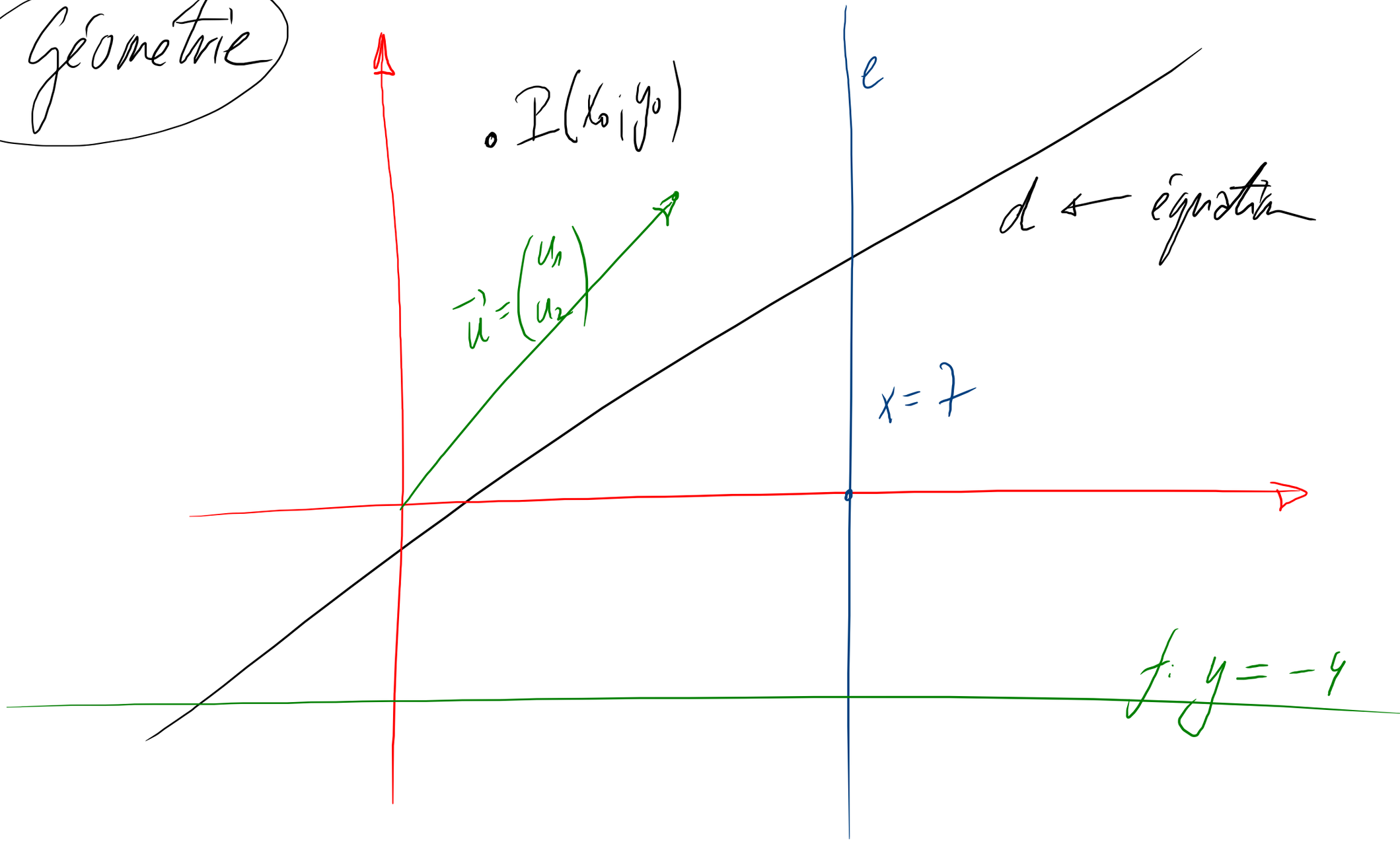
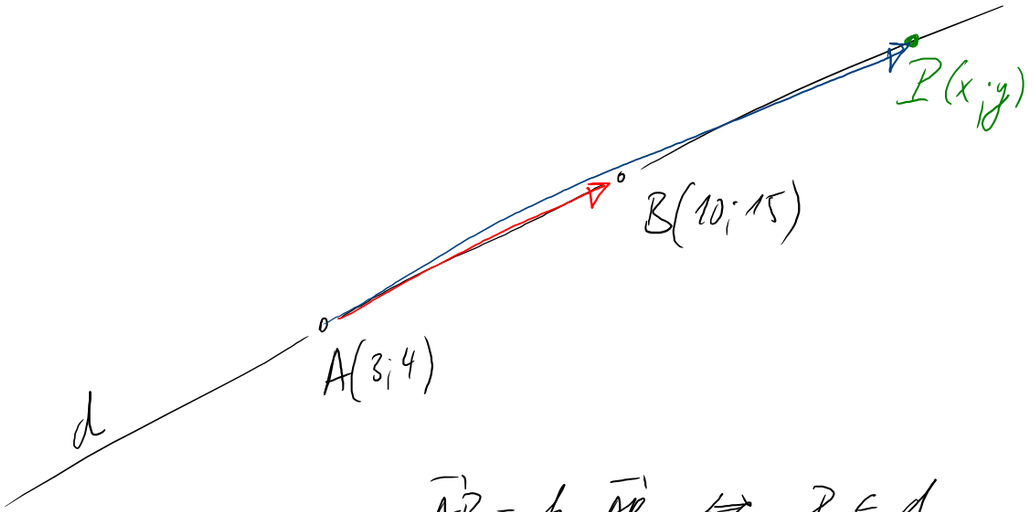
Géométrie


P(x₀ ; y₀)
e
d ← équation
$\vec{u} = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix}$
x = 7
f : y = -4



$\vec{AP} = k \cdot \vec{AB} \Leftrightarrow P \in d$

$\begin{pmatrix} x-3 \\ y-4 \end{pmatrix} = k \begin{pmatrix} 7 \\ 11 \end{pmatrix}$

parametrické

$\begin{cases} x-3 = 7k \\ y-4 = 11k \end{cases}$

$x = 3 + 7k$

$y = 4 + 11k$

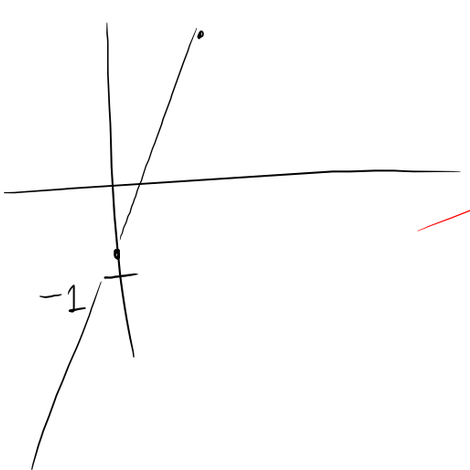
$\frac{x-3}{7} = \frac{y-4}{11}$

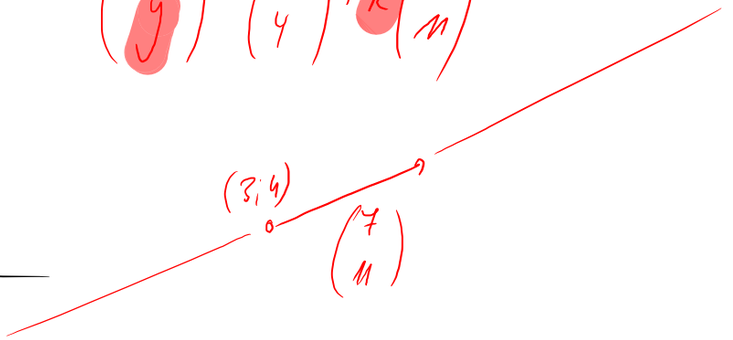
$11x - 33 = 7y - 28$

$11x - 7y - 5 = 0$

$y = \frac{11}{7}x - \frac{5}{7}$

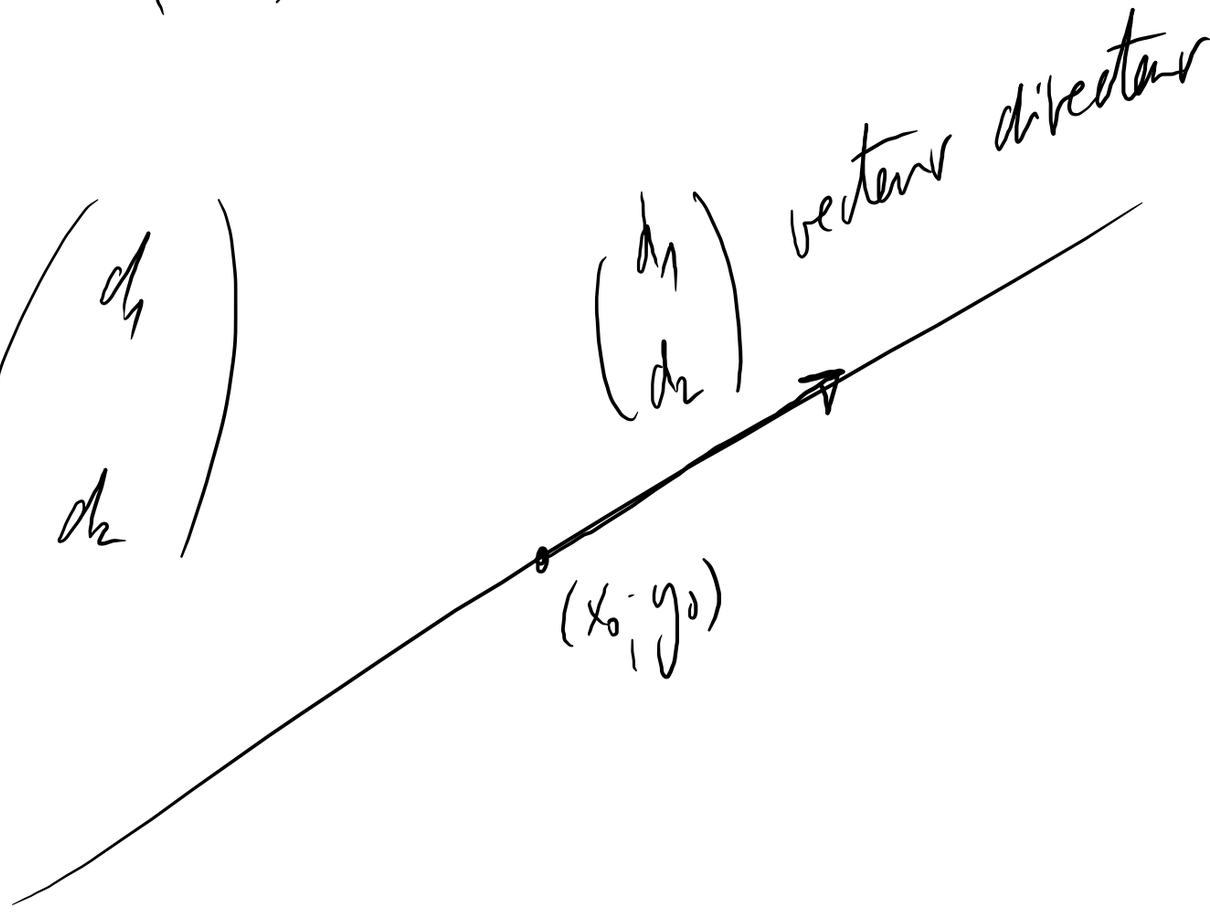
$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} + k \begin{pmatrix} 7 \\ 11 \end{pmatrix}$





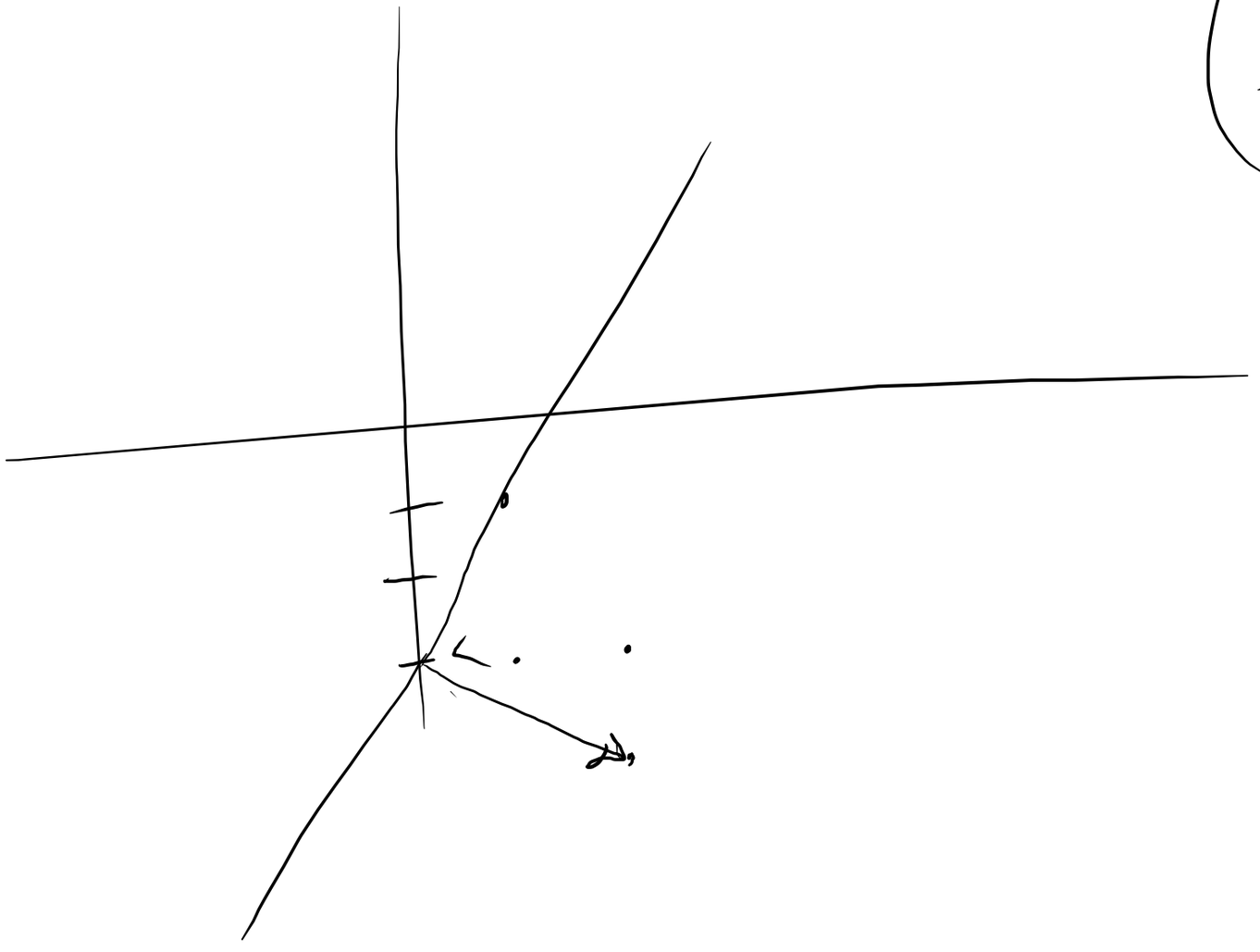
$d: \; ax + by + c = 0$ $\qquad \begin{pmatrix} a \\ b \end{pmatrix} \perp d$

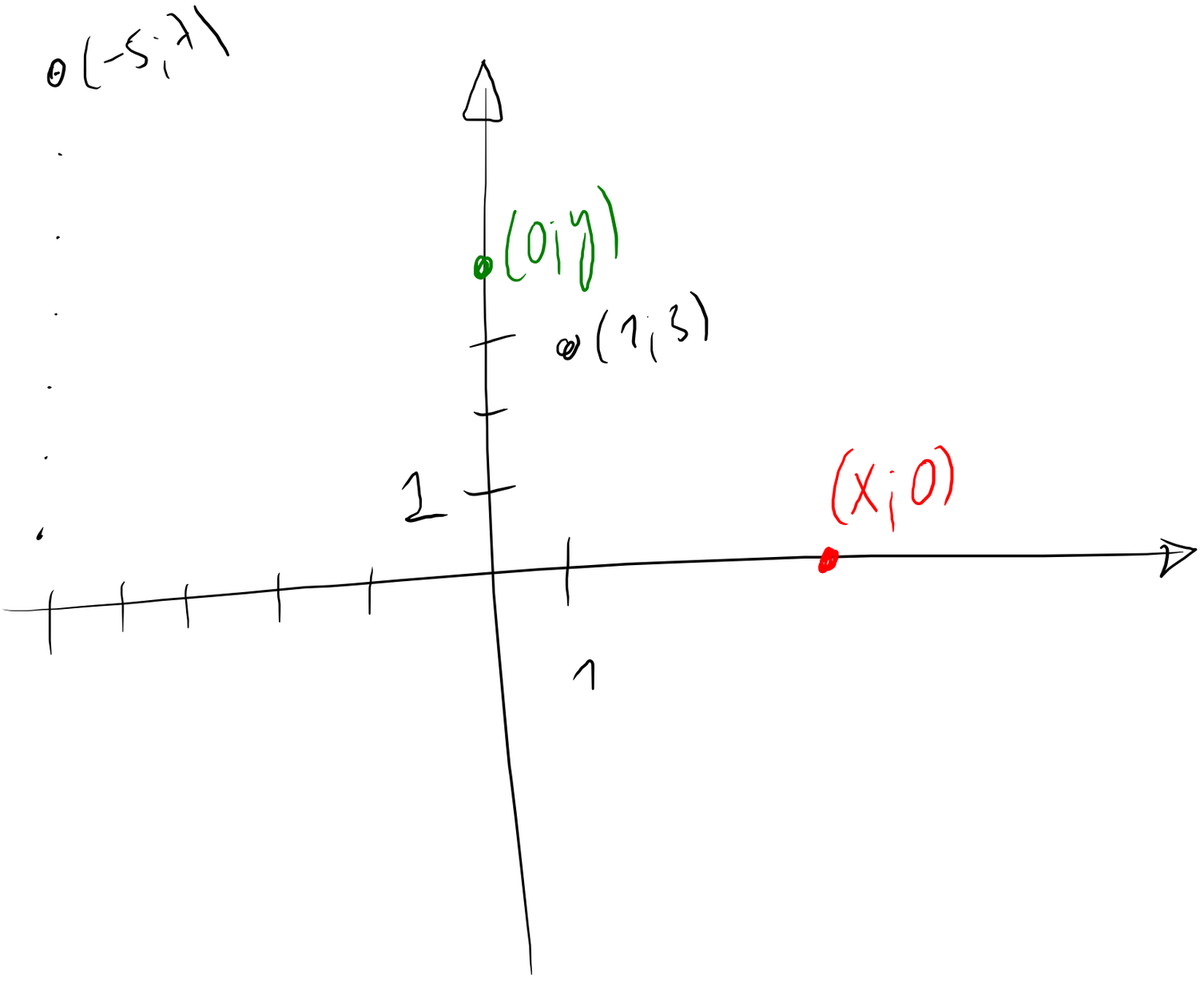
$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} x_0 \\ y_0 \end{pmatrix} + k \begin{pmatrix} d_1 \\ d_2 \end{pmatrix}$$



$$y = 2x - 3 \iff 2x - y - 3 = 0$$

$$\begin{pmatrix} 2 \\ -1 \end{pmatrix}$$



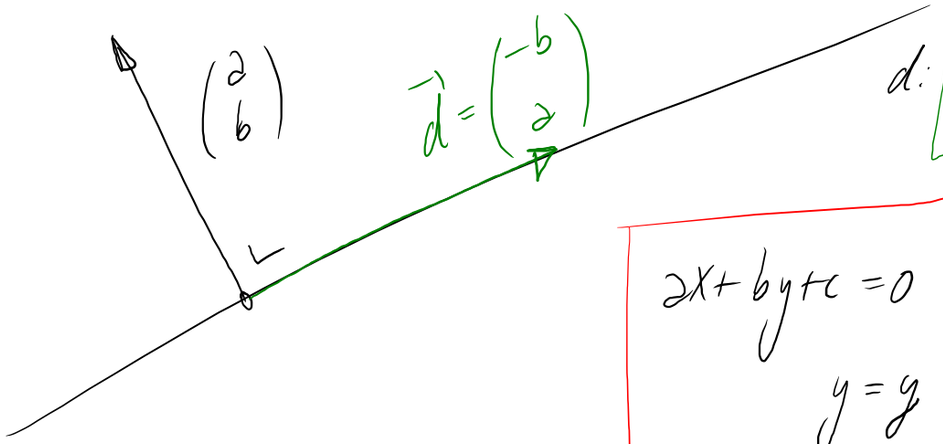

(-5;7)
(0;y)
(1;3)
1
(x;0)
1

$$\frac{x-1}{-5} = \frac{y-2}{3}$$

$$3x-3 = -5y+10$$

$$\boxed{3x+5y-13=0}$$

$$\begin{pmatrix} a \\ b \end{pmatrix} \cdot \begin{pmatrix} -b \\ a \end{pmatrix} = -ab + ab = 0$$



$d: \boxed{ax + by + c = 0}$

$a \neq 0$

$$\boxed{\begin{cases} x = y \\ y = y \end{cases}}$$

$$\boxed{\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -c/a \\ 0 \end{pmatrix} + k \begin{pmatrix} -b/a \\ 1 \end{pmatrix} = \begin{pmatrix} -c/a \\ 0 \end{pmatrix} + k \begin{pmatrix} -b \\ a \end{pmatrix}}$$

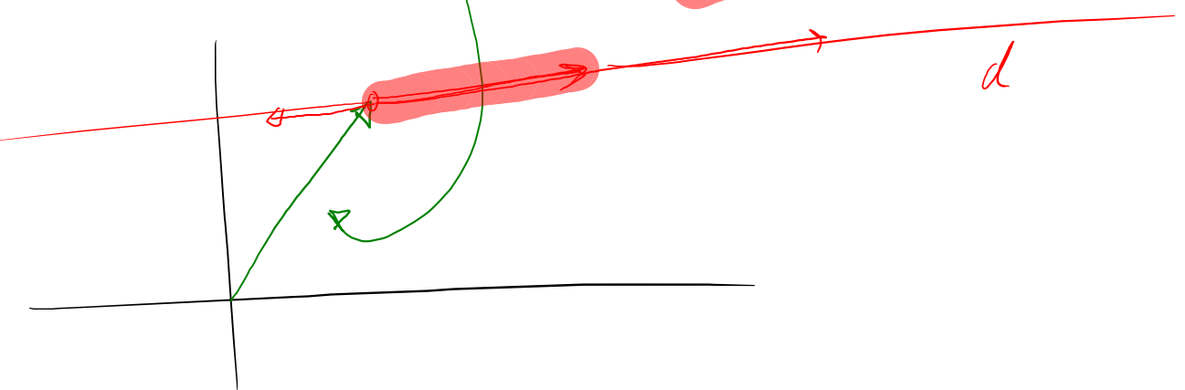
$$x = -\frac{b}{a}y - \frac{c}{a}$$

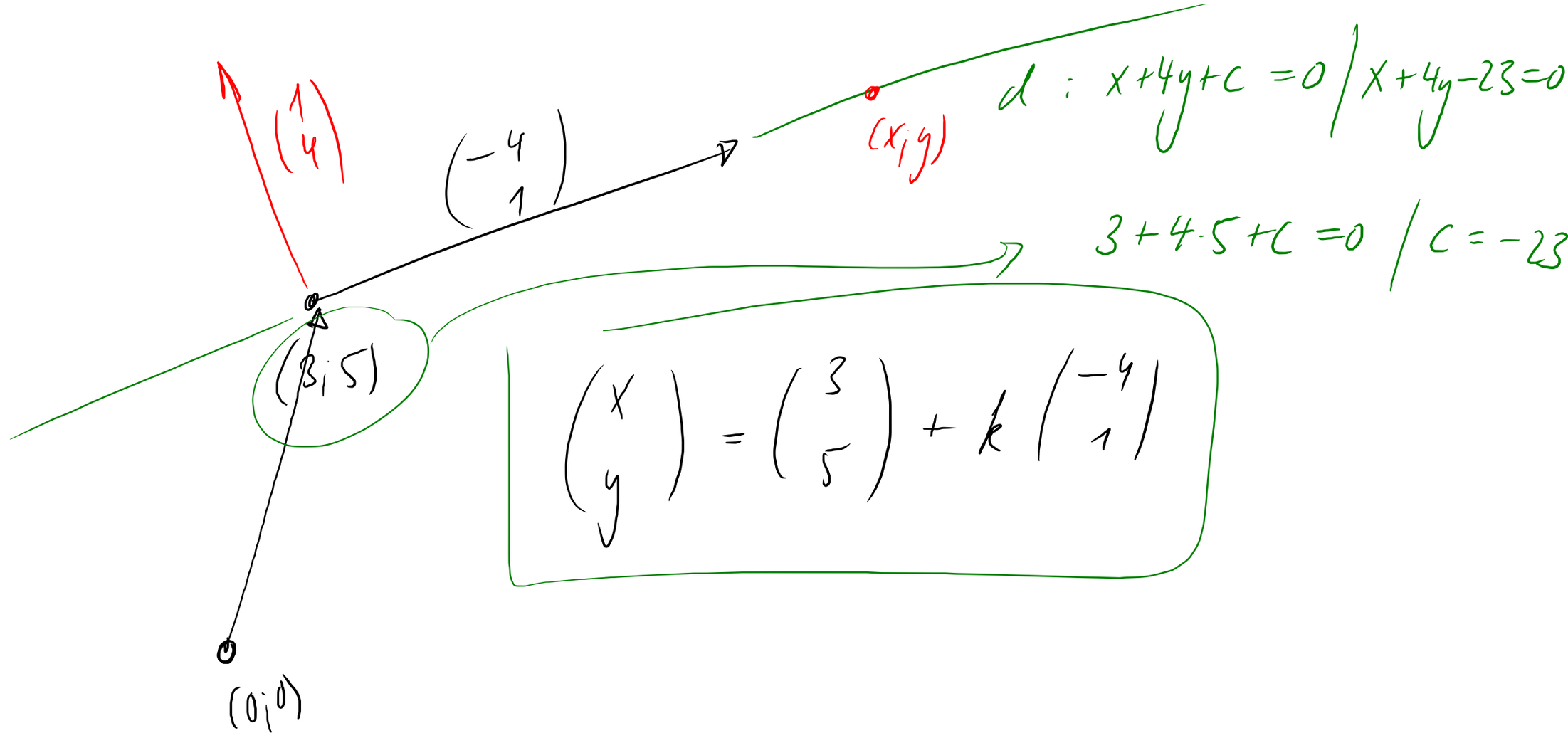
$$y = y + 0$$

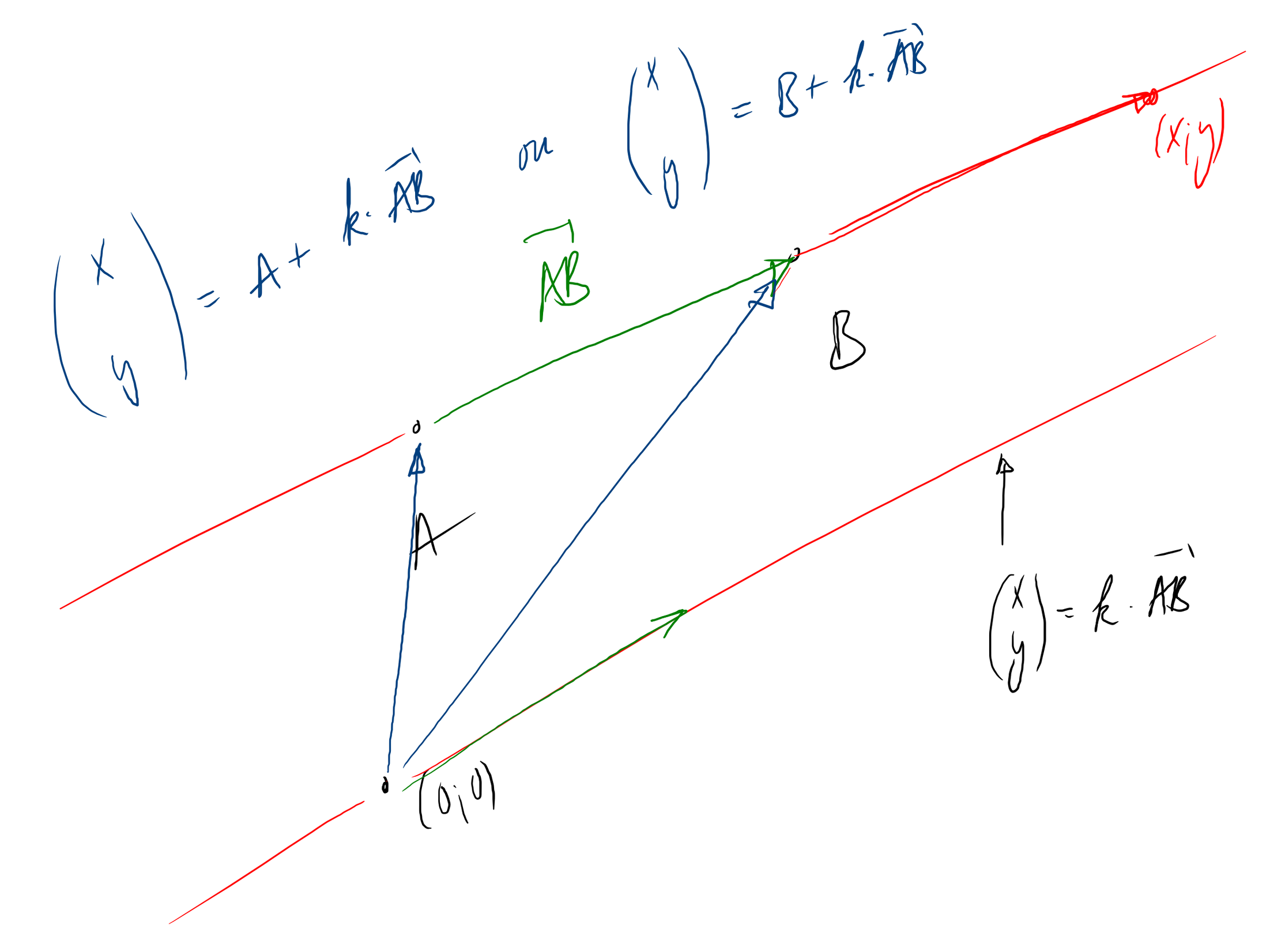
$$\begin{pmatrix} x \\ y \end{pmatrix} = \underbrace{\begin{pmatrix} -c/a \\ 0 \end{pmatrix}}_{\text{point}} + y \underbrace{\begin{pmatrix} -b/a \\ 1 \end{pmatrix}}_{\text{vecteur directeur}}$$

$$\begin{pmatrix} -b \\ a \end{pmatrix} = \vec{d}$$

$$\Rightarrow \vec{n} = \begin{pmatrix} a \\ b \end{pmatrix}$$

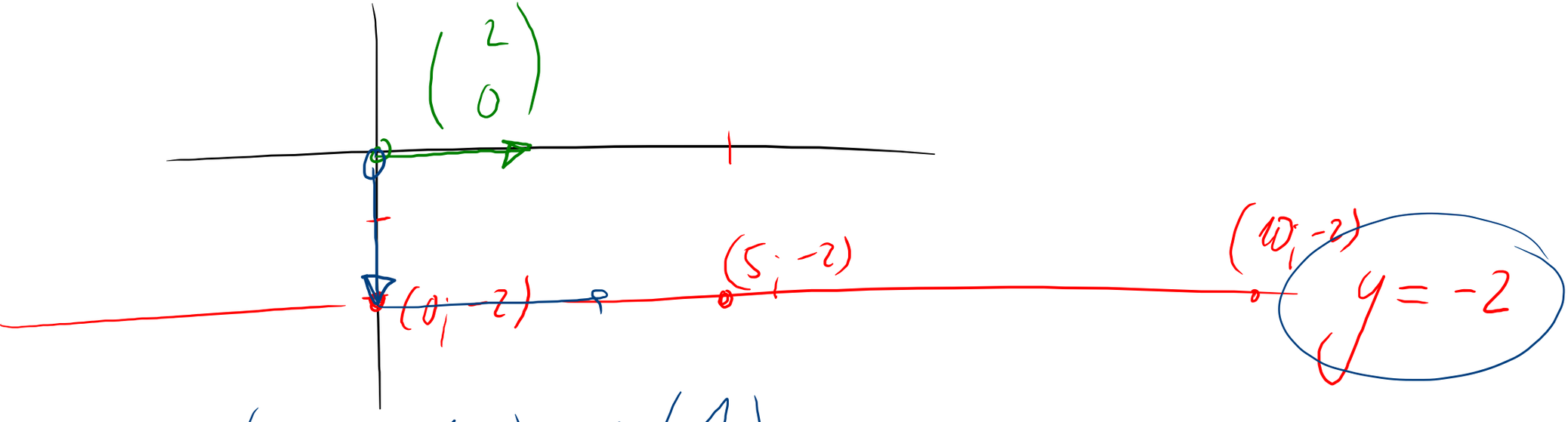



$\begin{pmatrix} 1 \\ 4 \end{pmatrix}$
$\begin{pmatrix} -4 \\ 1 \end{pmatrix}$
$(x;y)$
$d: x+4y+c=0 \,/\, x+4y-23=0$
$3+4\cdot 5+c=0 \,/\, c=-23$
$(3;5)$
$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 5 \end{pmatrix} + k \begin{pmatrix} -4 \\ 1 \end{pmatrix}$
$(0;0)$

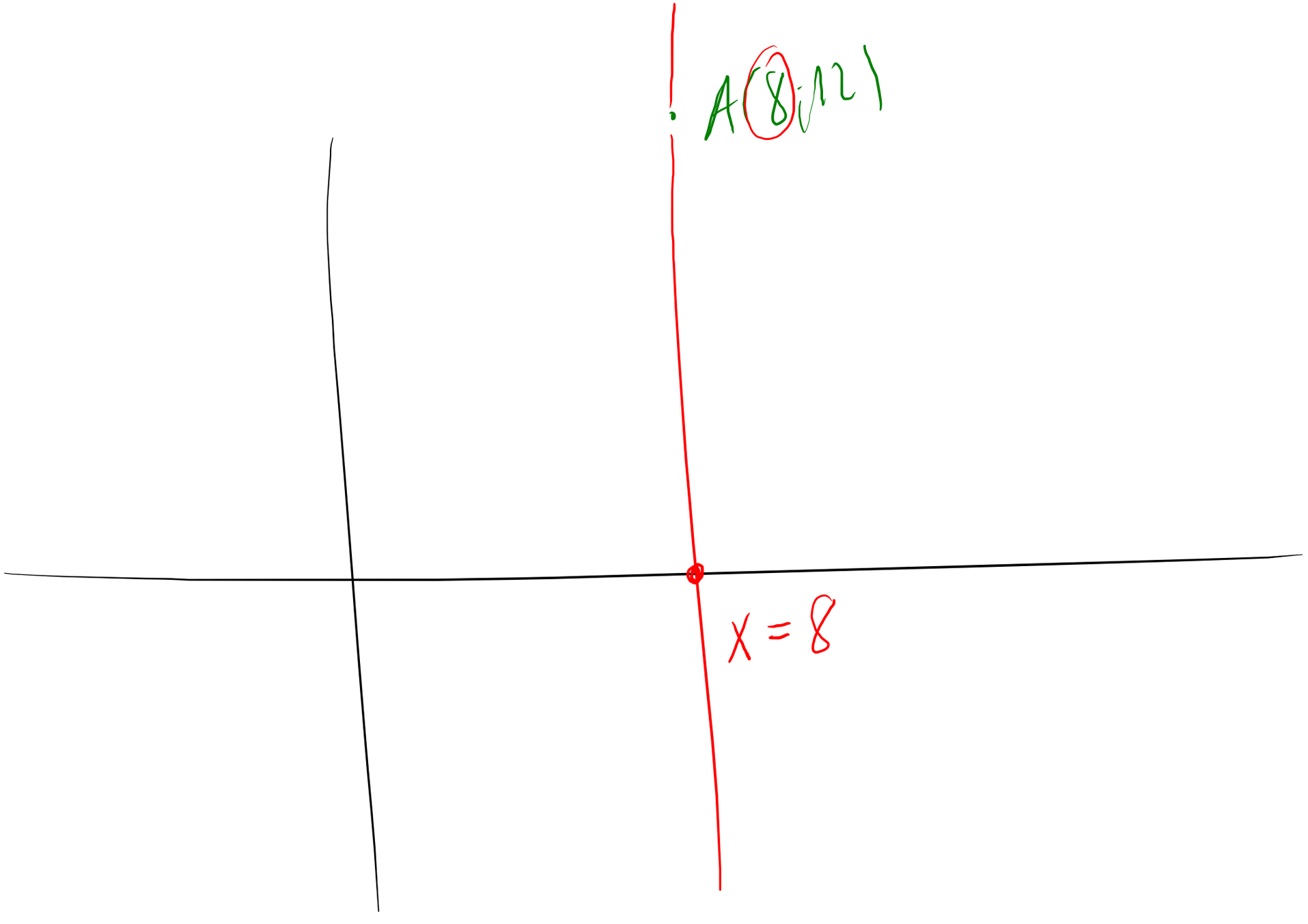

$\begin{pmatrix} x \\ y \end{pmatrix} = A + k \cdot \overrightarrow{AB}$
ou
$\begin{pmatrix} x \\ y \end{pmatrix} = B + k \cdot \overrightarrow{AB}$
$\overrightarrow{AB}$
(x ; y)
B
A
(0 ; 0)
$\begin{pmatrix} x \\ y \end{pmatrix} = k \cdot \overrightarrow{AB}$

$$ax + by + c = 0 \quad \Leftrightarrow \quad y = -\frac{a}{b}x - \frac{c}{b}$$

horizontale $\Rightarrow \quad -\frac{a}{b} = 0 \quad \Rightarrow \quad a = 0 \quad \Rightarrow \quad y = -\frac{c}{b}$



$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0 \\ -2 \end{pmatrix} + k \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$


A(8;12)
x = 8

$x = -\frac{3}{7}y$

$y = 7$

$x = -3$

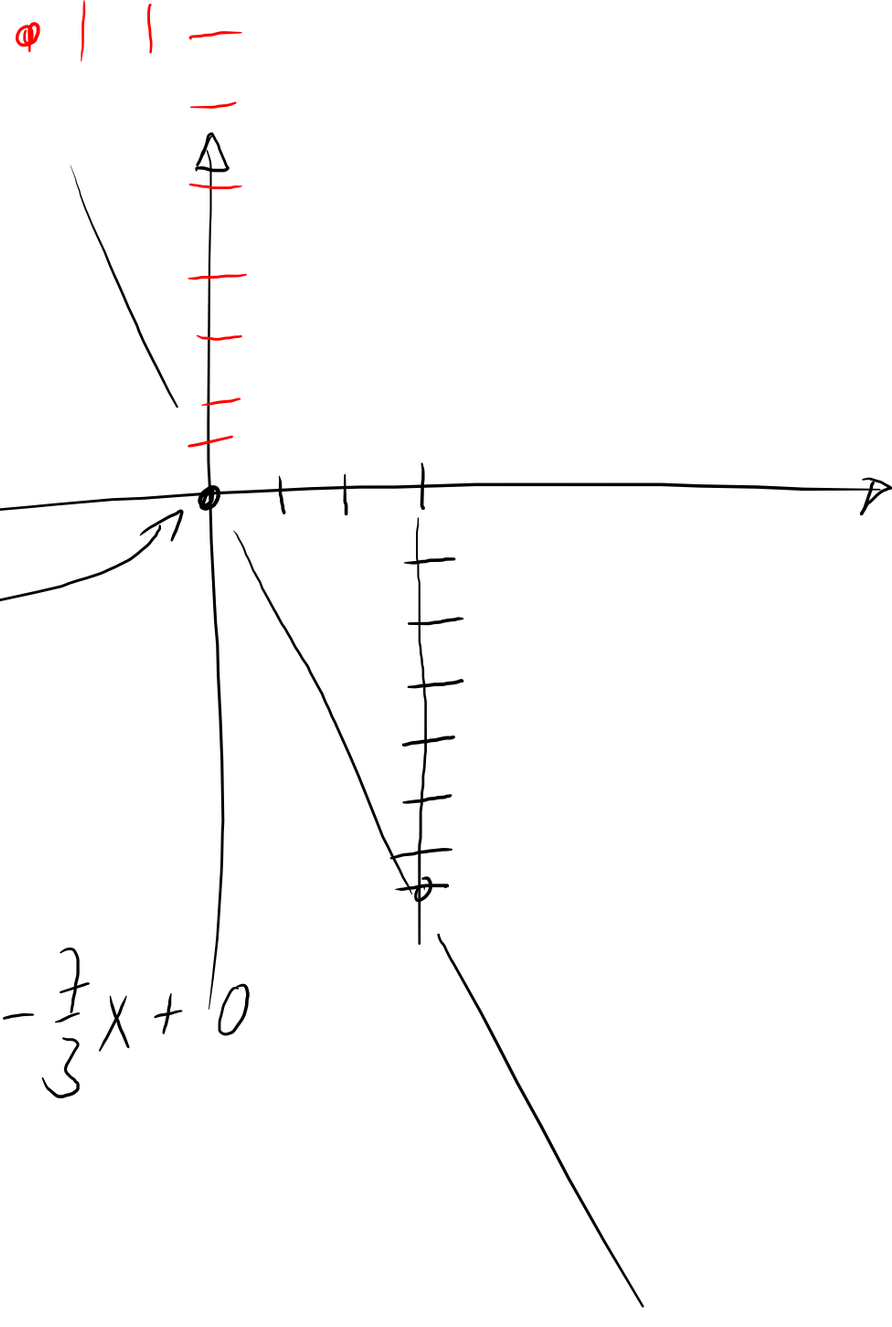
$7x + 3y = 0$

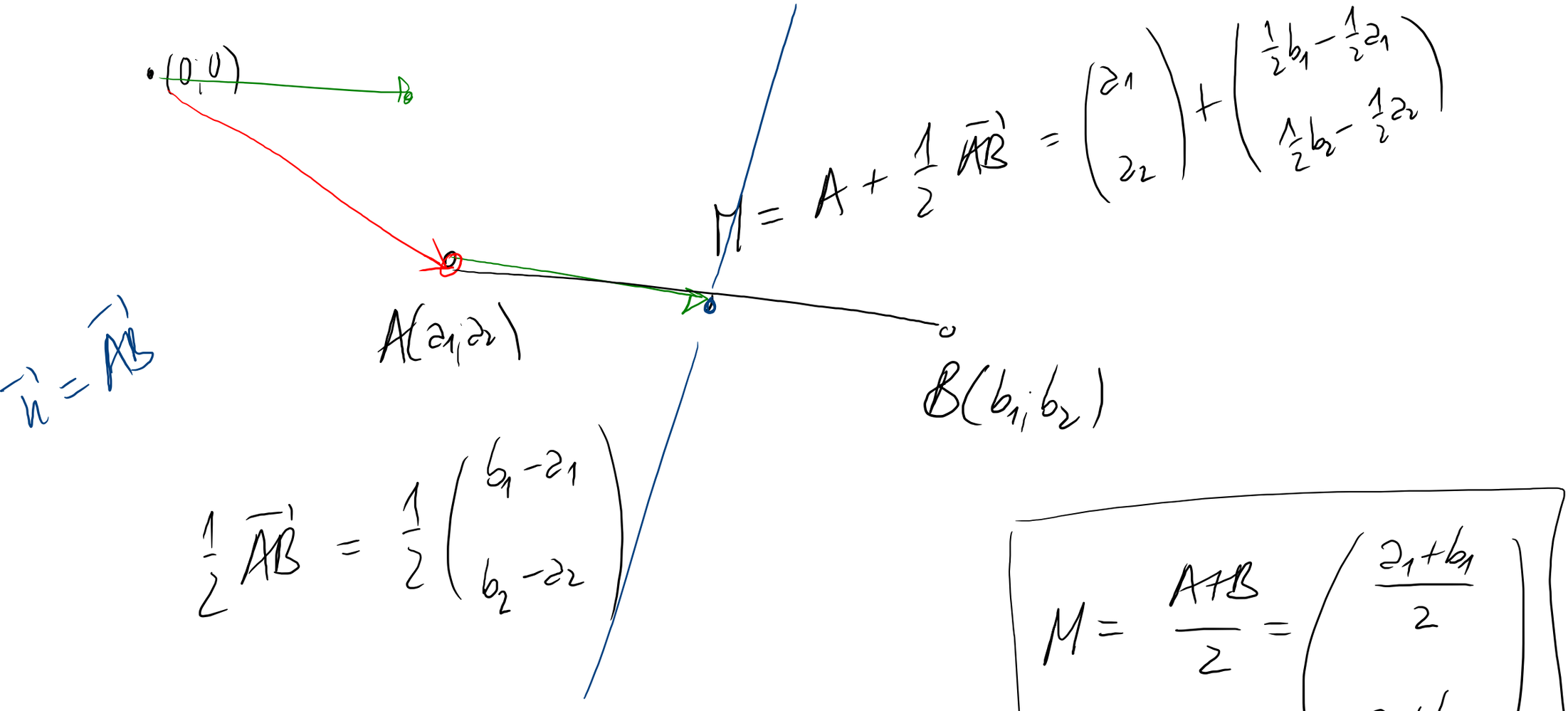
$x = 0 \Rightarrow y = 0$

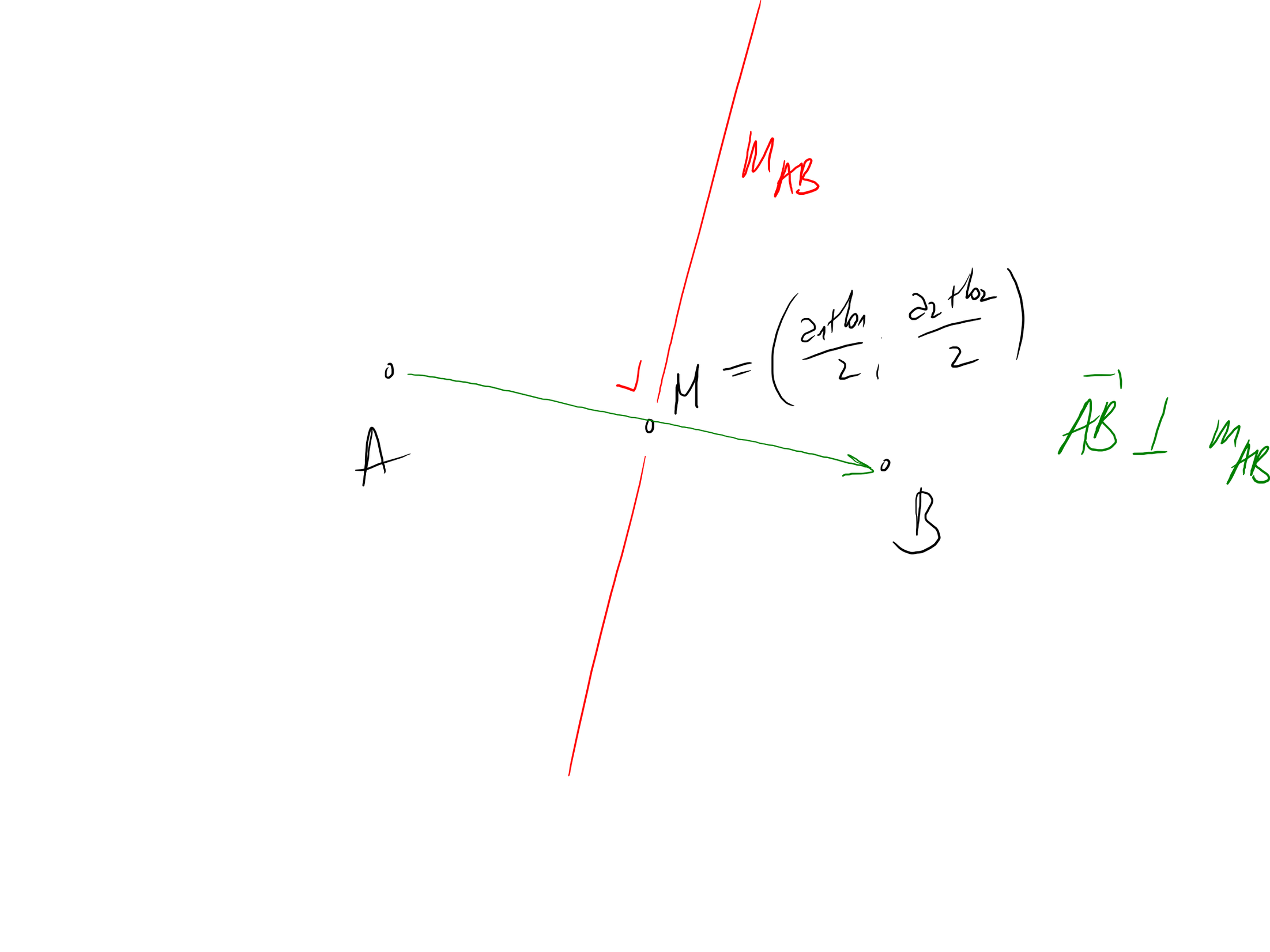
$y = 0 \Rightarrow x = 0$

$3y = -7x + 0 \quad / : 3$

$y = -\frac{7}{3}x + 0$




(0,0)
A(a1,a2)
B(b1,b2)
M = A + 1/2 AB = (a1, a2) + (1/2 b1 − 1/2 a1, 1/2 b2 − 1/2 a2)
u = AB
1/2 AB = 1/2 (b1 − a1, b2 − a2)
M = (A+B)/2 = ((a1+b1)/2, (a2+b2)/2)


m_{AB}
$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$
$\overline{AB} \perp m_{AB}$
A
B
M

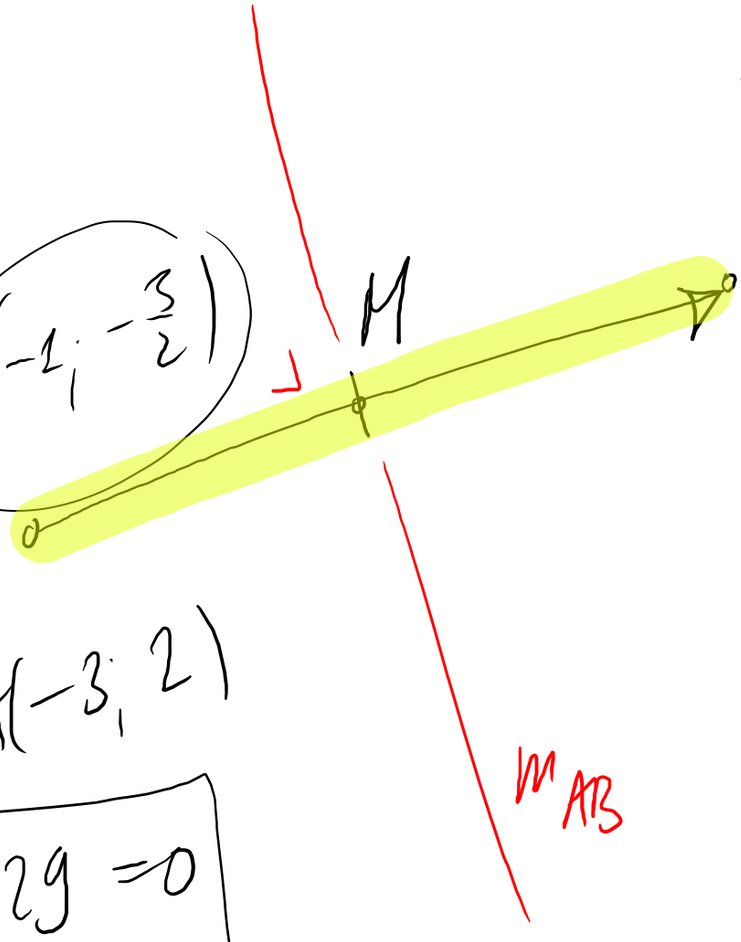
M est le milieu de AB.

$M = \left(\frac{a_1+b_1}{2}; \frac{a_2+b_2}{2}\right)$

$= \left(\frac{-2}{2}; \frac{-3}{2}\right) = \left(-1; -\frac{3}{2}\right)$

$A(-3; 2)$

$B(1; -5)$



médiatrice

$M \in m_{AB}$

$\vec{n} = \overrightarrow{AB} = \begin{pmatrix} -4 \\ -7 \end{pmatrix} \sim \begin{pmatrix} 4 \\ 7 \end{pmatrix}$

$4x + 7y + k = 0$

$-4 - \frac{21}{2} + k = 0$

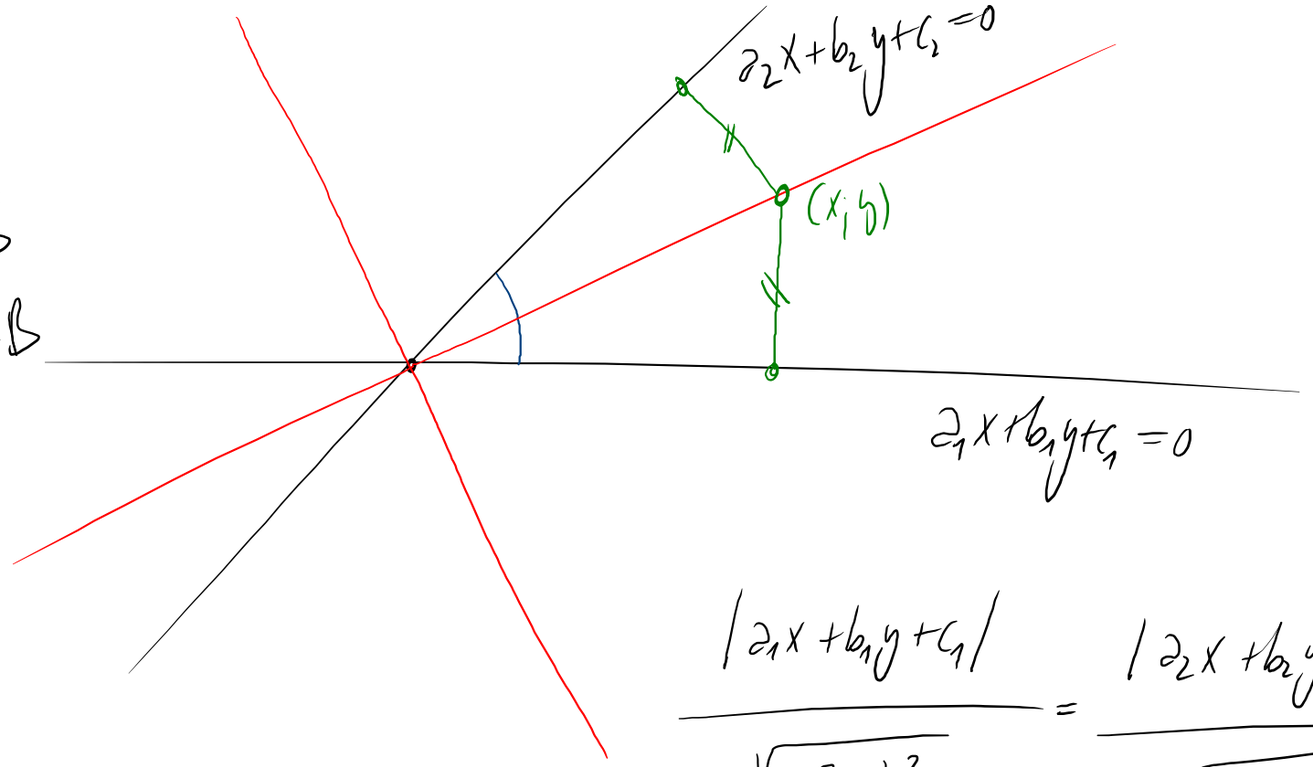
$k = -\frac{29}{2}$

$m_{AB}: \quad 8x + 14y - 29 = 0$

$|A| = |B|$

$\Leftrightarrow A = \pm B$

$\Leftrightarrow \pm A = B$



$$\frac{|a_1x+b_1y+c_1|}{\sqrt{a_1^2+b_1^2}} = \frac{|a_2x+b_2y+c_2|}{\sqrt{a_2^2+b_2^2}}$$

bissₙ

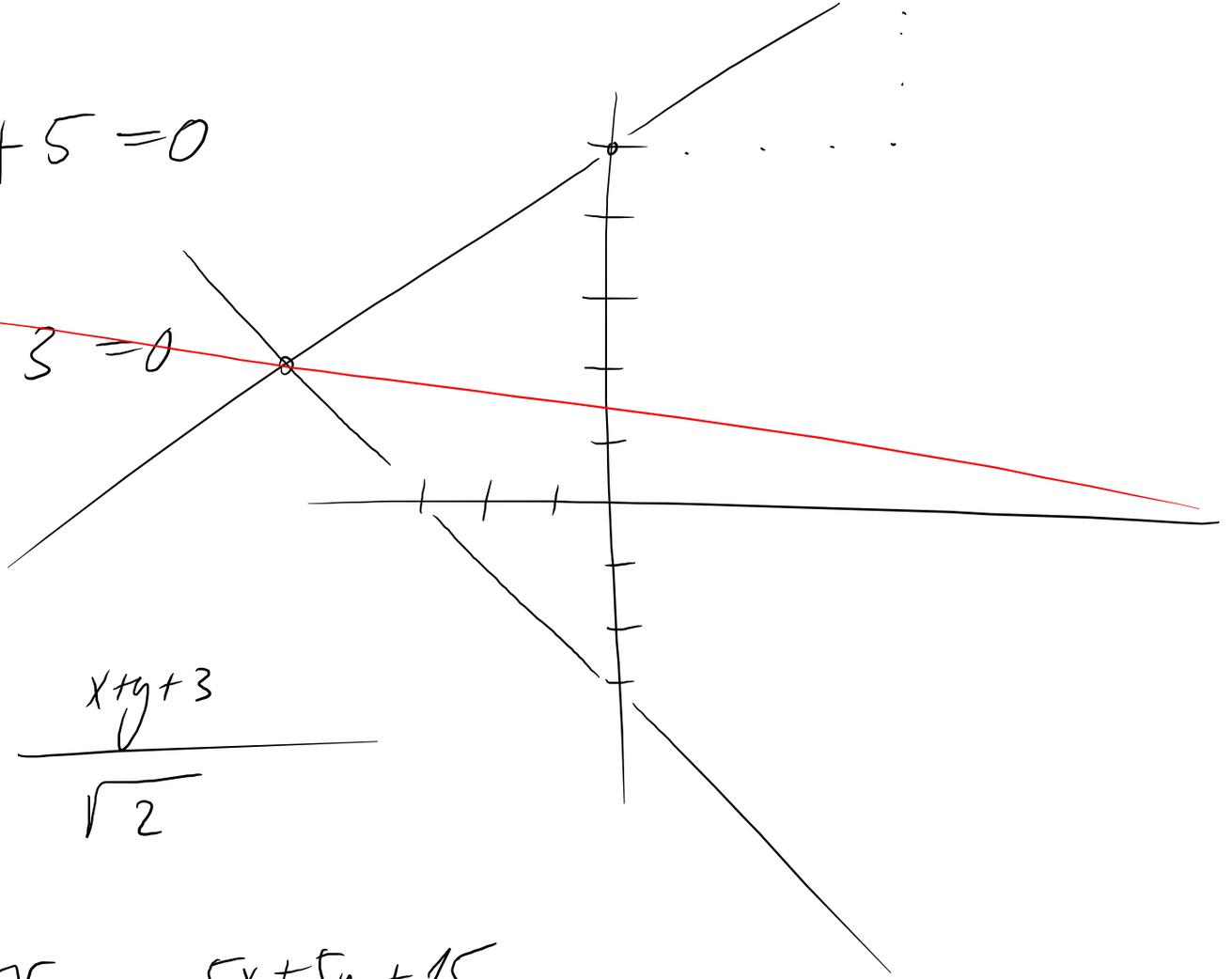
$$\frac{a_1x+b_1y+c_1}{\sqrt{a_1^2+b_1^2}} = \frac{a_2x+b_2y+c_2}{\sqrt{a_2^2+b_2^2}}$$

bissₙ

$$\frac{a_1x+b_1y+c_1}{\sqrt{a_1^2+b_1^2}} = -\frac{a_2x+b_2y+c_2}{\sqrt{a_2^2+b_2^2}}$$

$3x-4y+5=0$

$x+y+3=0$

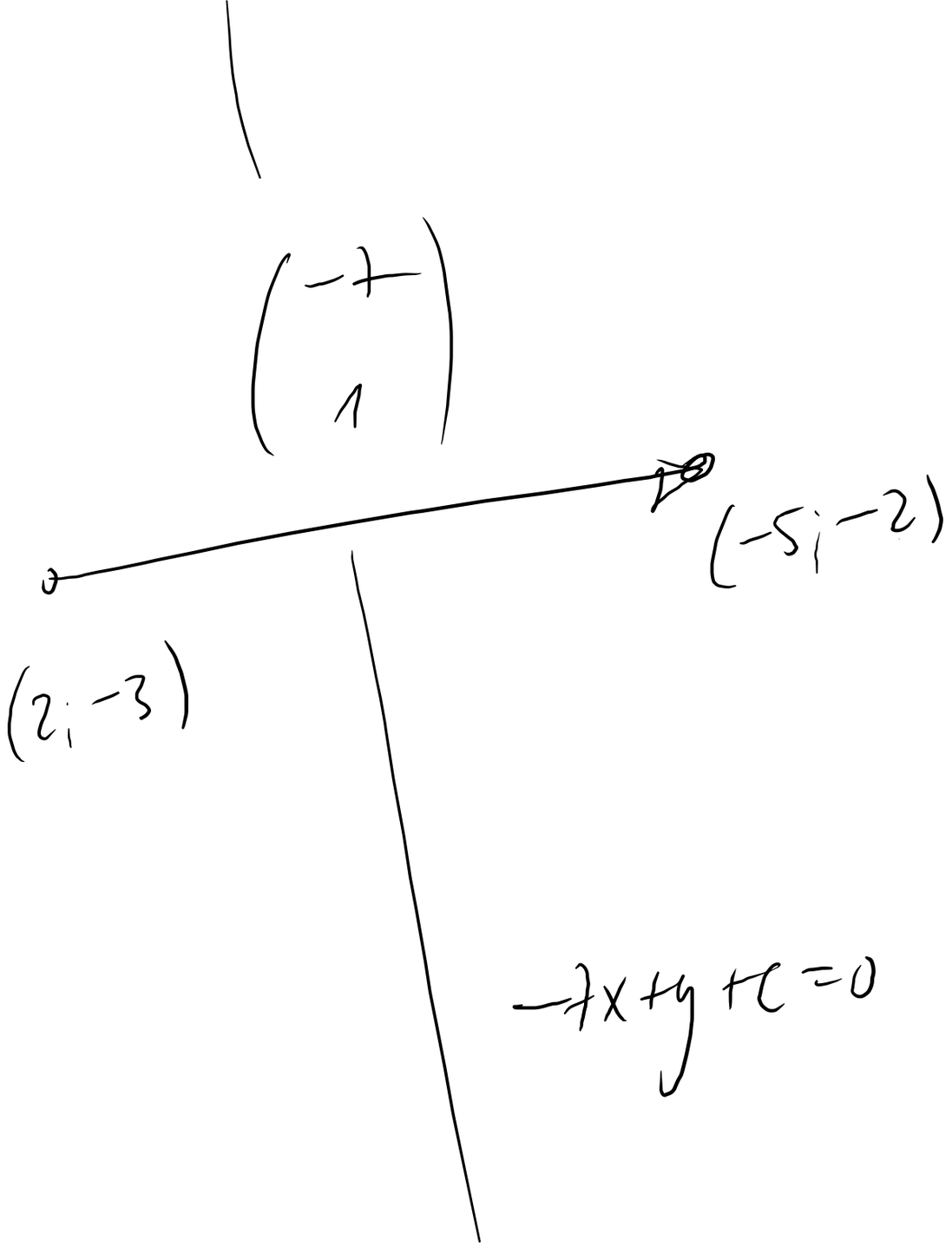


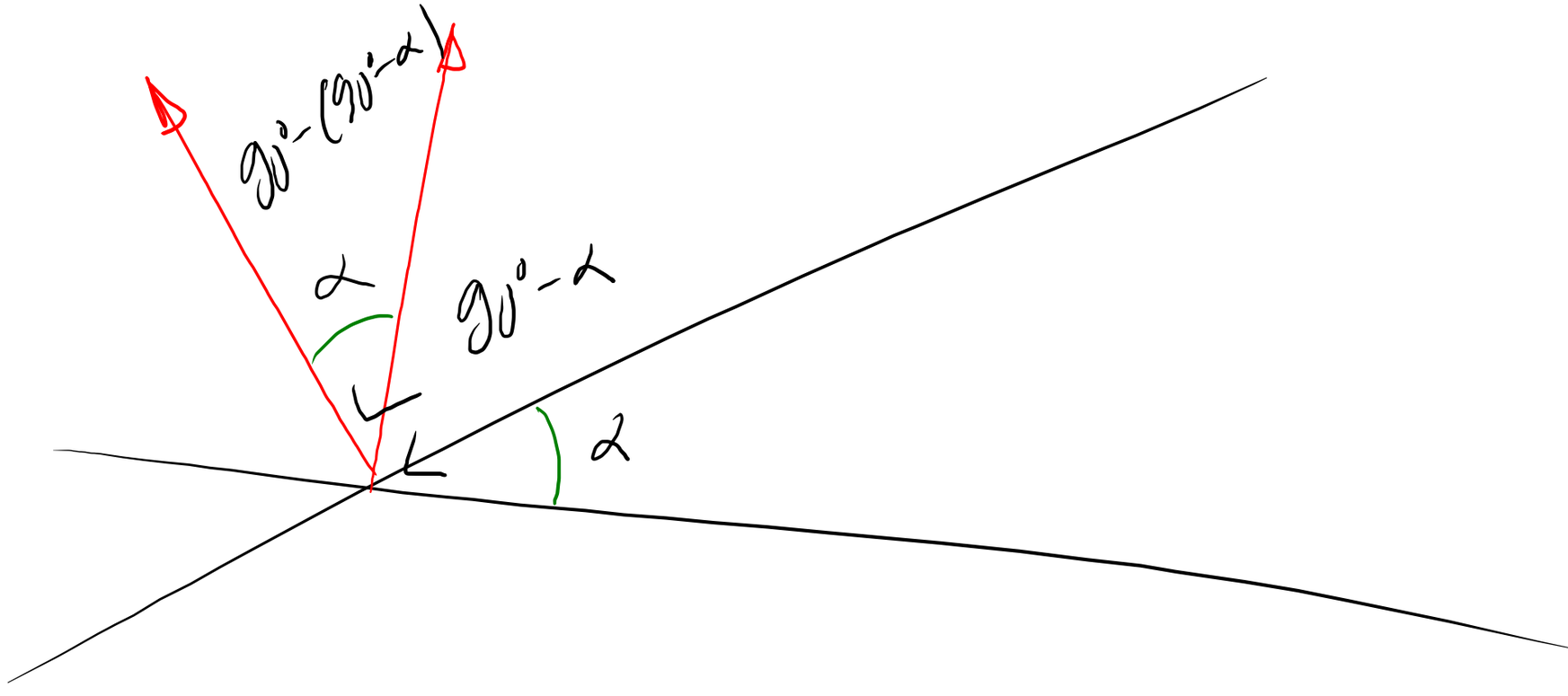
$$\frac{3x-4y+5}{\sqrt{9+16}} = \frac{x+y+3}{\sqrt{2}}$$

$$3\sqrt{2}x - 4\sqrt{2}y + 5\sqrt{2} = 5x + 5y + 15$$

$$(5-3\sqrt{2})x + (5+4\sqrt{2})y + 15 - 5\sqrt{2} = 0$$

$$+0{,}8x + 10{,}6y + 8 = 0$$


(-7
1)
(-5;-2)
(2;-3)
-7x+y+C=0


90°-(90°-α)
α
90°-α
α

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

$$\hat{n} \begin{pmatrix} 2 \\ b \end{pmatrix} \qquad \hat{d} \begin{pmatrix} -b \\ 1 \end{pmatrix}$$