_2 = f(x_1)$$

$$\frac{x_3 - \frac{x_1}{2}}{x_3 - x_1} = 3 \Rightarrow x_3 = g(x_1)$$

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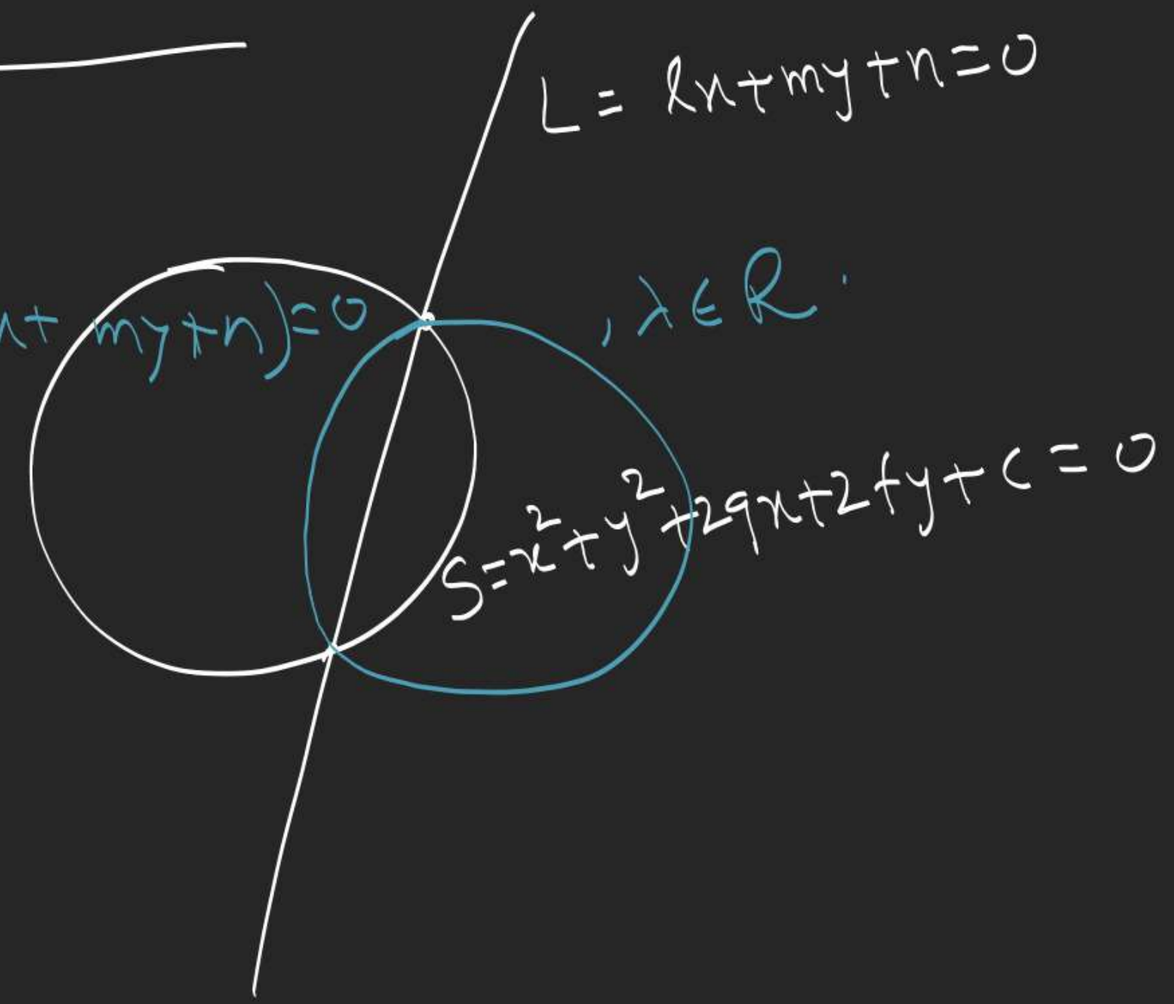
Family of Circles thru intersection of a given line & a circle

$$x^2+y^2+2gx+2fy+c+\lambda(lx+my+n)=0 \quad , \lambda \in R.$$

$$\boxed{S+\lambda L=0 \quad \lambda \in R}$$



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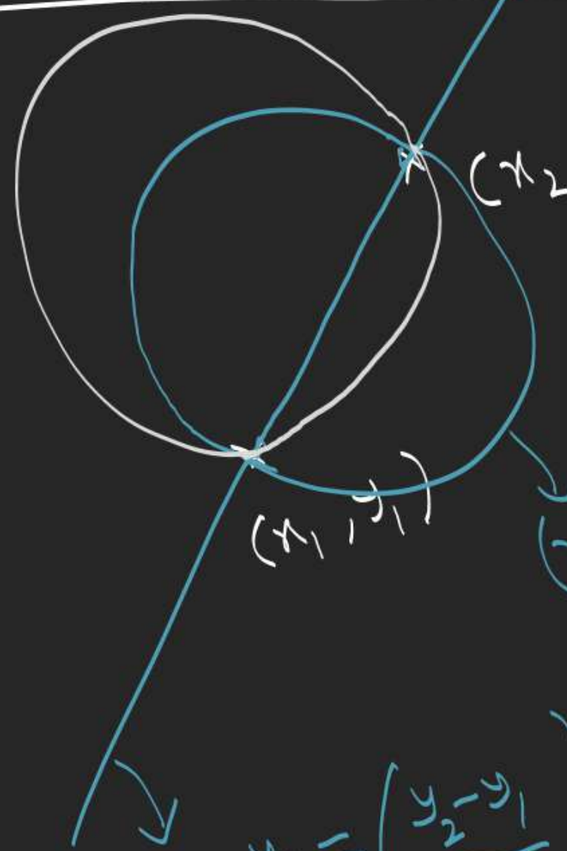
Family of Circles thru two given points



$$(x-x_1)(x-x_2)+(y-y_1)(y-y_2)+\lambda\left((y-y_1)-\left(\frac{y_2-y_1}{x_2-x_1}\right)(x-x_1)\right)=0$$

$$\lambda \in R$$

$$(x-x_1)(x-x_2)+(y-y_1)(y-y_2)=0$$

$$y-y_1=\left(\frac{y_2-y_1}{x_2-x_1}\right)(x-x_1)$$

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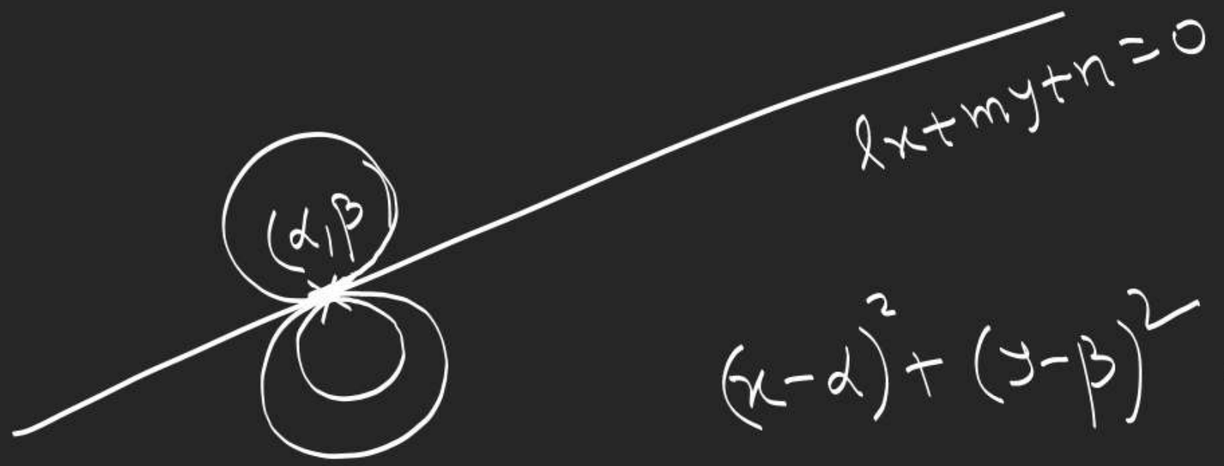
Family of circles touching a line at a given point on it



$$(x-\alpha)^2+(y-\beta)^2+\lambda(lx+my+n)=0 .$$

$\lambda \in R$.

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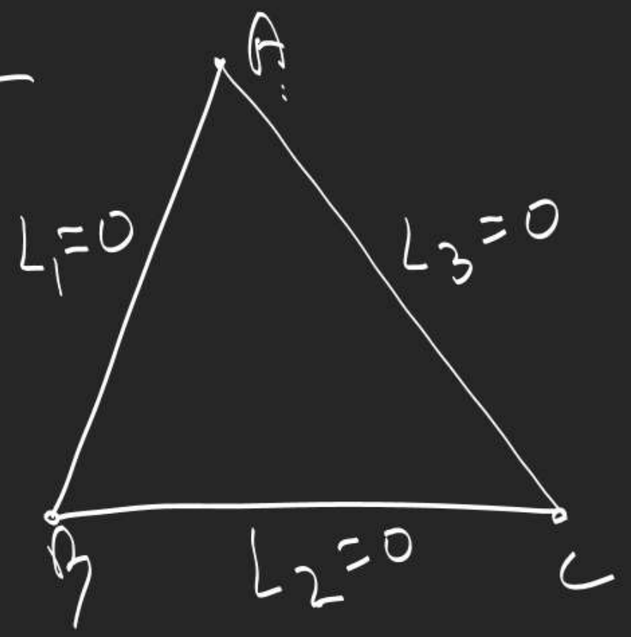
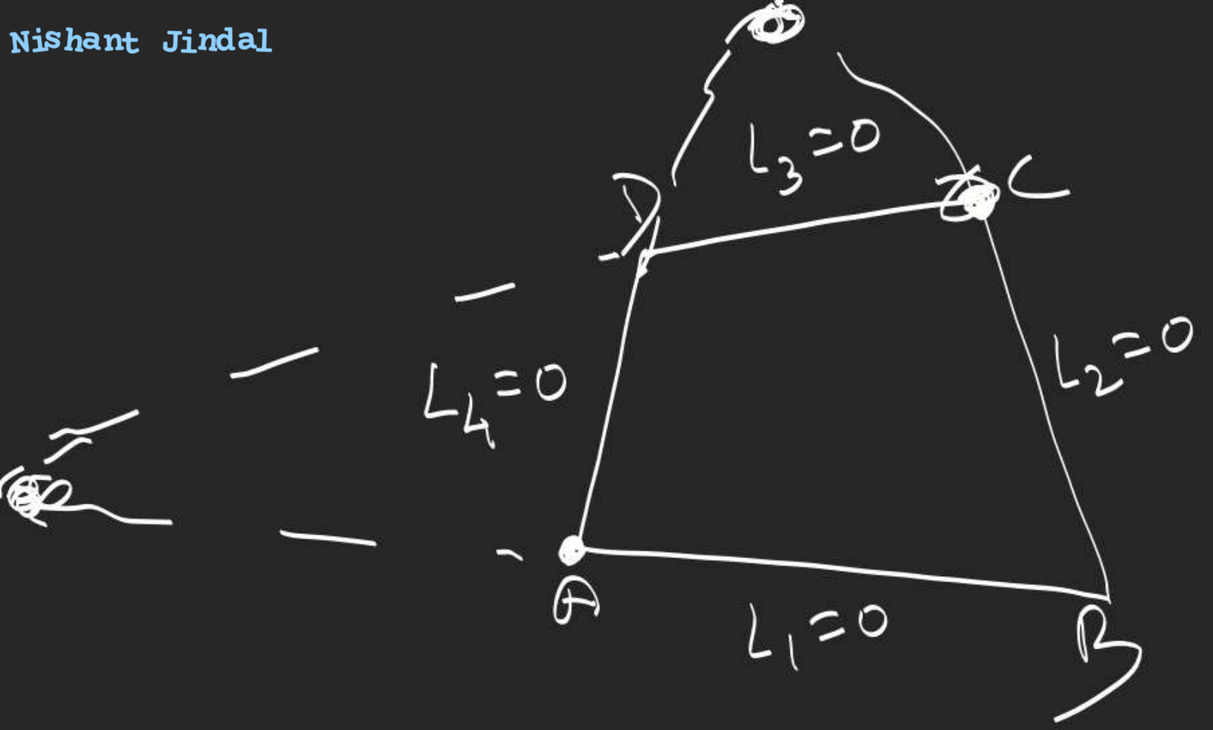
Circumcircle



$$L_1L_2+\lambda L_2L_3+\mu L_3L_1=0$$

Coeff. of x^2 = Coeff. of y^2

Coeff of $xy=0$ $\Big\}$ $\lambda, \mu = ?$



Circumcircle

$$L_1L_3 + \lambda L_2L_4 = 0$$

Coeff. of x^2 = Coeff. of y^2

Coeff. of $xy = 0$

$\lambda = ?$

$$L_1L_2 + \lambda L_3L_4 = 0$$

✗

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1. Find the eqn. of circle which touches the line $2x-y=4$ at point $(1,-2)$ and

(i) passes thru $(3,4)$

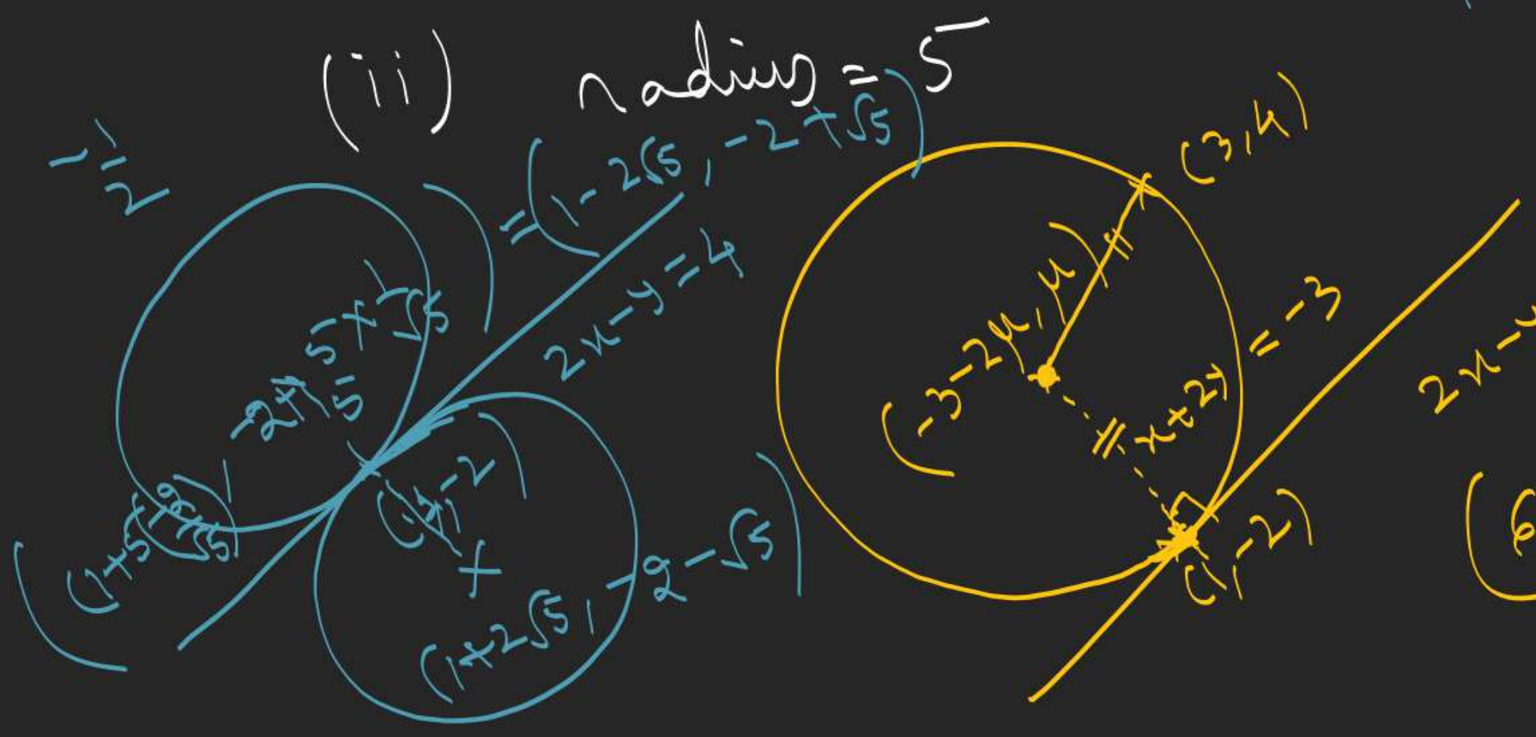
(ii) radius $= \sqrt{5}$

$$(x-1)^2+(y+2)^2+\lambda(2x-y-4)=0$$

Put $(3,4)$

$$4+36+\lambda(-2)=0$$

$$\lambda = 20$$



$$(6+2\mu)^2+(4-\mu)^2=(4+2\mu)^2+(\mu+2)^2$$

$\mu = ?$

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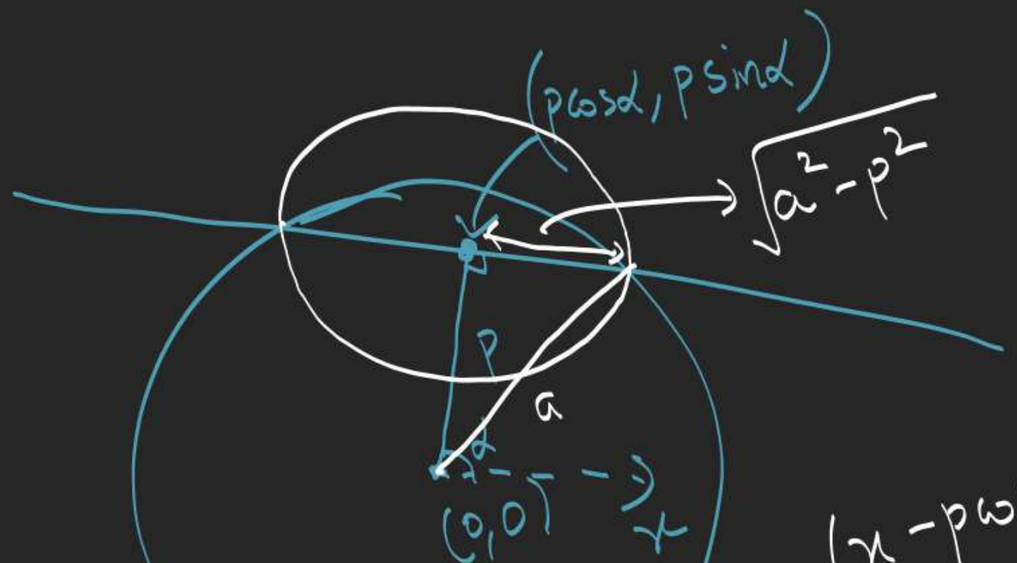
2. Find the eqn. of circle drawn on chord $x\cos\alpha + y\sin\alpha = p$ of the circle $x^2+y^2=a^2$ as its diameter.



$$x^2+y^2-a^2+\lambda(x\cos\alpha+y\sin\alpha-p)=0$$

$$(x-p\cos\alpha)^2+(y-p\sin\alpha)^2=a^2-p^2$$

Put $\left(-\frac{\lambda}{2}\cos\alpha, -\frac{\lambda}{2}\sin\alpha\right)$ to $x\cos\alpha+y\sin\alpha=p$, $\lambda=?$

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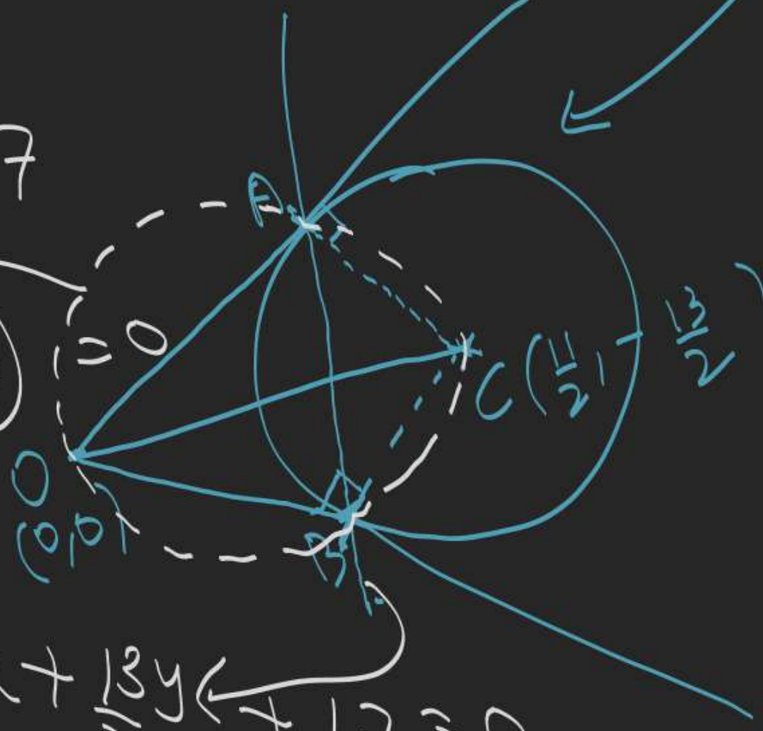
3. Find the equation of circle which passes thru origin and thru the point of contact of tangents drawn from origin to the circle $x^2+y^2-11x+13y+17=0$.



$x^2+y^2-11x+13y+17$

$+\lambda(11x-13y-34)=0$

Put (0,0)

$\lambda = ?$

$-\frac{11}{2}x+\frac{13}{2}y+17=0$

$x\left(x-\frac{11}{2}\right)+y\left(y+\frac{13}{2}\right)=0$

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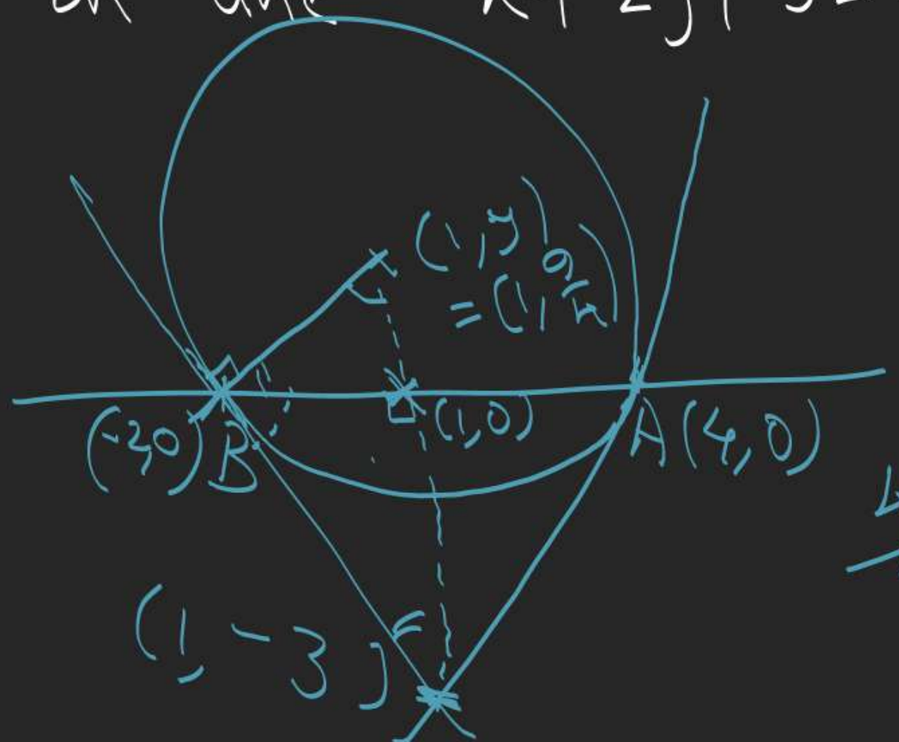
4. S.T. eqn $x^2+y^2-2x-2\lambda y-8=0$ represents for different values of λ, a system of circles passing thru fixed points A, B. Also find the eqn of that circle of the system, the tangent to which at A and B meet on line $x+2y+5=0$.



$$(x^2+y^2-2x-8)-2\lambda(y)=0$$

$y=0$

$$x^2-2x-8=0$$

$A(4,0)$, $B(-2,0)$

$\frac{4}{3}=\frac{3}{y}$

$2\lambda=y$