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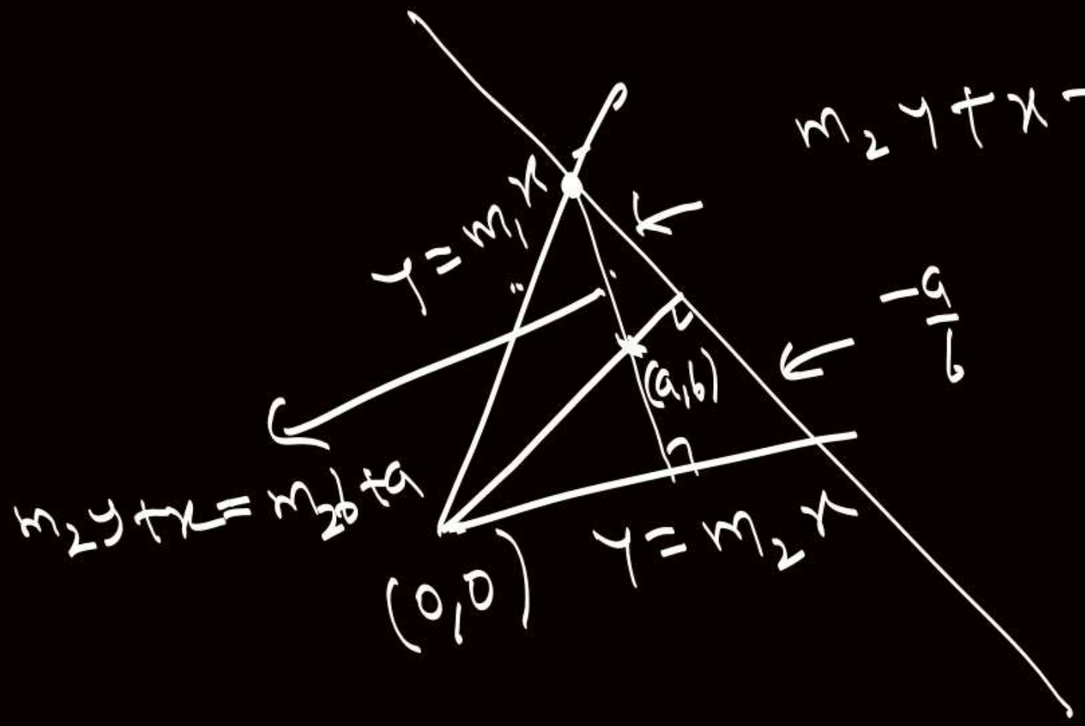

$$m_2 y + x - m_2 b - a + \lambda (y - m_1 x) = 0$$

$$\frac{\lambda m_1 - 1}{m_2 + \lambda} = -\frac{a}{b}.$$

$\lambda = ?$

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Find locus of P, s.t. $PA^2 + PB^2 = \text{const.} = \lambda$

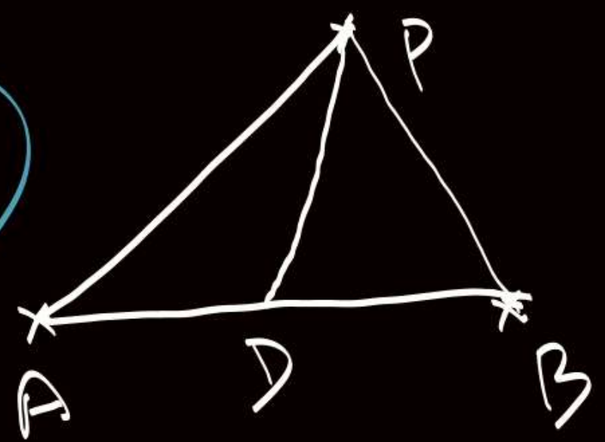
A, B are fixed points.

Circle with centre midpoint of A, B.

$A(-a, 0)$, $B(a, 0)$

$(x+a)^2 + y^2 + (x-a)^2 + y^2 = \lambda$.

$\frac{PA}{PB} = \lambda$



$PD^2 = \frac{2(PA^2 + PB^2) - AB^2}{4}$

$= \frac{2\lambda - (AB)^2}{4}$

$2\lambda - (AB)^2 > 0$

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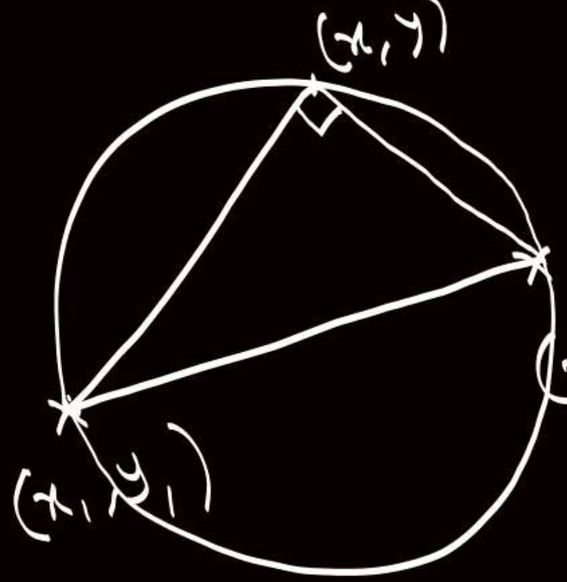
Diametric form



$$\left(\frac{y-y_1}{x-x_1}\right)\left(\frac{y-y_2}{x-x_2}\right) = -1$$

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

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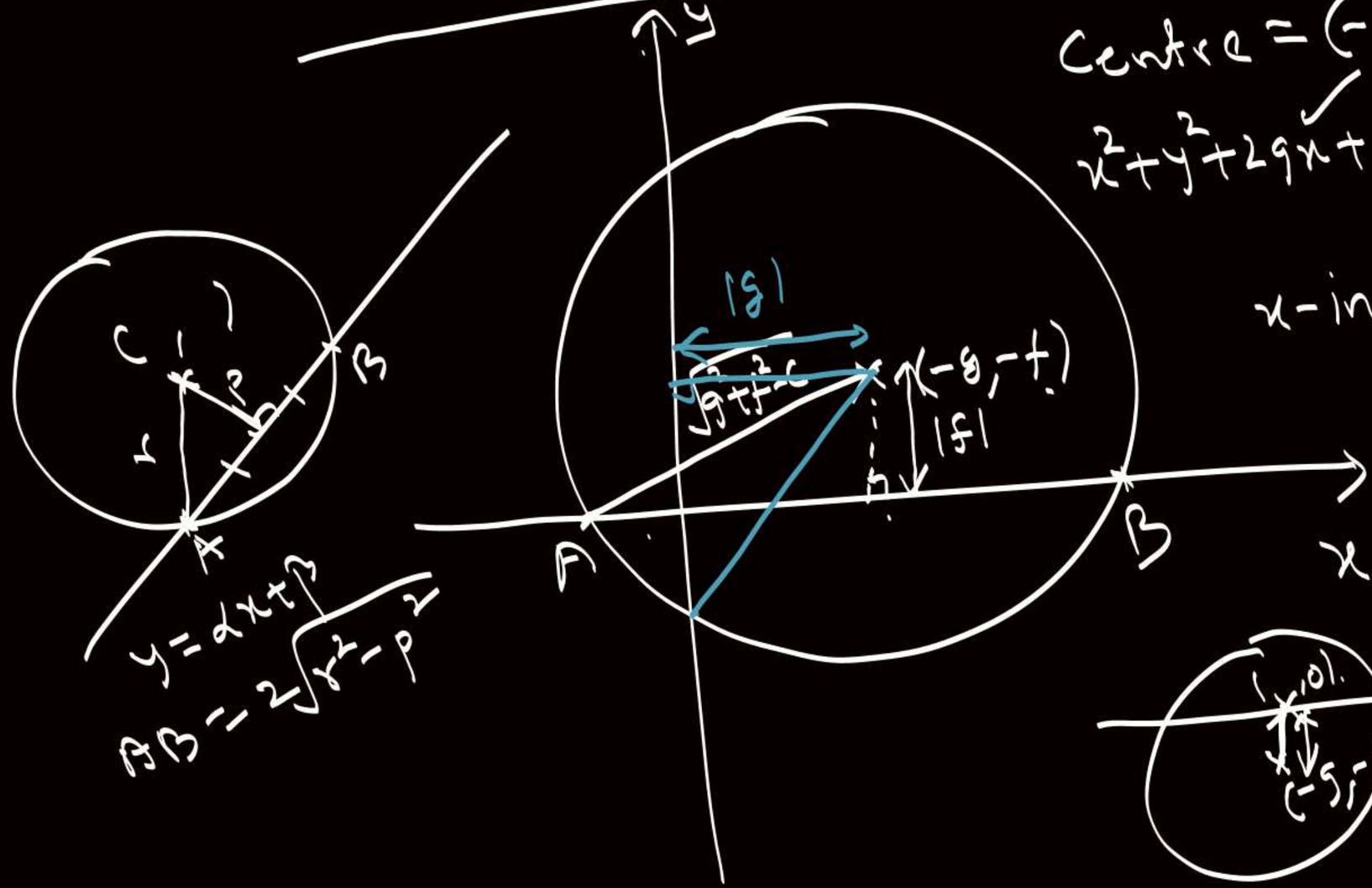
Intercepts of Circle on Coordinate axes

Centre $= (-g, -f)$, radius $= \sqrt{g^2+f^2-c}$

$x^2+y^2+2gx+2fy+c=0$



x-intercept $= AB$

$= 2\sqrt{g^2-c}$

y-intercept

$= 2\sqrt{f^2-c}$

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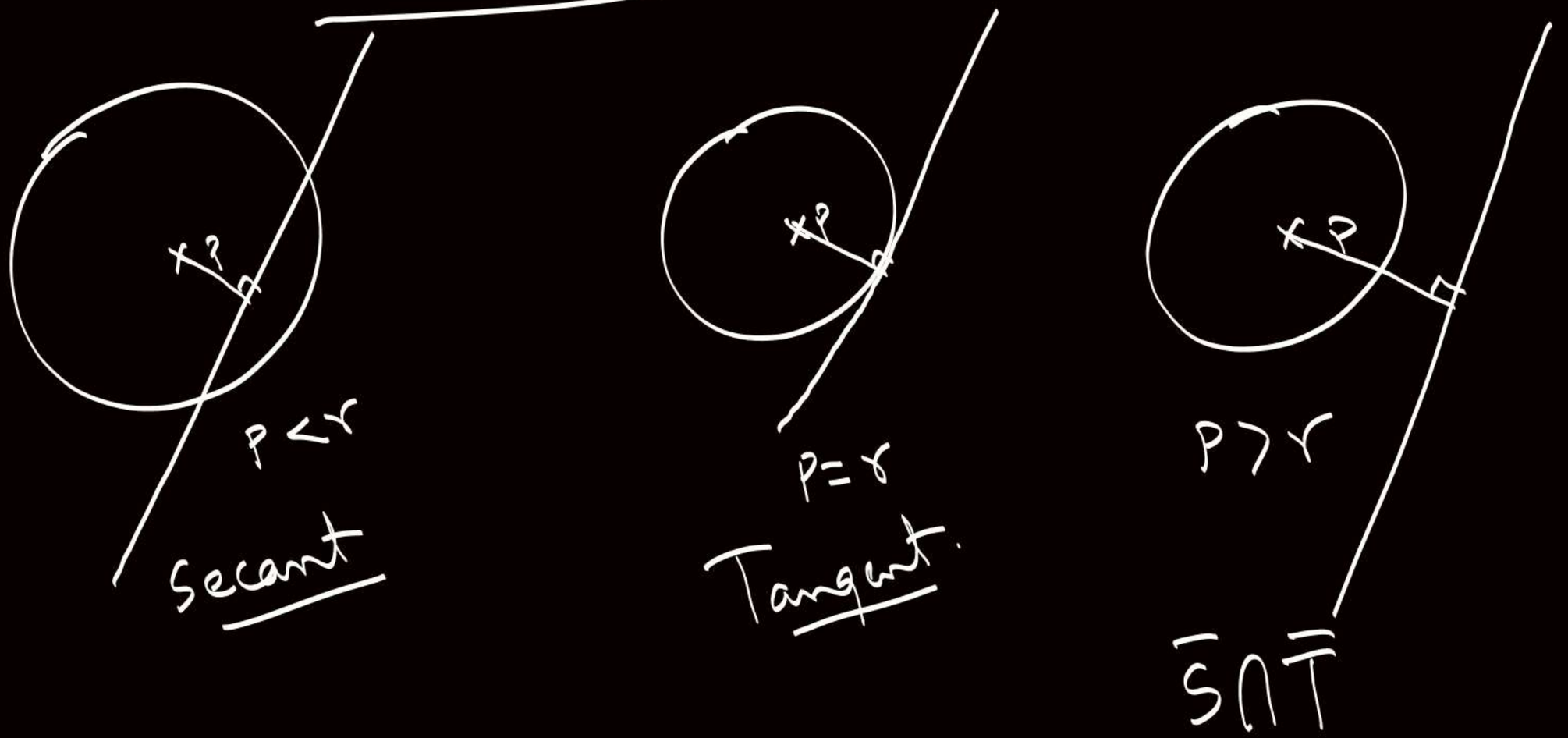
Circle & Line



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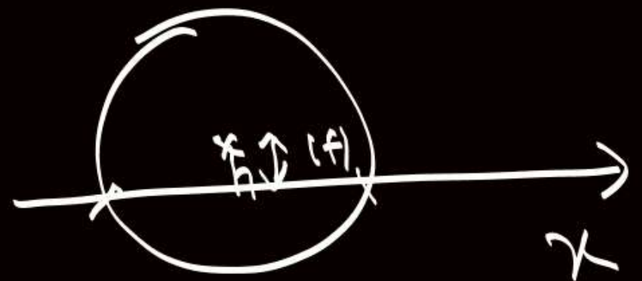


$g^2 - c > 0$

$|f| < r$

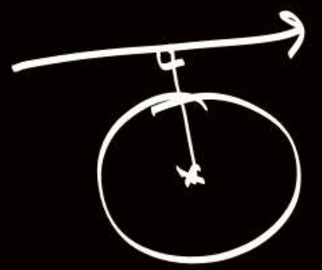
$f^2 < g^2 + f^2 - c$

$g^2 - c > 0$

$g^2 - c = 0$

$|f| = r$

$g^2 - c = 0$



$g^2 - c < 0$

$|f| > r$

$f^2 > g^2 + f^2 - c$

$g^2 - c < 0$

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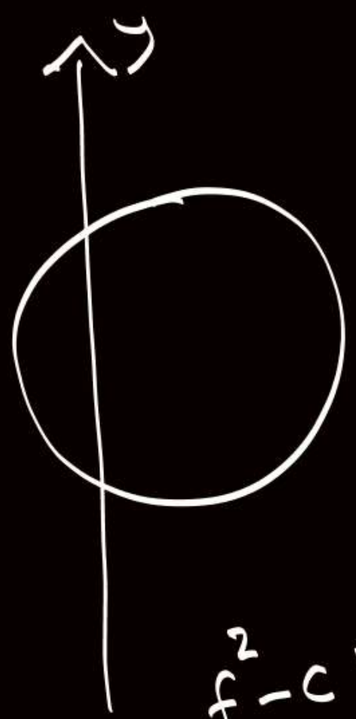
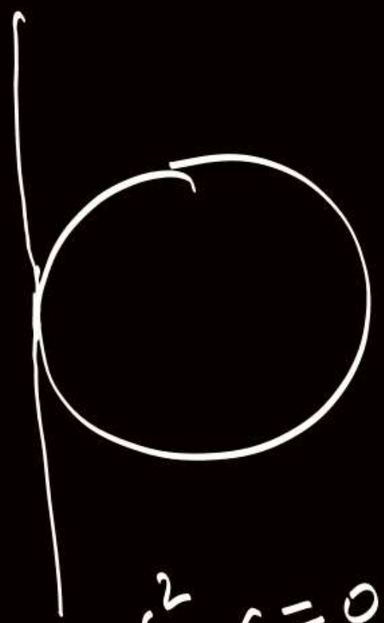
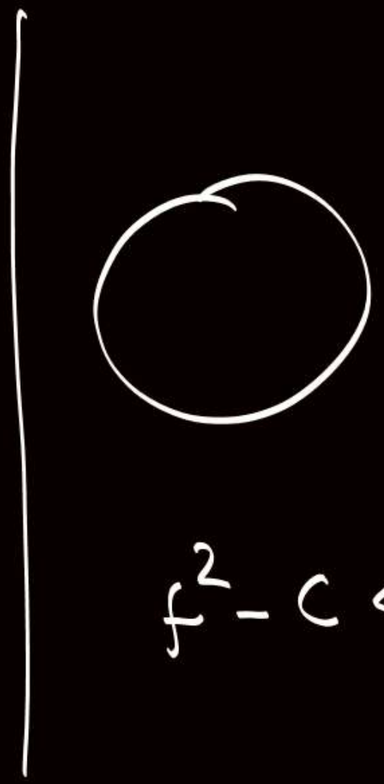


$f^2 - c > 0$



$f^2 - c = 0$



$f^2 - c < 0$.

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1: Find the eqn. of circle whose centre is on line $y=2x$ and which passes thru points $(-1,2)$ & $(3,-2)$.

2: Find the eqn. of circle which has its centre at point $(4,3)$ and which touches the line $5x-12y-10=0$.

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

$y-0=x-1$

$y=2x$

$r=\frac{|20-36-10|}{\sqrt{5^2+12^2}}=2$

$2x=x-1$

$x=-1$

$y=-2$

$(-1,-2)$

$(-1,2)$ $(3,-2)$ $(1,0)$

$x^2+y^2+2gx+2fy+c=0$

Put $(-1,2)$ — ①

Put $(3,-2)$ — ②

$-f=-2g$

$\boxed{(x+1)^2+(y+2)^2=16}$

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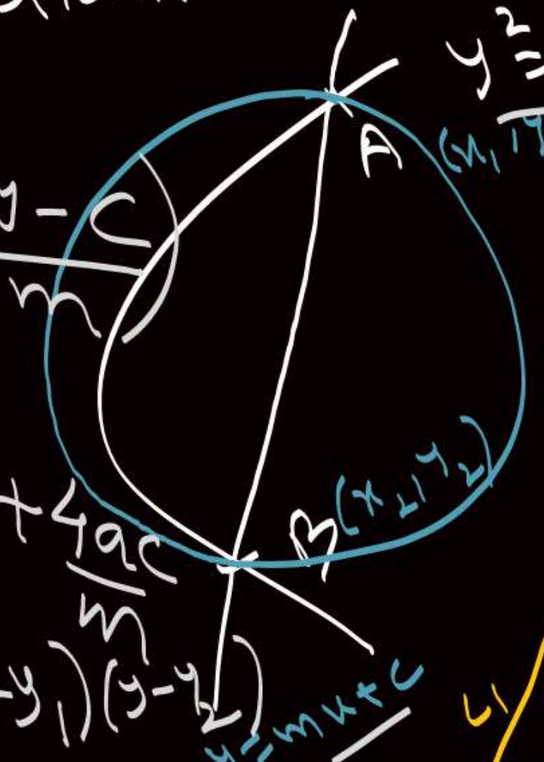
3. Find the eqn. of circle with points of intersection A, B of the curve $y^2 = 4ax$ and line $y = mx + c$ as diametric ends.



$$y^2 = 4a\left(\frac{y-c}{m}\right)$$

$$y^2 - \frac{4a}{m}y + \frac{4ac}{m} = (y-y_1)(y-y_2)$$

$$(mx+c)^2 = 4ax$$

$$m^2x^2 + (2cm - 4a)x + c^2 = 0$$

$$\Rightarrow x^2 + \left(\frac{2cm-4a}{m^2}\right)x + \frac{c^2}{m^2} = (x-x_1)(x-x_2)$$

$$x^2 + \left(\frac{2cm-4a}{m^2}\right)x + \frac{c^2}{m^2} + y^2 - \frac{4a}{m}y + \frac{4ac}{m} = 0$$

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

x_1, x_2 — $\Sigma x - \Pi$ (nem.)

y_1, y_2 — $\Sigma x - \Pi$ (1 - 5)