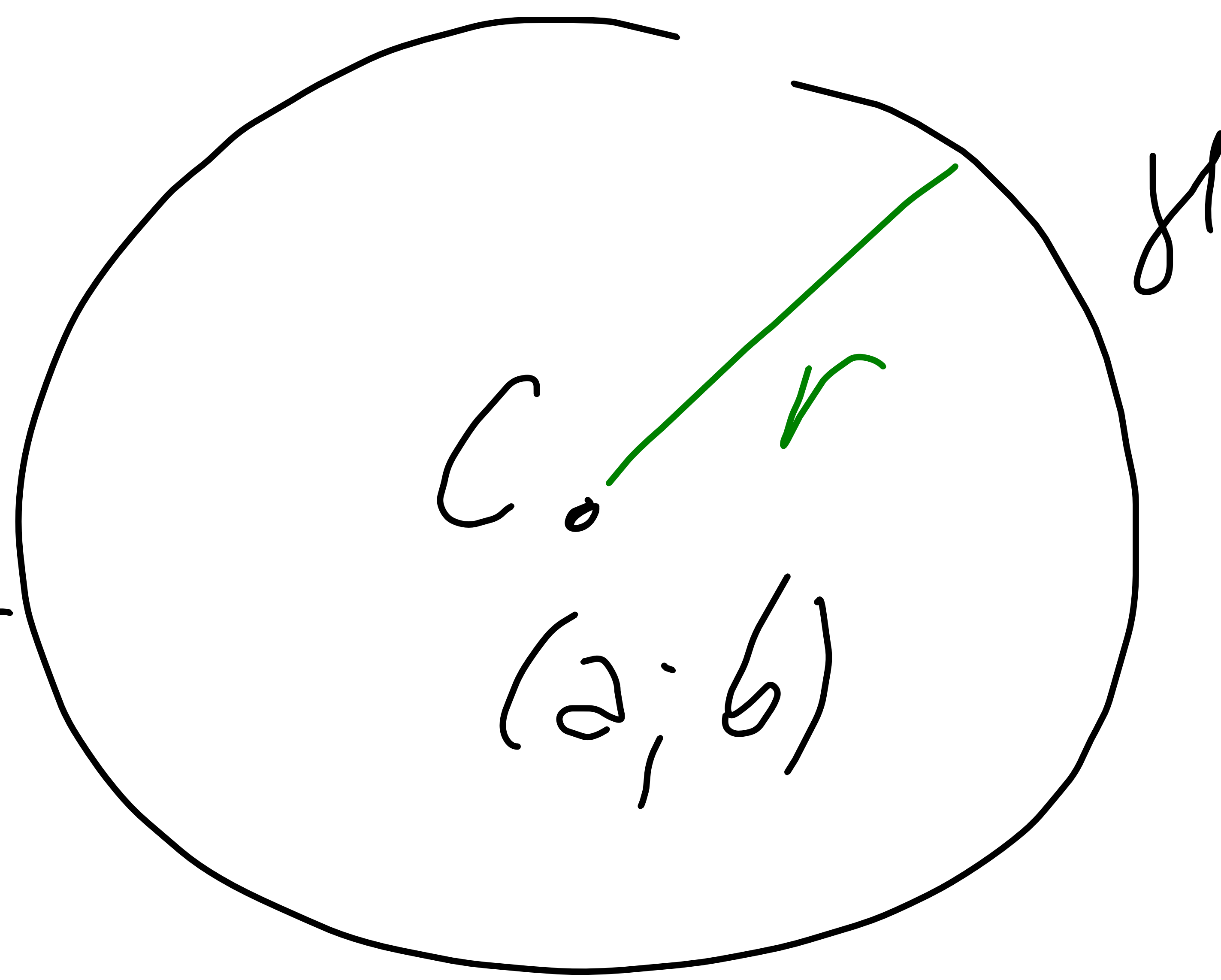


Circle

$$(x-a)^2 + (y-b)^2 = r^2$$



$$(x-2)^2 + (y-3)^2 = 9$$

$r = 3$  centro en  $(2; 3)$

$$x^2 - 2x + y^2 = 15$$

$$x^2 - 2x + 1 - 1 + (y-0)^2 = 15$$

$$(x-1)^2 + (y-0)^2 = 16$$

$$x^2 + mx =$$

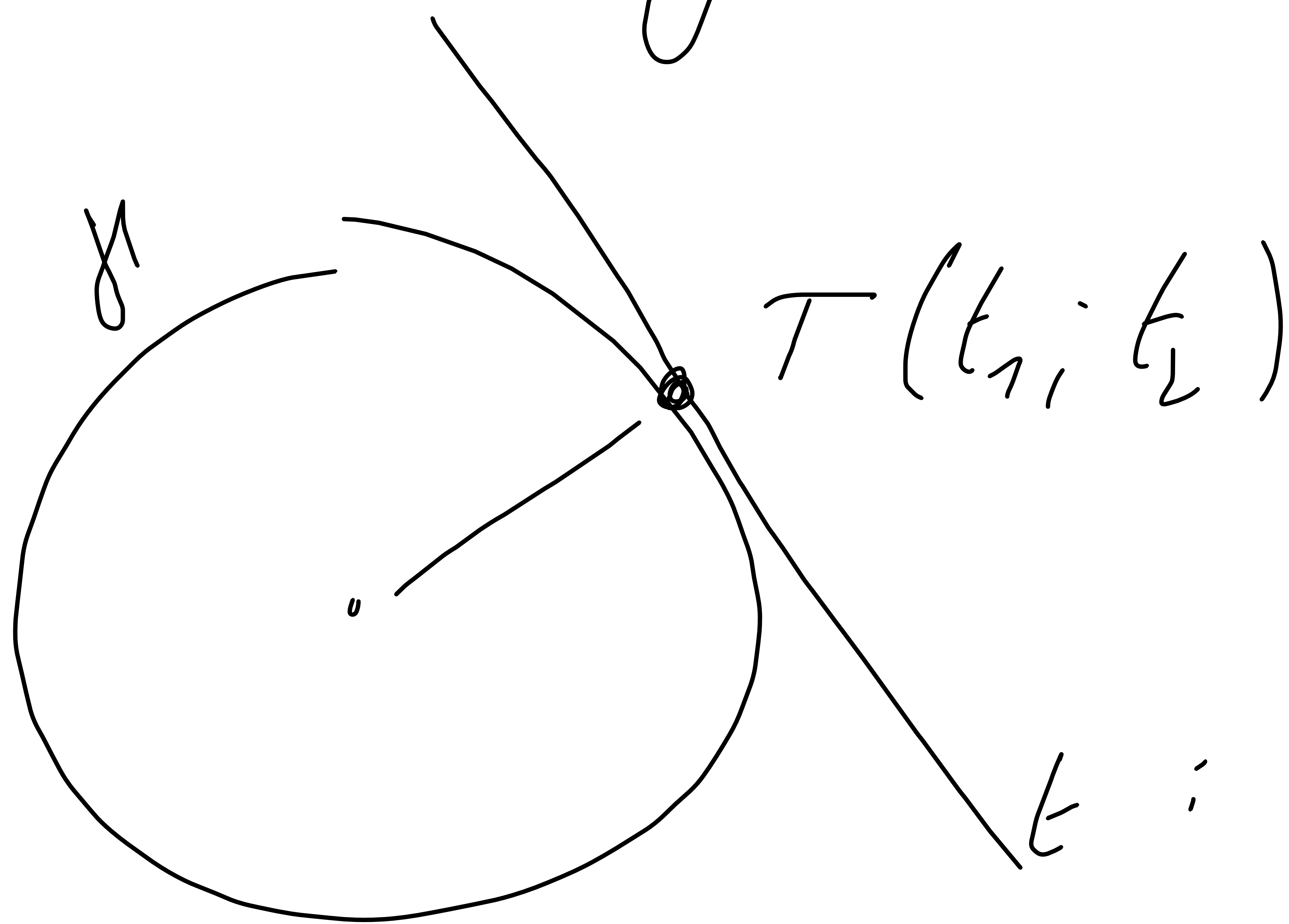
$$x^2 + 2 \cdot x \cdot \frac{m}{2} + \frac{m^2}{4} - \frac{m^2}{4} =$$

$$\left(x + \frac{m}{2}\right)^2 - \frac{m^2}{4}$$

$C(2; b)$   $r$

TANGENTES

$\gamma: (x-2)^2 + (y-b)^2 = r^2$



$(t_1, t_2) \in \gamma$

$t: \underbrace{(t_1 - 2)}_{\in \mathbb{R}} (\underbrace{x - 2}_{\in \mathbb{R}}) + \underbrace{(t_2 - b)}_{\in \mathbb{R}} (\underbrace{y - b}_{\in \mathbb{R}}) = r^2$

Example

$$(x-3)^2 + (y+2)^2 = 25$$

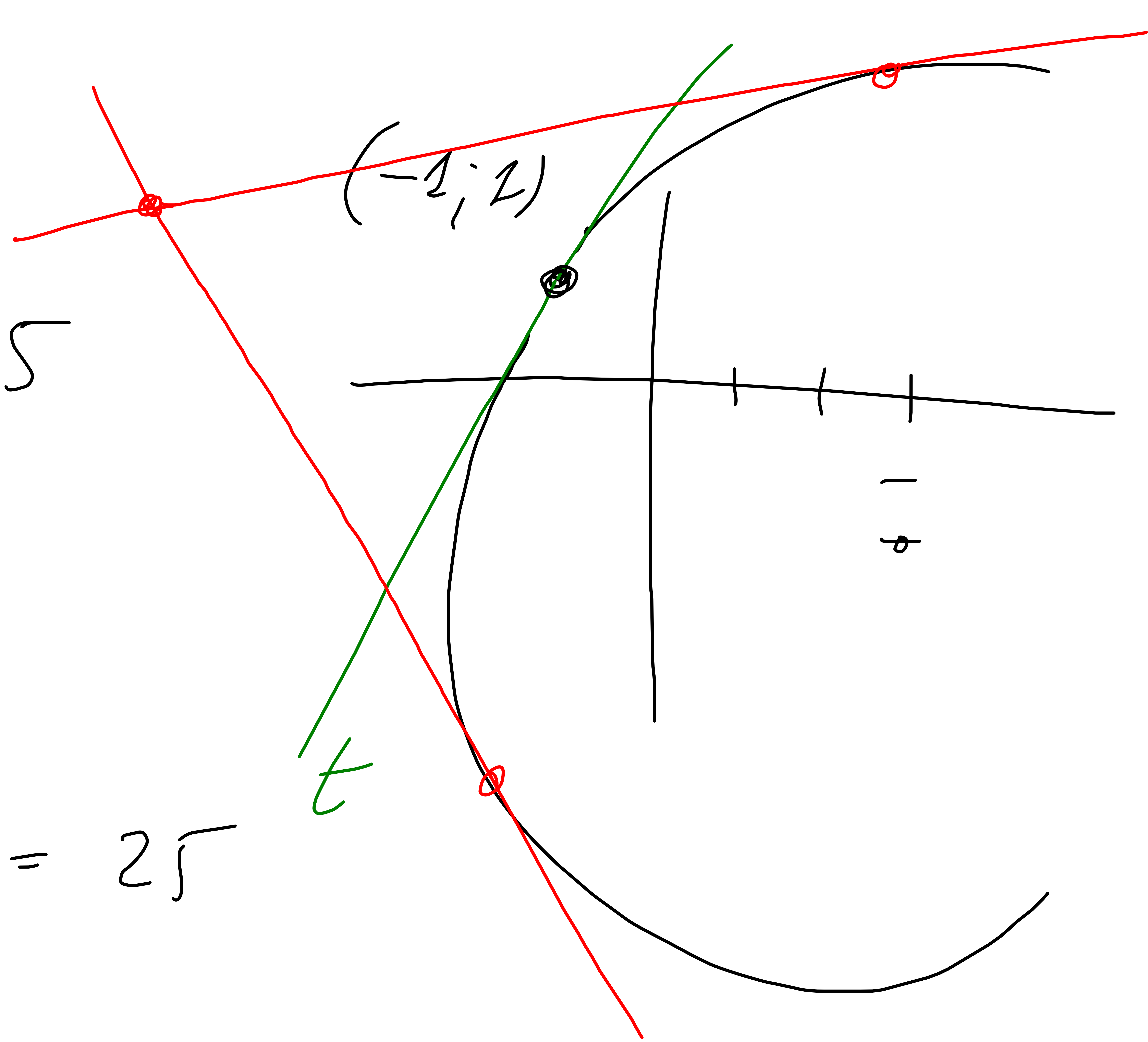
$$T(-1; 1) \in \mathcal{S}'$$

$$t: (x-3)(x-3) + (y+2)(y+2) = 25$$

$$-4(x-3) + 3(y+2) = 25$$

$$-4x + 12 + 3y + 6 = 25$$

$$t: 4x - 3y + 7 = 0$$



$$(x-3)^2 + (y+2)^2 = 25$$

$$(-4-3)^2 + (3+2)^2 \neq 25$$

$P \notin \gamma$

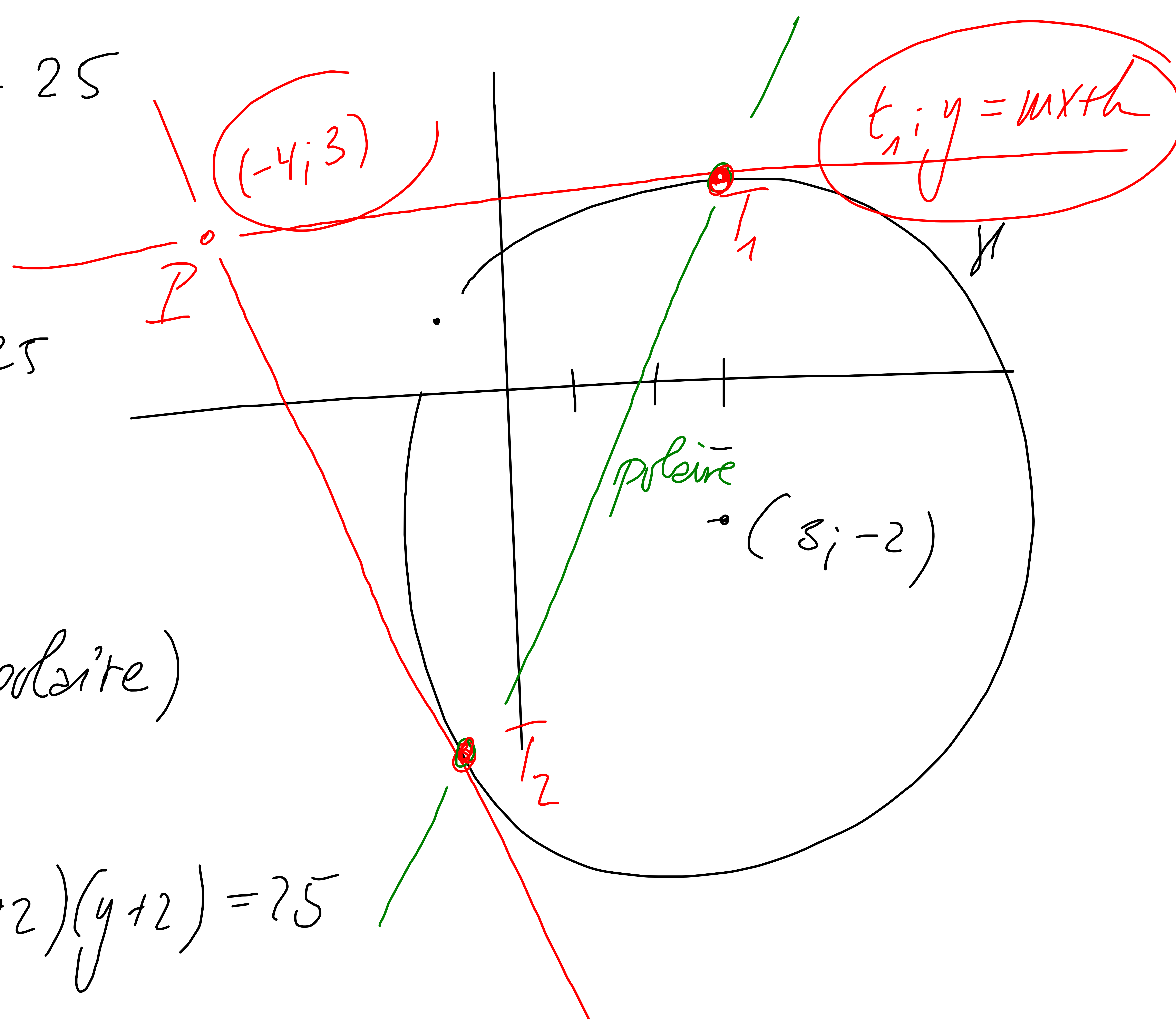
Méthode 1 (polaire)

$$(-4-3)(x-3) + (3+2)(y+2) = 25$$

$$-7x + 21 + 5y + 10 = 25$$

$$7x - 5y - 6 = 0$$

$$y = \frac{7}{5}x - \frac{6}{5}$$



$$(x-3)^2 + \left(\frac{7}{5}x + \frac{4}{5}\right)^2 = 25$$

$$\begin{matrix} \swarrow \\ T_1 \\ \searrow \\ T_2 \end{matrix}$$

$$t_1 : d_{PT_1} \quad t_2 : d_{PT_2}$$

$$(x-3)^2 + (y+2)^2 = 25$$

Pet

$$t: y = mx + h$$

$$3 = -4m + h$$

$$h = 4m + 3$$

$$t: mx - y + h$$

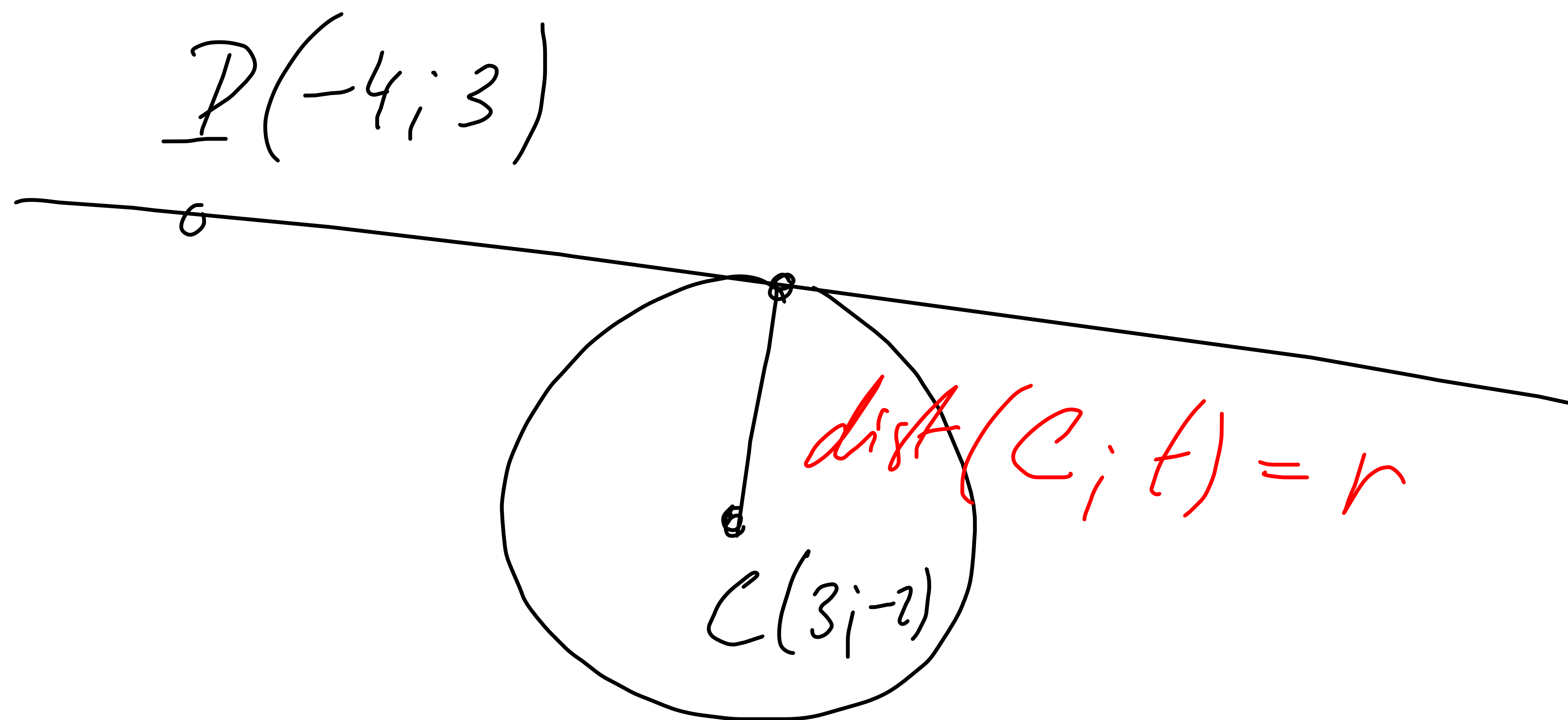
$$\text{dist}(C; t) =$$

$$\frac{|m \cdot 3 - (-2) + 4m + 3|}{\sqrt{m^2 + 1}}$$

$$= \frac{|7m + 5|}{\sqrt{m^2 + 1}} = 5$$

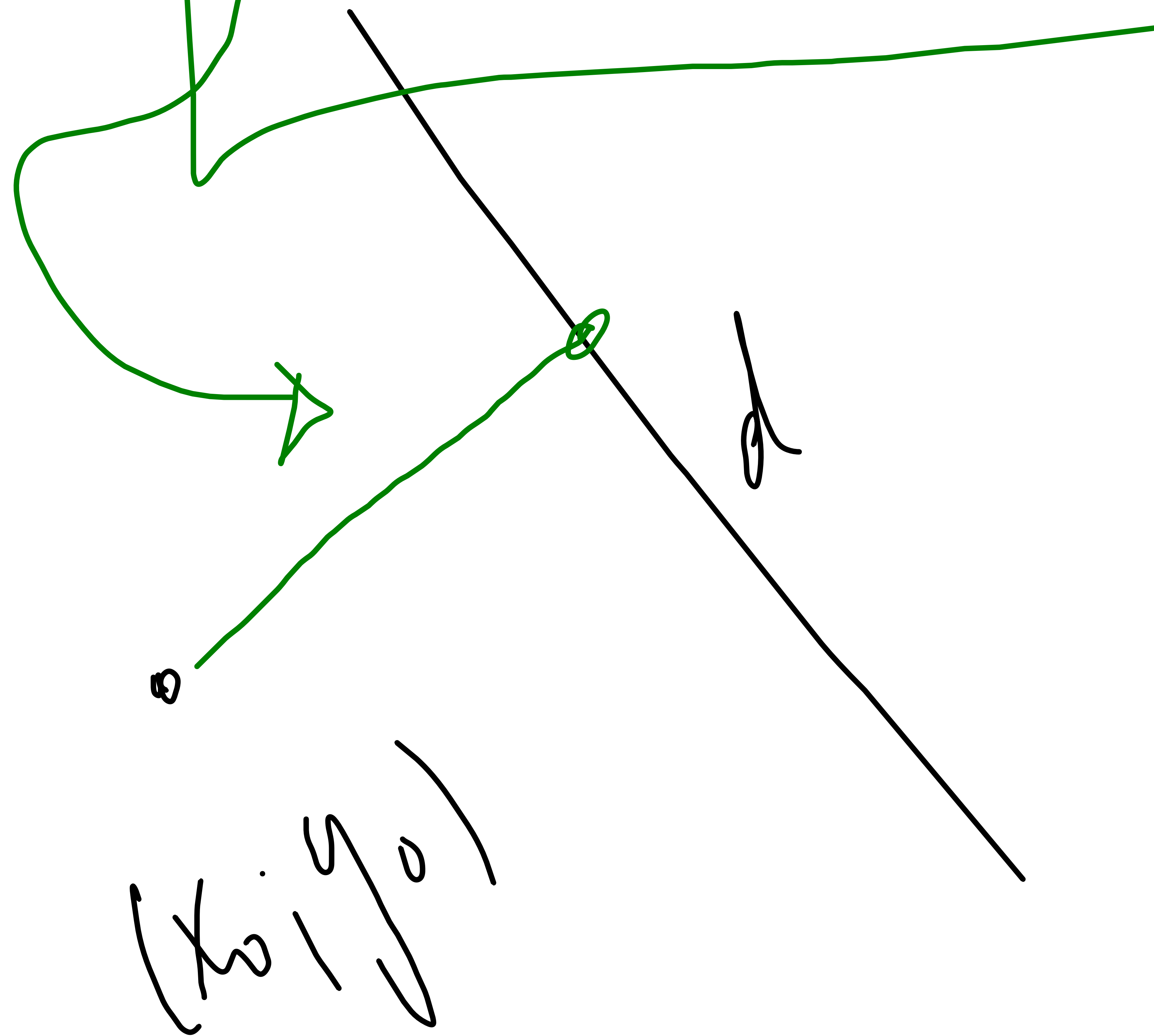
$$\Rightarrow (7m + 5)^2 = 25(m^2 + 1)$$

Donne les deux pentes. On en déduit les équations.



$$d: 2x + by + c = 0$$

$$\text{dist}((x_0, y_0); d) = \frac{|2x_0 + by_0 + c|}{\sqrt{2^2 + b^2}}$$



$$x^2 - 2x + y^2 + 4y = 20$$

$$A^2 - 2AB + B^2 - B^2$$

$$x^2 - 2 \cdot x \cdot 1 + y^2 + 4y = 20$$

$$A^2 - 2AB + B^2 = (A - B)^2$$

$$\boxed{x^2 - 2 \cdot x \cdot 1 + 1} \text{ } (-1) + y^2 + 4y = 20$$

$$(x-1)^2 + y^2 + 4y = 21$$

$$A^2 + 2AB + B^2 - B^2$$

$$(x-1)^2 + \boxed{y^2 + 2 \cdot y \cdot 2 + 4} \text{ } (+4) = 21$$

$$(y+2)^2$$

$$\boxed{(x-1)^2 + (y+2)^2 = 25}$$

$$2x = 2 \cdot x - 1,5$$

$$-5y = -2 \cdot y - 2,5$$

$$C = (1, -2)$$

$$r = 5$$

$$x^2 + x + y^2 = 0$$

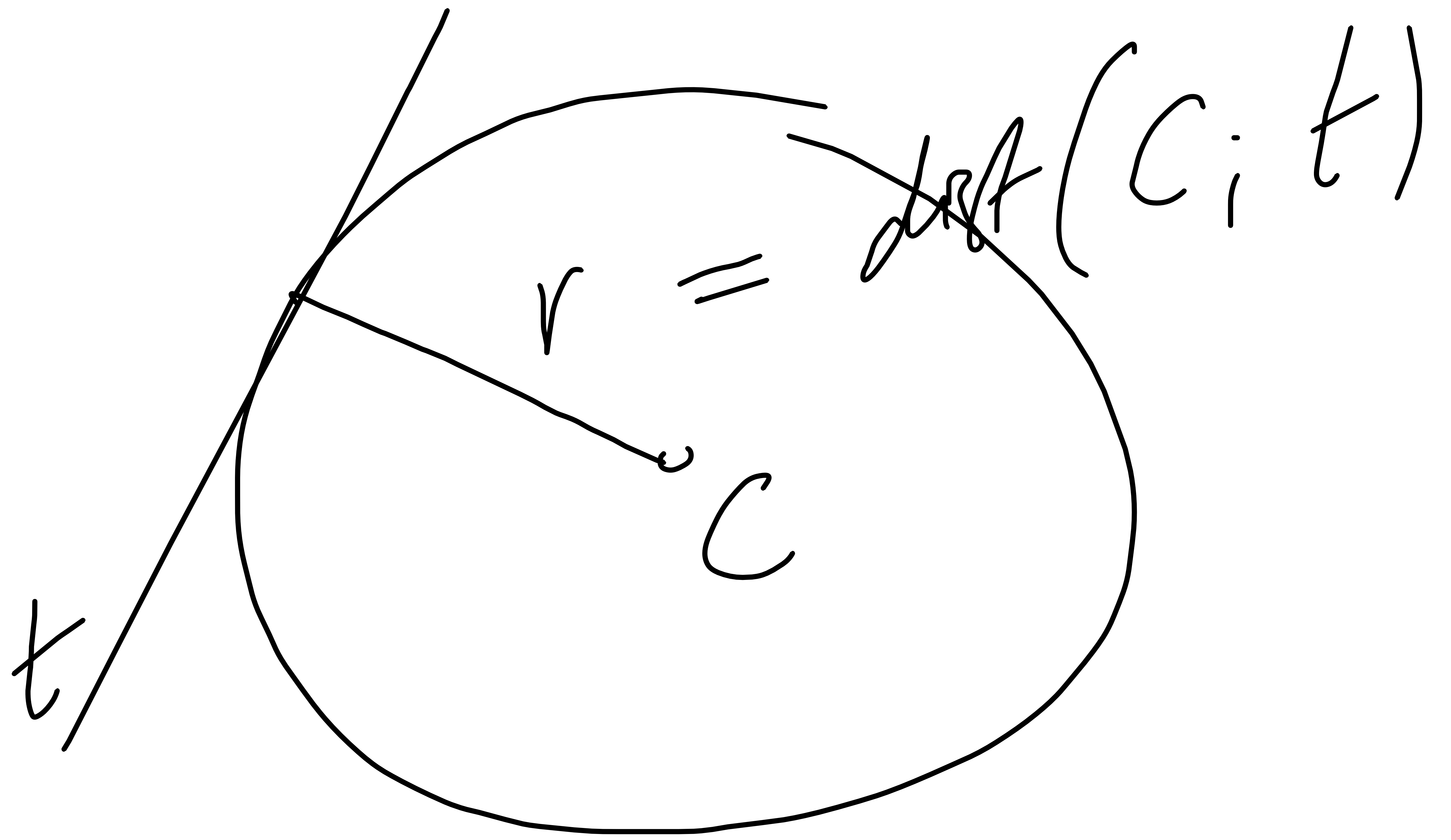
$$x^2 + 2 \cdot x \cdot \frac{1}{2} + y^2 + 2 \cdot y \cdot 0 = 0$$

$$\left(x + \frac{1}{2}\right)^2 - \frac{1}{4} + (y + 0)^2 = 0$$



$$x^2 + y^2 = r^2$$

↓  
✓



$$A(a_1; a_2) \quad B(b_1; b_2)$$

$$M_{AB} = \begin{pmatrix} \frac{a_1 + b_1}{2} & \frac{a_2 + b_2}{2} \\ 2 & 2 \end{pmatrix}$$

$$M_{AB} = A + \frac{1}{2} \overline{AB} = B + \frac{1}{2} \overline{BA}$$