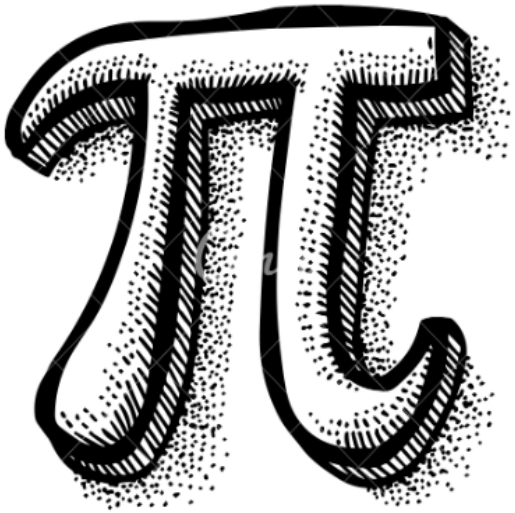

scidata



Geometría Analítica

Rectas y planos

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Definición

La ecuación general de una recta en el plano se define como:

$$ax + by + c = 0,$$

donde x, y son las variables y $a, b, c \in \mathbb{R}$ son constantes no todas cero.

Wolframalpha

Dos puntos:
line [//math:(2,1)//] [//math:(3,4)//]

Doble intersección:
line, x-intercept=2, y-intercept=1

Pendiente, intersección
line, slope = 1, y-intercept=5

Punto, pendiente
?

ordenada

→ wolfram alpha?

$\mathbb{N} = \{1, 2, 3, \ldots\}$

$\mathbb{Z} = \{0, 1, -1, 2, -2, 3, -3, \ldots\}$

$\mathbb{Q} = \left\{ \frac{p}{q} : p, q \in \mathbb{Z},\ q \neq 0 \right\}$

$\mathbb{Q}^c = \mathbb{Q}' = \mathbb{I} = \{\sqrt{2}, e, \sqrt{3}, \pi, \ldots\}$

$\pi = \frac{l_c}{D} = \frac{10}{\quad}$

$\sqrt{2} \neq \frac{p}{q}$

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

$\mathbb{N}$ ... 1 2 3 4 ...

$\mathbb{Z}$ zahlen ... -2 -1 0 1 2 ...

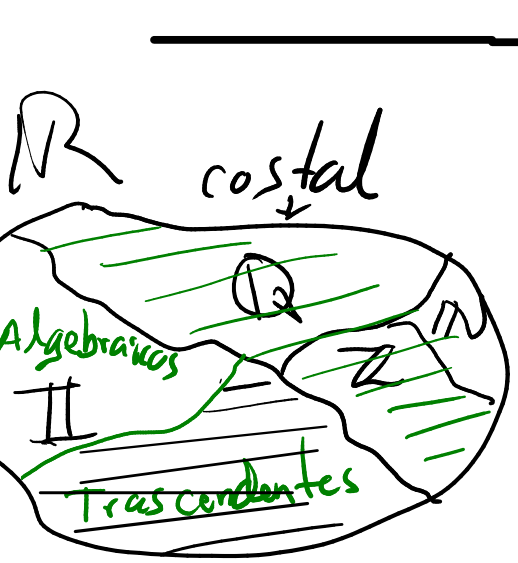
$\mathbb{Q}$ Racionales

$\mathbb{I}$ Irracionales

$\cup$ unión

$\mathbb{R} = \mathbb{Q} \cup \mathbb{I}$

$\mathbb{Q} \cap \mathbb{I} = \{\} = \emptyset$



Alg $\rightarrow \sqrt{2}, \sqrt{3}, \ldots$

Trasc $\rightarrow e, \pi, \rightarrow$ ¿e^{π}, π^{e}?

e^{π}, $\pi + e$ ¿$\pi + e$?

$2.71434343\ldots$ rational.

$8.$

$\pi \cong 3.141592\ldots$ irrational.

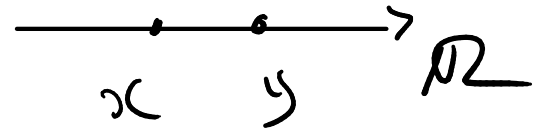
0.000000000001 rational

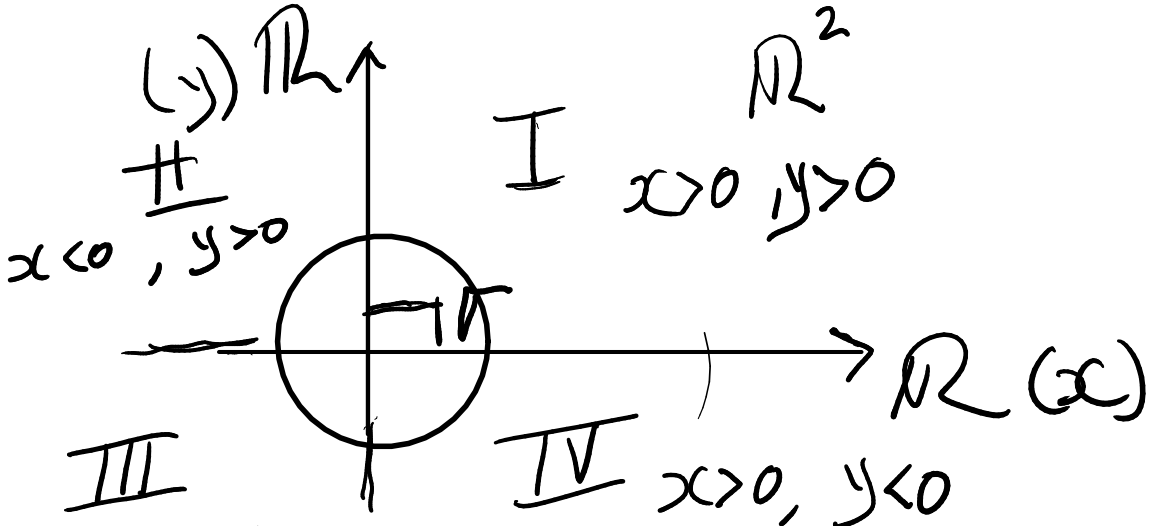
0.0000000000000000001

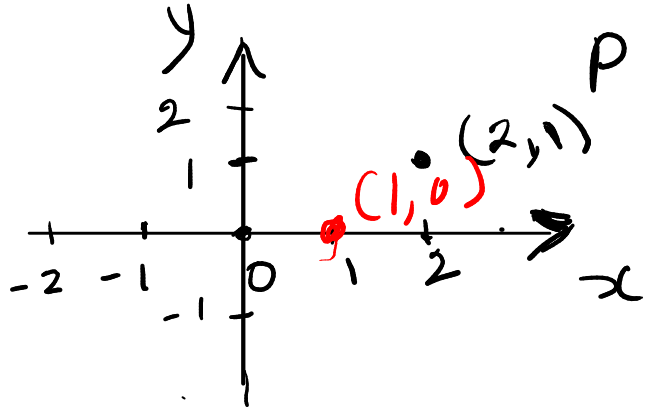
$1 \times 10^{-30} = 0.000000000000000000000000\ldots01$

$\mathbb{R}^2 = \{(x,y) : x, y \in \mathbb{R}\}$

tal que pertenecen







plano cartesiano

(2, 1)

(x, 1)

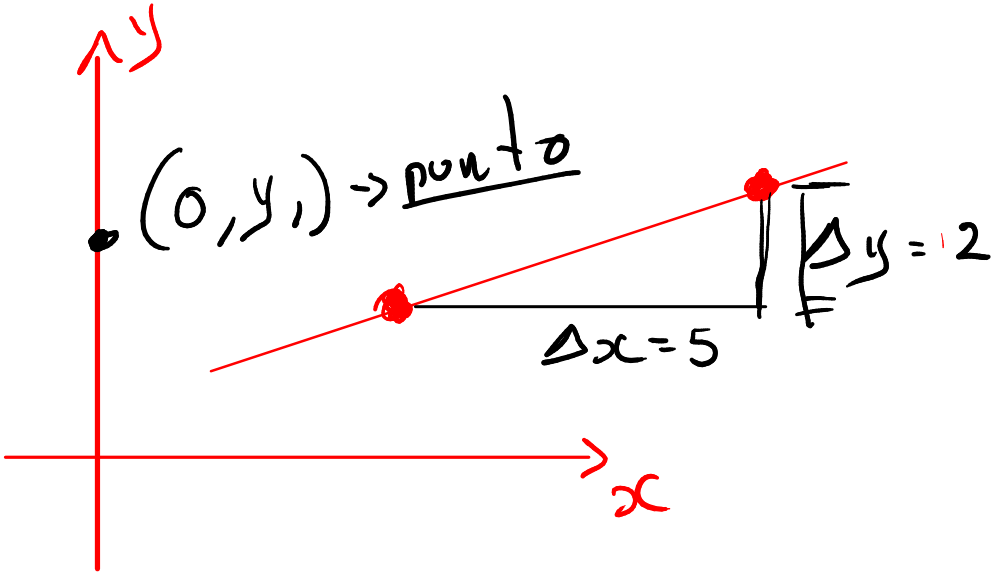
(-3, 2) → II

(1, 0)

(-1, -4) → II

$ax + by + c = 0$

① Dos puntos.



$m = \frac{\Delta y}{\Delta x}$ → pendiente de la recta.

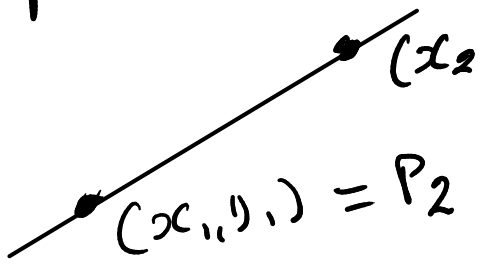
② m y un punto.

③ Ordenada al origen $y = y_1$.
y m.

④ $x = a$, $y = b$
$(a, 0)$, $(0, b)$

intersección con ejes

① 2 puntos



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{y_1 - y_2}{x_1 - x_2}$$

$$y = m(x - x_1) + y_1$$

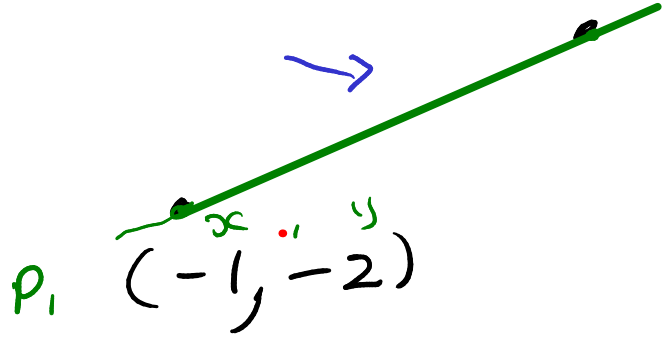
Fórmula de la recta dado 2 puntos

$$\boxed{y = \frac{y_1 - y_2}{x_1 - x_2}(x - x_1) + y_1}$$

$(5, 3)$ P_2 → gral.

x, y

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



① ~~$5x - 6y + 3 = 0$~~ X

② $-5x + 6y + 7 = 0$ ✓

$$m = \frac{-2 - 3}{-1 - 5} = \frac{-5}{-6} = \frac{5}{6} > 0$$

$$m = \frac{3-(-2)}{5-(-1)} = \frac{3+2}{5+1} = \frac{5}{6} > 0$$

$$y = \frac{5}{6}(x-(-1)) + (-2) = \frac{5}{6}(x+1) - 2$$

$\rightarrow (6)$ $\quad y = \frac{5}{6}(x+1) - 2$

$\Rightarrow \quad 6y = \frac{5 \cdot 6}{6}(x+1) - 2(6)$

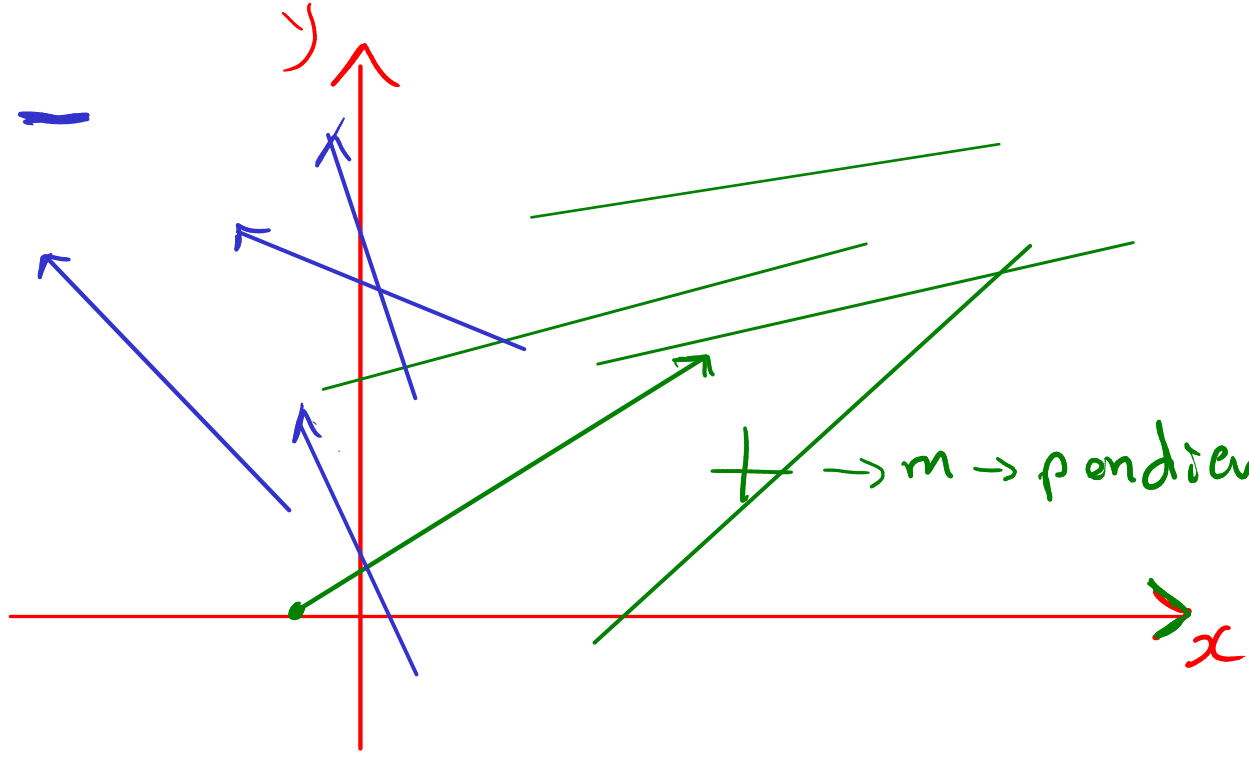
$\Rightarrow \quad 6y = 5(x+1) - 12$

$6y = 5x + 5 - 12$

$6y - 5x = -7$

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

pend −



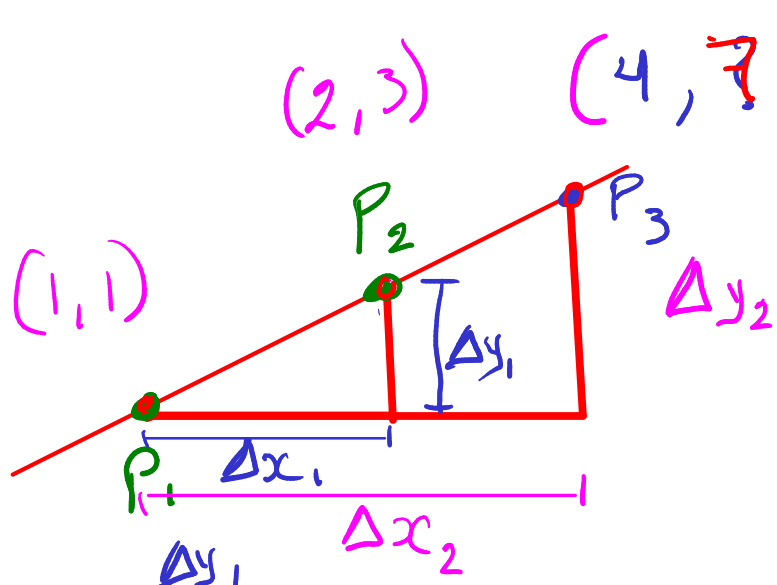
+ → m → pendiente.

P_1

P_2

→ (1, −3) / (−2, 1) → $m < 0$

IV II



P_1, P_2, P_3 "colineales"

$P_1 \to P_2 \quad m_1 = \frac{\Delta y_1}{\Delta x_1}$

$P_1 \to P_3 \quad m_2 = \frac{\Delta y_2}{\Delta x_2}$

¿$m_1 = m_2$?

Retos

$$m_1 = \frac{3-1}{2-1} = \frac{2}{1} = 2.$$

$$m_2 = \frac{6-3}{4-2} = \frac{3}{2} \ ?$$

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Definición

La ecuación general de un plano en el espacio se define como:

$$ax + by + cz + d = 0,$$

donde x, y, z *son las variables y* $a, b, c, d \in \mathbb{R}$ *son constantes no todas cero.*

Definición

La ecuación general de un híperplano en un espacio de n dimensiones se define como:

$$a_1x_1 + a_2x_2 + a_3x_3 + \cdots + a_{n-1}x_{n-1} + a_nx_n + b = 0,$$

donde $x_1, x_2, ..., x_n$ son las variables y $a_1, a_2, ..., a_n, b \in \mathbb{R}$ son constantes no todas cero.