

RETTA

polinomio di 1° grado.

* $A(x_A, y_A) \quad B(x_B, y_B) \quad y=f(x)$

$$\frac{x-x_A}{x_B-x_A} = \frac{y-y_A}{y_B-y_A}$$

$$(x-x_A)(y_B-y_A) = (x_B-x_A)(y-y_A)$$

$$(y_B-y_A)x + (x_A-x_B)y + y_Ax_B - y_Ax_A + y_Ax_A - x_Ay_B = 0$$

pongo: $\left. \begin{aligned} y_B-y_A &= a \\ x_A-x_B &= b \\ y_Ax_B - x_Ay_B &= c \end{aligned} \right\} \Rightarrow$

$$ax+by+c=0$$

equazione della retta in forma implicita.

* $ax+by+c=0$

$$by = -ax - c$$

$$b \neq 0$$

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

pongo $-\frac{a}{b} = m \quad -\frac{c}{b} = q$

$y = mx + q$
coefficiente angolare $(-\frac{a}{b})$ quota $(-\frac{c}{b})$

$$y = mx + q$$

equazione retta in forma esplicita.

Esempi

1) Scrivere eq. retta dati m e q :

Utilizzo la forma esplicita.

2) Scrivere retta passante per A, B :

Utilizzo la forma implicita.

3) Scrivere eq. retta // ad una retta data e passante per A :

Utilizzo forma esplicita

ES

$$r: 2x+3y-7=0$$

$$P(1; 3)$$

Scrivere eq. retta s // r e passante per P :

$$m_r = m_s$$

$$m_r = -\frac{2}{3}$$

$$m_s = -\frac{2}{3}$$

$$3y = -2x + 7 \quad y = -\frac{2}{3}x + \frac{7}{3}$$

$$s: y = m_s x + q$$

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

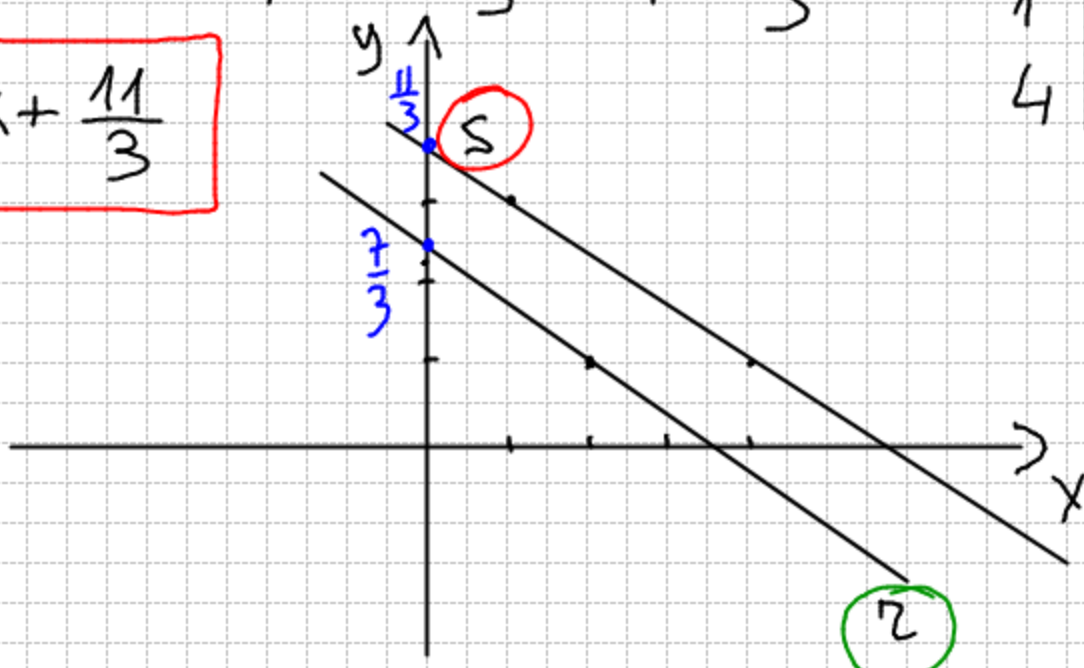
$$3 = -\frac{2}{3}(1) + q$$

$$q = 3 + \frac{2}{3}$$

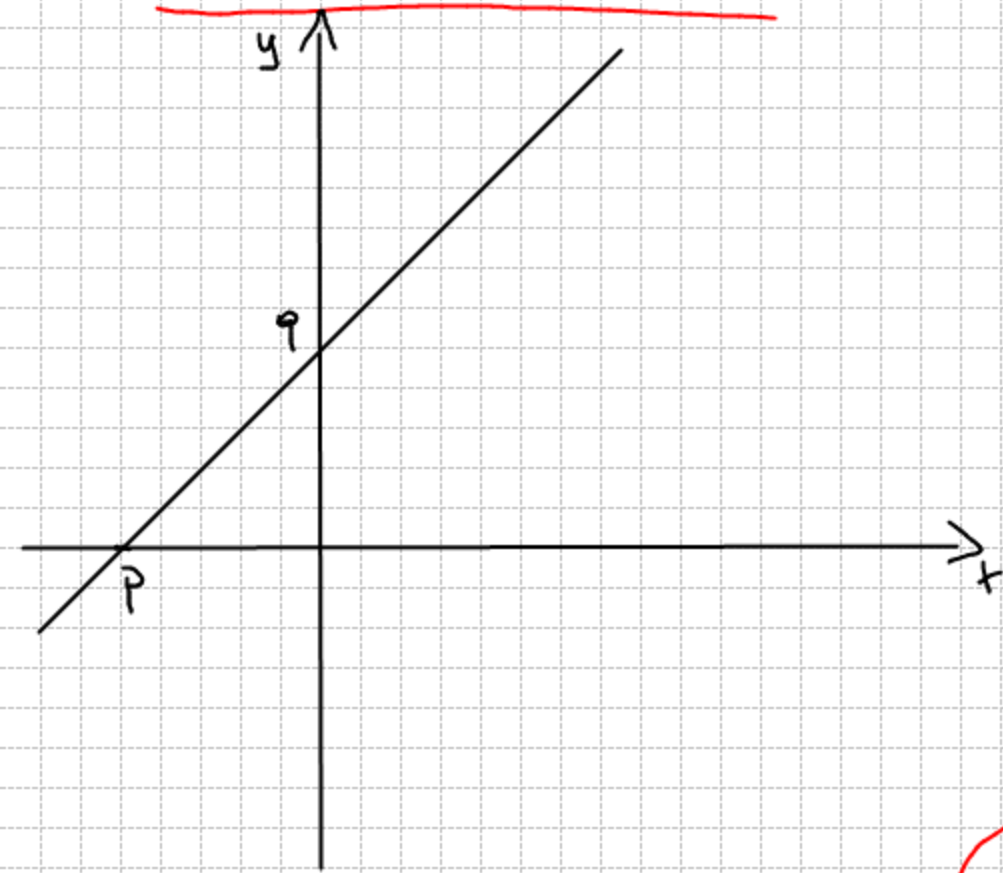
$$q = \frac{11}{3}$$

$$y = -\frac{2}{3}x + \frac{11}{3}$$

x	y
2	1
0	$\frac{7}{3}$
1	3
4	1



FORMA SEGMENTARIA



$$A(p; 0)$$

$$B(0; q)$$

$$\frac{x - x_A}{x_B - x_A} = \frac{y - y_A}{y_B - y_A}$$

$$\frac{x - p}{0 - p} = \frac{y - 0}{q - 0}$$

$$\frac{x - p}{-p} = \frac{y}{q}$$

$$\frac{-x}{p} + \frac{-p}{-p} = \frac{y}{q}$$

$$\frac{x}{p} + \frac{y}{q} = 1$$

equazione
segmentaria
della retta.

ESEMPIO

Scrivere la retta $3x + 2y - 7 = 0$ in forma segmentaria.

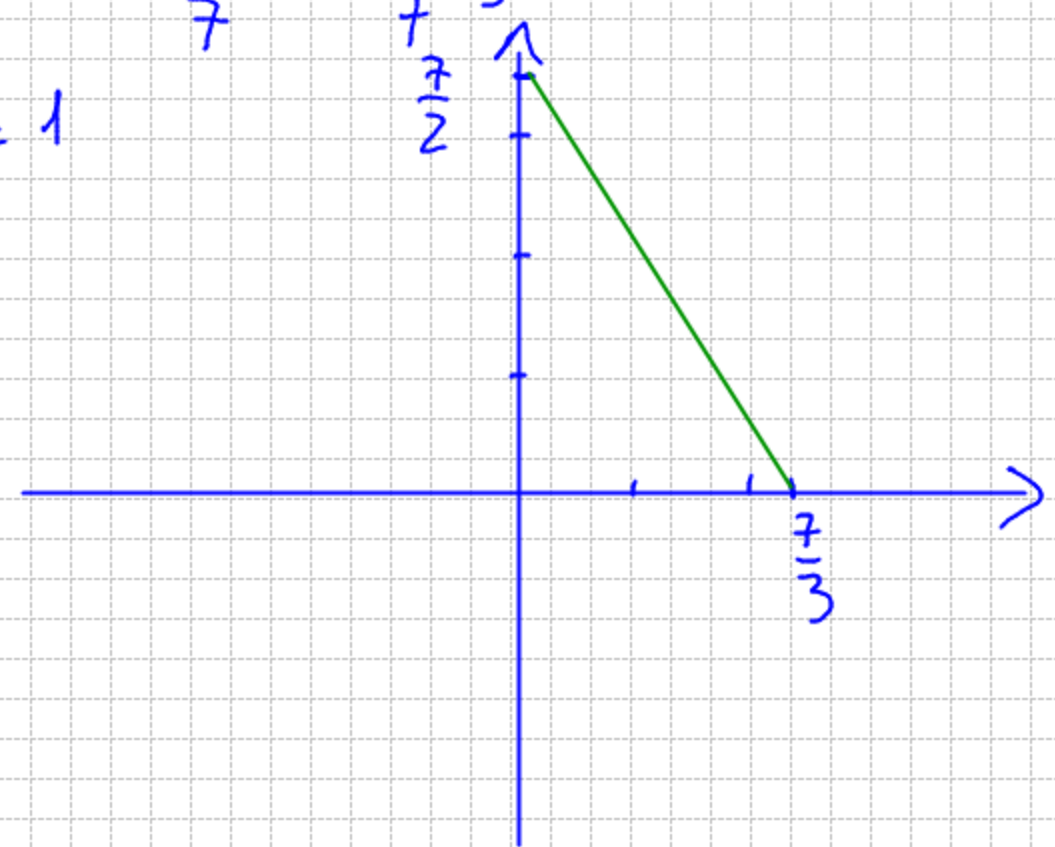
$$3x + 2y = 7$$

$$\frac{3x}{7} + \frac{2y}{7} = 1$$

$$\frac{x}{\frac{7}{3}} + \frac{y}{\frac{7}{2}} = 1$$

$$A\left(\frac{7}{3}; 0\right)$$

$$B\left(0; \frac{7}{2}\right)$$



RETTE

$$\frac{x-x_A}{x_B-x_A} = \frac{y-y_A}{y_B-y_A}$$

$$(y_B - y_A)x + (x_A - x_B)y + y_A x_B - x_A y_B = 0$$

$$\frac{(x_A - x_B)y}{x_A - x_B} = \frac{(y_A - y_B)x + x_A y_B - y_A x_B}{x_A - x_B}$$

$$y = \frac{y_A - y_B}{x_A - x_B} x + \frac{x_A y_B - y_A x_B}{x_A - x_B}$$

$$\rightarrow y = mx + q$$

$$ax + by + c = 0$$

$$by = -ax - c$$

$$b \neq 0 \quad y = -\frac{a}{b}x - \frac{c}{b}$$

Esempio:

m_{AB}

Scrivere il coefficiente angolare di una retta passante per $A(x_A, y_A)$ e $B(x_B, y_B)$:

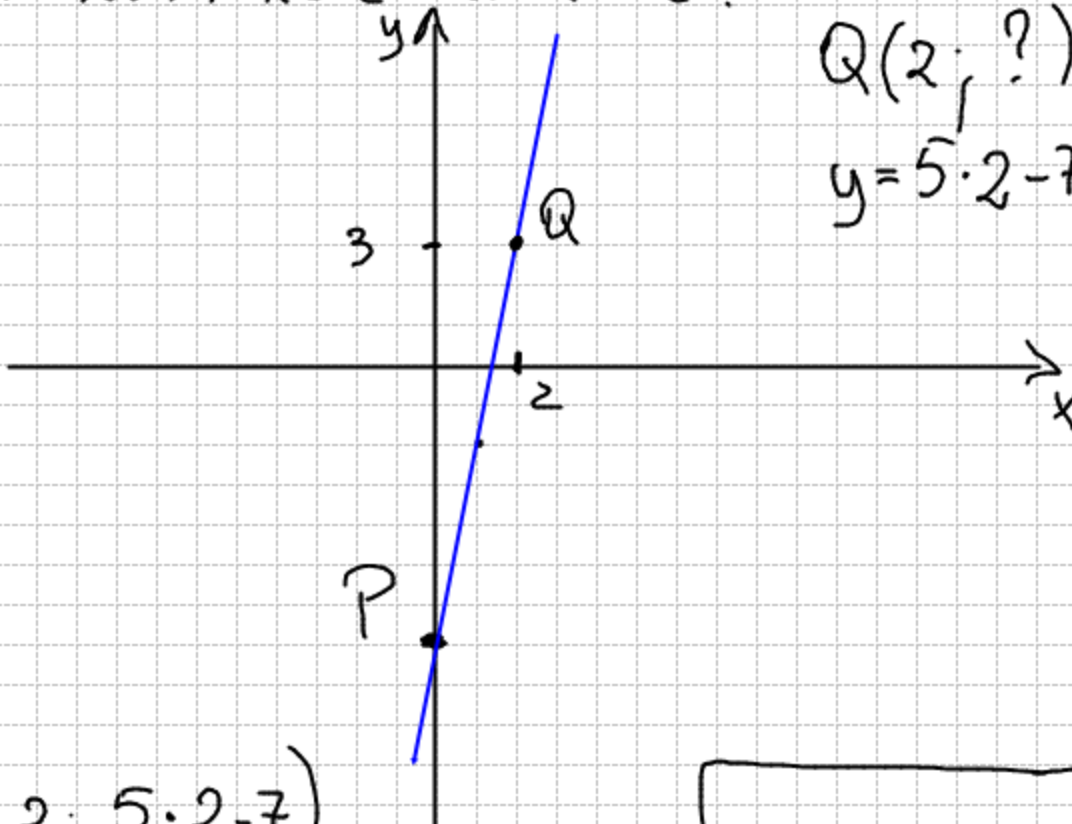
$$m_{AB} = \frac{y_A - y_B}{x_A - x_B}$$

$$\left[m_{AB} = \frac{y_B - y_A}{x_B - x_A} \right]$$

ESEMPIO

Data la retta $r: y = 5x - 7$ e il punto $P \in r$ $P(0; -7)$

Trovare a quale distanza si trova da P il punto Q di ascissa $x = 2$ con $Q \in r$.



$$Q(2; ?) \in r \quad r: y = 5x - 7$$
$$y = 5 \cdot 2 - 7 = 3$$

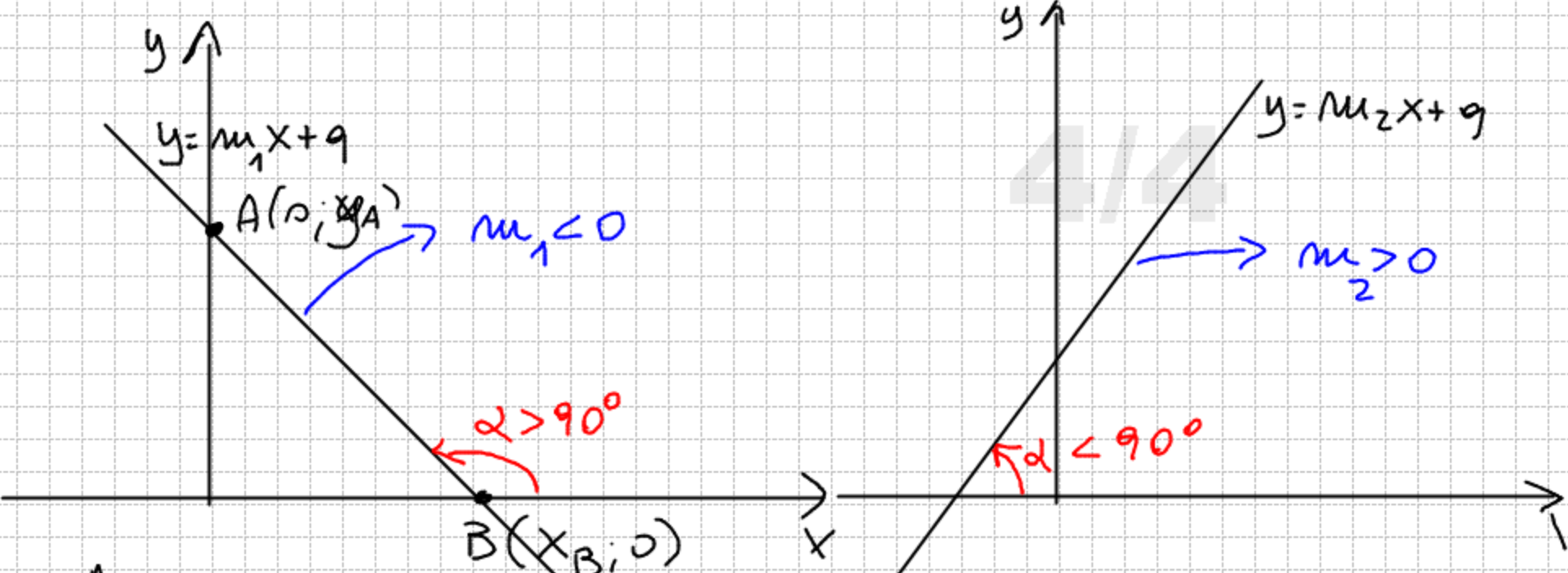
r	
x	y
0	-7
1	-2

$$Q(2; 5 \cdot 2 - 7)$$

$$Q(2; 3)$$

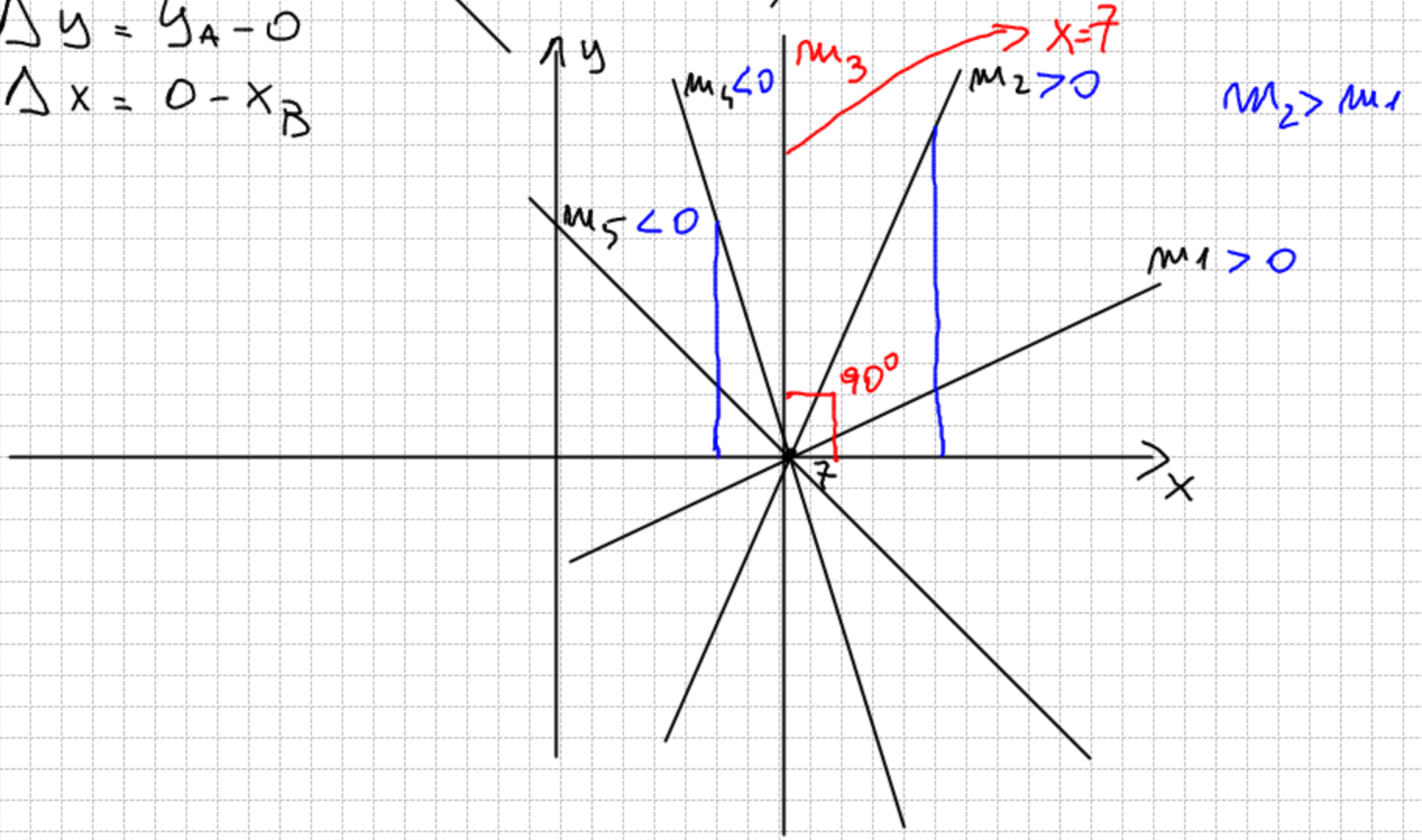
$$PQ = \sqrt{(x_P - x_Q)^2 + (y_P - y_Q)^2} = \sqrt{4 + 100} = \sqrt{104}$$

1



$$\Delta y = y_A - 0$$

$$\Delta x = 0 - x_B$$



$$\left. \begin{array}{l} y = mx + q \\ ax + by + c = 0 \end{array} \right\} \Rightarrow \begin{array}{l} m = 0 \Leftrightarrow y = q \\ m \neq 0 \Leftrightarrow y = mx + q \\ a = 0, b \neq 0 \Rightarrow y = -\frac{c}{b} \\ b = 0, a \neq 0 \Rightarrow x = -\frac{c}{a} \\ a \neq 0, b \neq 0 \Rightarrow ax + by + c = 0 \end{array}$$