POSIZIONE RECIPROCA TRA LE RETTE

M3016

RETTA PASSANTE PER DUE PUNTI $A(x_A; y_A)$ $B(x_B; y_B)$

NE ESISTE SOLO UNA

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

$A(-5; 3)$ $B(4; -2)$

$$\frac{x-(-5)}{4-(-5)} = \frac{y-3}{-2-3}$$

$$\frac{x+5}{4+5} = \frac{y-3}{-5}$$

$$\frac{-5(x+5)}{\cancel{-45}} = \frac{9(y-3)}{\cancel{-45}}$$

$$-5x - 25 = 9y - 27$$

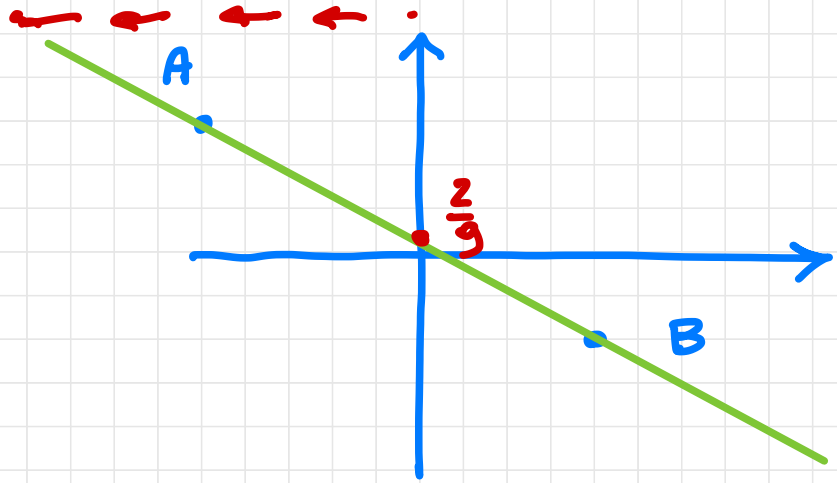
$$-5x - 9y + 2 = 0$$

$$\boxed{5x + 9y - 2 = 0}$$

$$y = -\frac{5}{9}x + \frac{2}{9}$$

$$m = -\frac{5}{9}$$

$$q = +\frac{2}{9}$$



LE RETTE INCIDENTI

$$\begin{cases} y = mx + q \\ y = m'x + q' \end{cases}$$

SI FA IL SISTEMA PER TROVARE IL PUNTO DI INTERSEZIONE

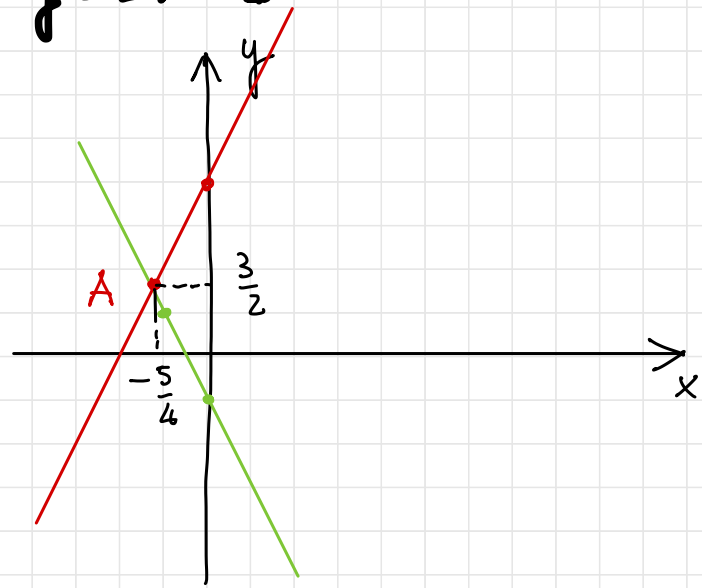
ESEMPIO : $y = 2x + 4$; $y = 2x - 1$

$$\begin{cases} y = 2x + 4 \\ y = -2x - 1 \end{cases}$$

$2x + 4 = -2x - 1$

$4x = -5 \rightarrow x = -\frac{5}{4}$

$y = -2\left(-\frac{5}{4}\right) - 1 = \frac{5}{2} - 1 = \frac{3}{2}$



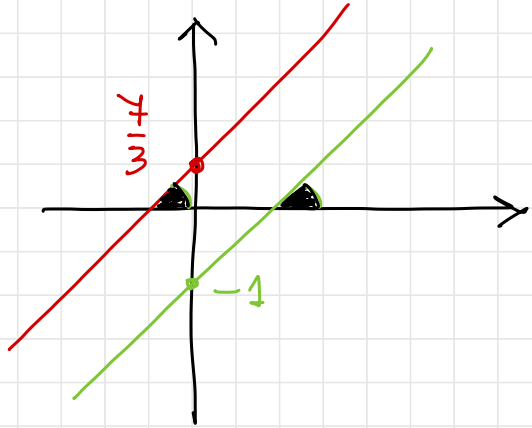
$A\left(-\frac{5}{4} ; \frac{3}{2}\right)$

RETTE PARALLELE

HANNO LA STESSA m

$y = 3x - 1$

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



$$\boxed{m = m'}$$

LE RETTE $2x - 3y + 8 = 0$ e $4x - 6y + 1 = 0$

SONO PARALLELE?

$y = \frac{2}{3}x + \frac{8}{3}$

$m = \frac{2}{3}$ $q = \frac{8}{3}$

$y = \frac{2}{3}x + \frac{1}{6}$

$m' = \frac{2}{3}$ $q' = \frac{1}{6}$

FORMA ESPLICITA

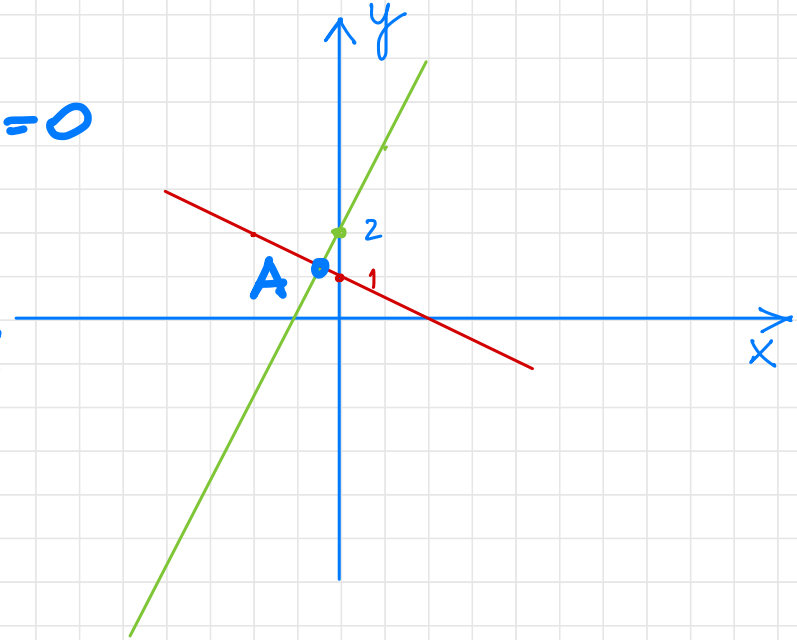
SI

RETTE PERPENDICOLARI

- $y = 2x+2$; $x + 2y - 2 = 0$

$\downarrow$

- $y = -\frac{1}{2}x + 1$



$$\begin{cases} y = 2x+2 \\ y = -\frac{1}{2}x+1 \end{cases}$$

INTERSEZIONE

$$2x+2 = -\frac{1}{2}x+1$$

$$\frac{4x+4}{\cancel{2}} = \frac{-x+2}{\cancel{2}}$$

$$5x = -2 \rightarrow x = -\frac{2}{5}$$

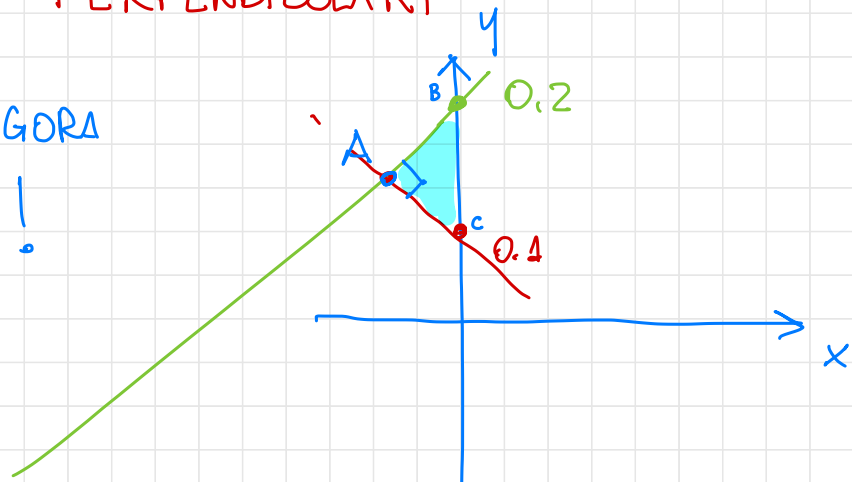
$$y = 2\cdot\left(-\frac{2}{5}\right)+2 = -\frac{4}{5}+2 = \frac{+6}{5}$$

$A\left(-\frac{2}{5}\,;\,\frac{6}{5}\right)$

DIMOSTRIAMO CHE SONO PERPENDICOLARI

VALE IL TEOREMA DI PITAGORA

SE SONO PERPENDICOLARI !



$$\overline{AB}^2 + \overline{AC}^2 = \overline{BC}^2$$

$$\underbrace{\left[(x_A - x_B)^2 + (y_A - y_B)^2\right]}_{\overline{AB}^2} + \underbrace{\left[(x_A - x_C)^2 + (y_A - y_C)^2\right]}_{\overline{AC}^2} =$$

$$= \underbrace{\left[(x_B - x_C)^2 + (y_B - y_C)^2\right]}_{\overline{BC}^2}$$

$$\left(-\frac{2}{5}-0\right)^2+\left(\frac{6}{5}-2\right)^2+\left(-\frac{2}{5}-0\right)^2+\left(\frac{6}{5}-1\right)^2=$$

$$=1 \quad ?$$

$$+\frac{4}{25}+\left(\frac{-4}{5}\right)^2+\frac{4}{25}+\left(\frac{1}{5}\right)^2=1 \quad ?$$

$$\frac{4}{25}+\frac{16}{25}+\frac{4}{25}+\frac{1}{25}=1 \quad ?$$

$$\frac{\cancel{25}}{\cancel{25}}=1 \rightarrow 1=1 \quad \text{É RETTO}$$

LA RETTA $y=2x+2$ É PERPENDICOLARE A

$$y=-\frac{1}{2}x+1$$

$$2 \cdot \left(-\frac{1}{2}\right) = -1 \quad \rightarrow \quad \boxed{m \cdot m' = -1}$$

CONDIZIONE DI PERPENDICOLARITÁ

$$\boxed{m' = -\frac{1}{m}}$$

OPPOSTI E RECIPROCI

ES: $2y - 5x - 2 = 0$

a)

$$y = \frac{5}{2}x + 1$$

$m = \frac{5}{2}$

$q = +1$

b) $y = -\frac{2}{5}x$

$m = -\frac{2}{5}$

$q = 0$

c) $y = -\frac{2}{5}x - \frac{2}{5}$

$m = -\frac{2}{5}$

$q = -\frac{2}{5}$

d) $y = \frac{5}{2}$

$m = 0$

$q = \frac{5}{2}$

b) e c) PARALLELE

a) con b) e c) É PERPENDICOLARE

$+\frac{5}{2}$ e $-\frac{2}{5}$