

01/09/2025

On trouve de la parabole

$$y = 2(x-1)(x-3)$$

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

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

$$y = 2x^2 - 8x + 6$$

$$y - 6 = 2x^2 - 8x$$

$$y - 6 = 2(x^2 - 4x)$$

$$\frac{y-6}{2} = x^2 - 4x$$

$$\frac{y-6}{2} = (x-2)^2 - 4$$

$$Ax^2 + Bx + C \quad (x)$$

$$h(x-a)^2 + b \quad (xx)$$

$$y - 6 = 2(x-2)^2 - 8$$

$$y = 2(x-2)^2 - 2$$

$$v_1, v_2$$

$$y = h(x-v_1)(x-v_2)$$

$$y = 2(x-1)(x-3)$$

Para encontrar as raízes, hacemos $y = 0$

$$0 = 2(x-1)(x-3)$$

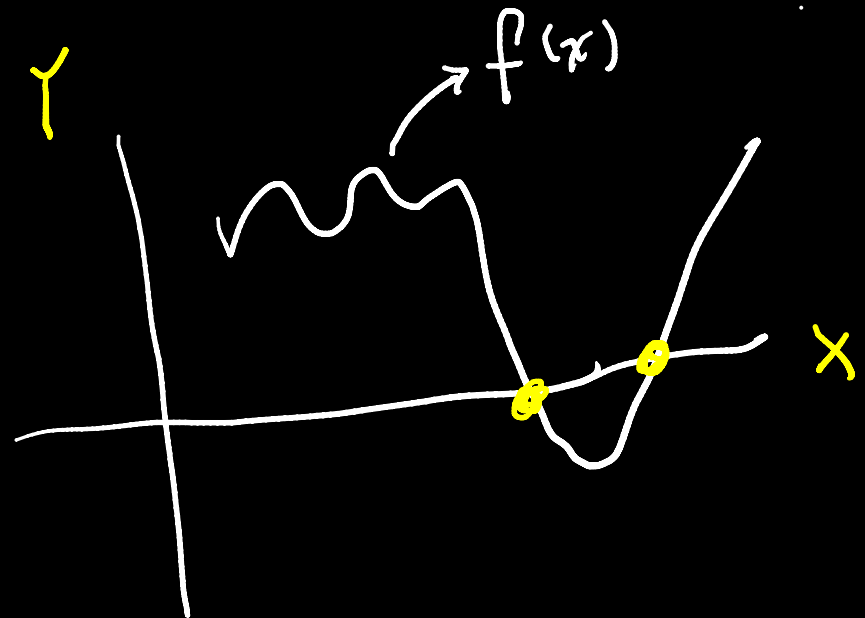
$$x = 1$$

$$x = 3$$

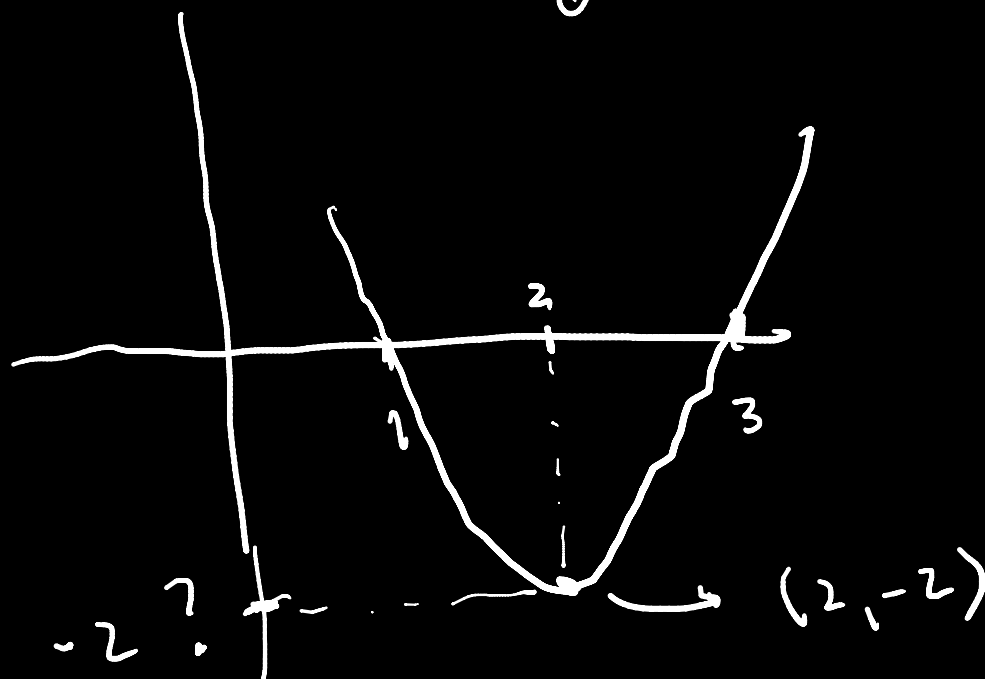
raízes

De maneira geral

$$f(x) = 0$$



$$y = 2(x-1)(x-3)$$



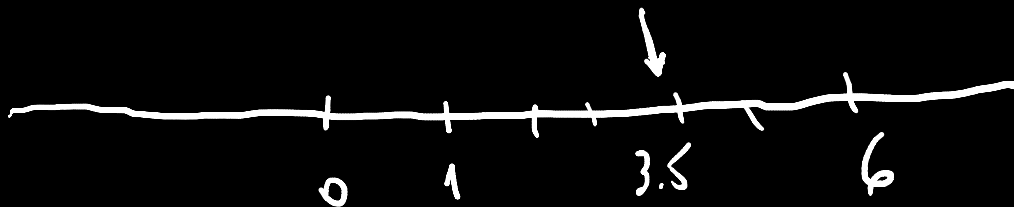
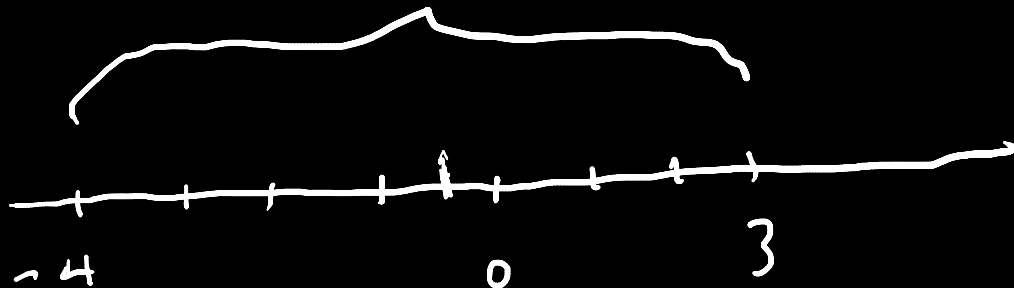
hence $x=2$, y min value
 $2(2-1)(2-3)$
 $2(1)(-1) = -2$

RAICES ; VALORES EN EL EJE X

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

$x = -4$; $x = 3$;

$$\frac{-4+3}{2} = \frac{-1}{2} = -\frac{1}{2} = -0.5$$



$$\frac{1+6}{2} = \frac{7}{2} = 3.5$$

	b		4
a	the middle	b	$\frac{49-2}{-98}$
"		"	
-4	$\frac{a+b}{2}$	3	

$$\frac{-4+3}{2} = -\frac{1}{2} = -0.5$$

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

$$b = -\frac{49}{2}$$

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

$$-2\left(-\frac{1}{2}+4\right)\left(-\frac{1}{2}-3\right) = -2 \cdot \frac{7}{2} \left(-\frac{7}{2}\right) = \frac{-98}{4} = \frac{49}{2}$$

Aplicación: La parábola de ROBERT MAY

Sea $y = b x (1 - x)$; $b > 0$

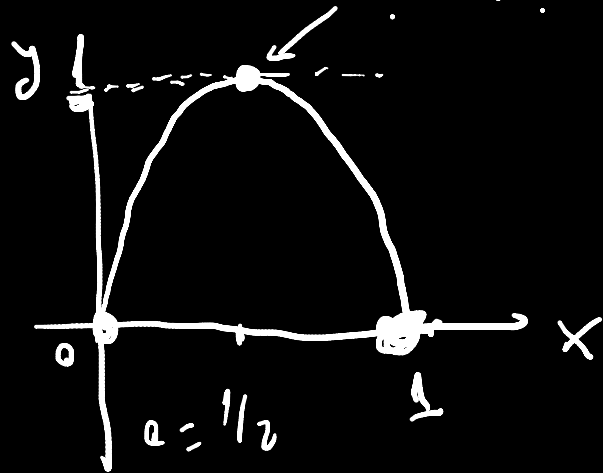
¿ raíces de esta parábola? $b = ?$

$$x = 0 ; x = 1$$

$$y = b x (1 - x)$$

$$y = b (x - x^2)$$

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



Queremos exigir que $0 < y < 1$

$$0 \leq b \frac{1}{2} \left(1 - \frac{1}{2}\right) \leq 1 \leadsto 0 \leq \frac{b}{4} \leq 1$$
$$0 \leq b < 4$$

$$y = kx(1-x)$$

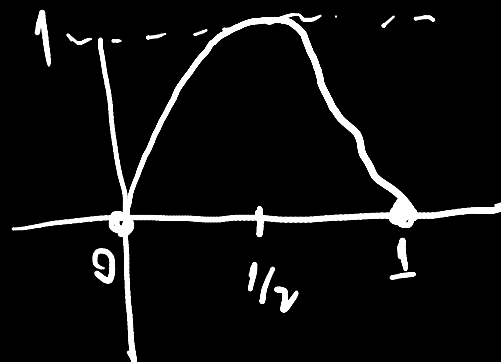
RAICES

$$x=0 ; x=1$$

$$k \rightarrow 0$$

$$y = kx - kx^2$$

$$y = -kx^2 + kx$$



$$k \cdot \frac{1}{2} \left(1 - \frac{1}{2}\right) = \frac{k}{4}$$

$$0 \leq \frac{k}{4} \leq 1$$

$$0 \leq k \leq 4$$

$$y = kx(1-x)$$

$$0 \leq k \leq 4$$

Aplícacion sea $0 \leq x_0 \leq 1$

$$x_1 = k x_0 (1 - x_0)$$

$$x_2 = k x_1 (1 - x_1)$$

⋮

$$x_{n+1} = k x_n (1 - x_n)$$

$$x_0, x_1, x_2, x_3, \dots, x_n$$