INEQUAÇÕES

MESTRES DA MATEMÁTICA

1) Inequação do 1º grau

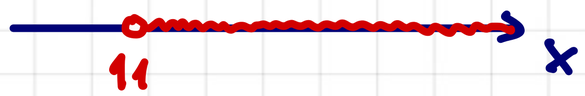
Ex: a) $x - 3 > 8$

$x > 11$

$S = \{x \in \mathbb{R} / x > 11\}$

Outras representações da solução:

- Gráfica



- com colchetes:

$S =]11, +\infty[$

Obs:

Abordagem Gráfica

Estudo do Sinal

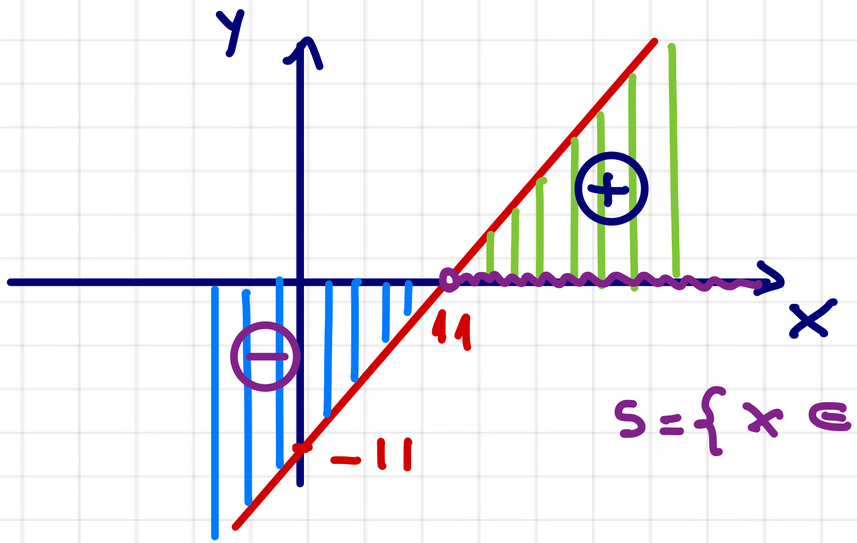
$x - 3 > 8$

$y = \underbrace{x - 11 > 0}_{\text{Função afim}}$

Raiz:

$x - 11 = 0$

$x = 11$



$S = \{x \in \mathbb{R} / x > 11\}$

2) Inequação do 2º Grau

(Inequação Quadrática)

MESTRES DA MATEMÁTICA

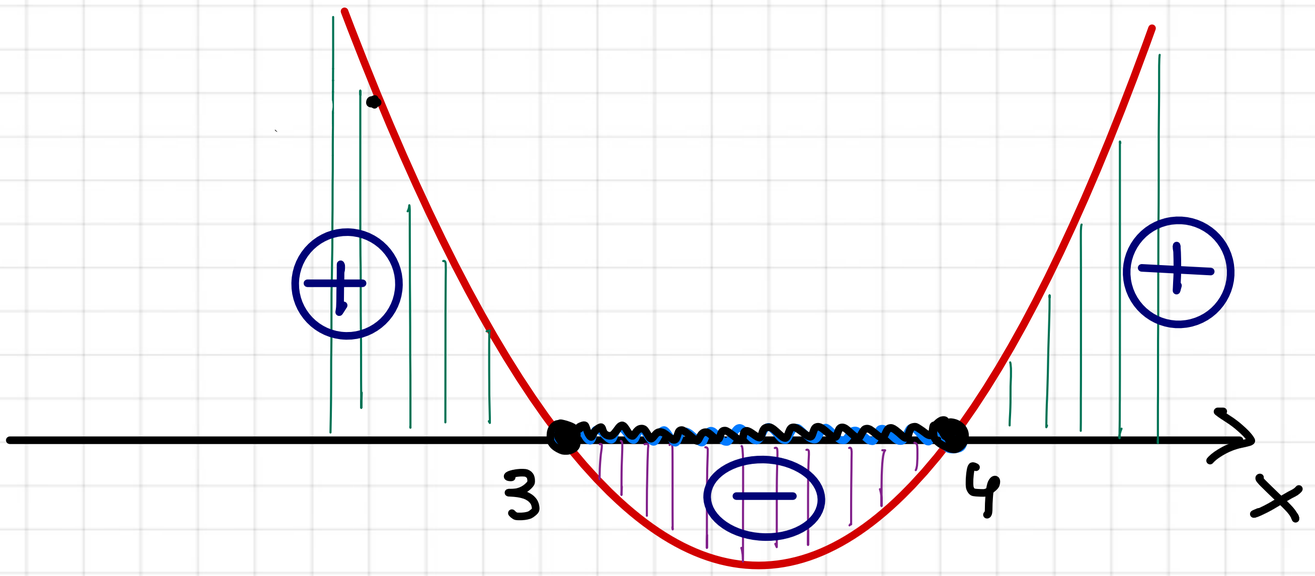
a) $y = x^2 - 7x + 12 \leq 0$

Estudo do sinal

Raízes:

$\Delta = (-7)^2 - 4 \cdot 1 \cdot 12 = 49 - 48 = 1$

$x = \dfrac{7 \pm 1}{2} \begin{cases} x_1 = 3 \\ x_2 = 4 \end{cases}$



$S = \{x \in \mathbb{R} \mid 3 \leq x \leq 4\}$

Obs:

$10 > 7$

Multiplicando por -1 os dois lados:

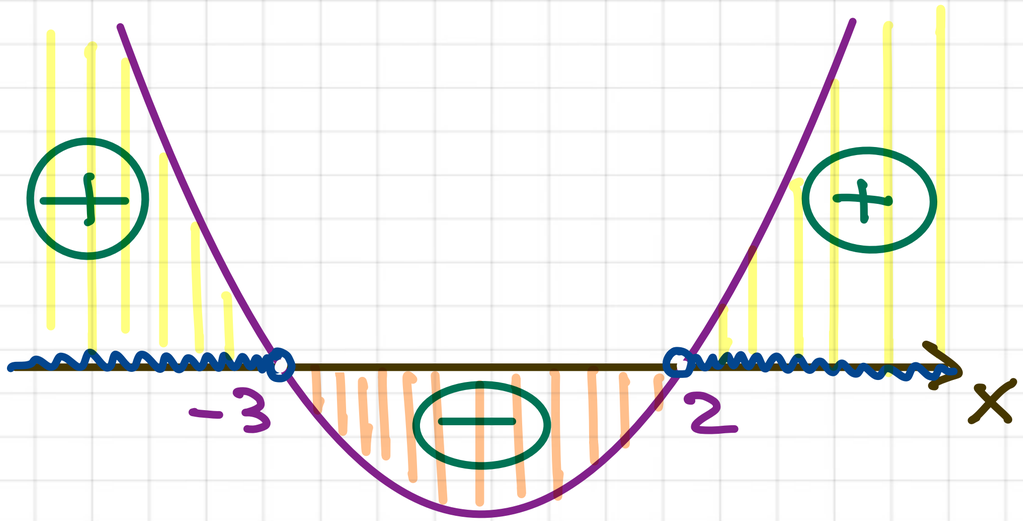
$-10 < -7$

b) $x^2 + x - 6 > 0$

Estudo do Sinal

$\Delta = 1^2 - 4 \cdot 1 \cdot (-6) = 25$

$x = \dfrac{-1 \pm 5}{2} \begin{cases} x_1 = -3 \\ x_2 = 2 \end{cases}$



$S = \{x \in \mathbb{R} / x < -3 \text{ ou } x > 2\}$

3) Inequação Produto

MESTRES DA MATEMÁTICA

Ex:

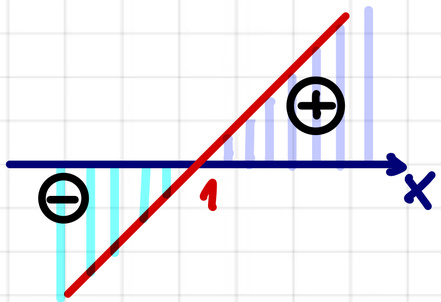
$\underbrace{(x-1)}_{\text{I}} \cdot \underbrace{(x+4)}_{\text{II}} \cdot \underbrace{(-x+12)}_{\text{III}} > 0$

Estudo do Sinal

(I) $y = x - 1$

Raiz: $x - 1 = 0$

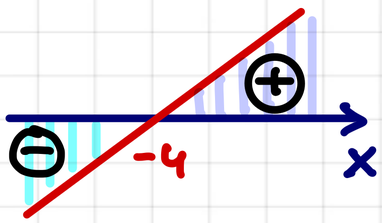
$x = 1$



(II) $y = x + 4$

Raiz: $x + 4 = 0$

$x = -4$

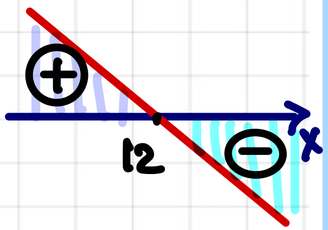


(III) $y = -x + 12$

Raiz: $-x + 12 = 0$

$-x = -12$

$x = 12$



Ex:

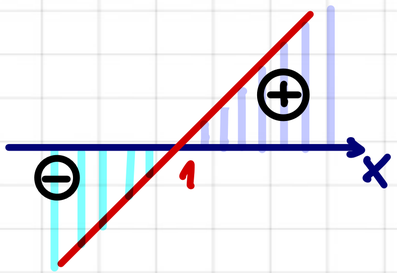
$$\underbrace{(x-1)}_{\text{I}}\cdot\underbrace{(x+4)}_{\text{II}}\cdot\underbrace{(-x+12)}_{\text{III}} > 0$$

Estudo do sinal

I $y = x - 1$

Raiz: $x - 1 = 0$

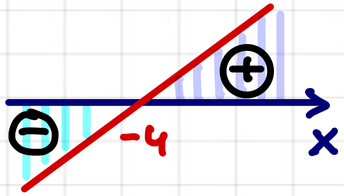
$x = 1$



II $y = x + 4$

Raiz: $x + 4 = 0$

$x = -4$

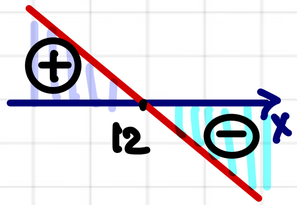


III $y = -x + 12$

Raiz: $-x + 12 = 0$

$-x = -12$

$x = 12$



Quadro de Sinais

I	−	−	+	+	x
II	−	+	+	+	x
III	+	+	+	−	x
Solução Final	+	−	+	−	x
		-4	1	12	

$$S = \{x \in \mathbb{R} \mid x < -4 \text{ ou } 1 < x < 12\}$$

MESTRES DA MATEMÁTICA

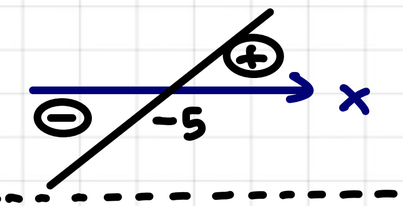
Exemplos:

a) $(x+5)(2x-6)(-x+4) \leq 0$

Estudo do sinal

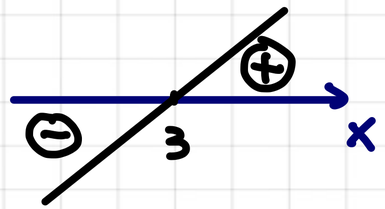
(I) $y = x+5$

Raiz $\longrightarrow -5$



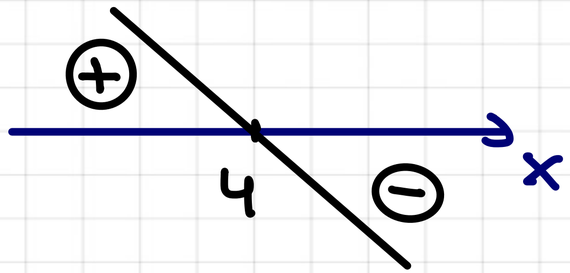
(III) $y = 2x-6$

Raiz $\longrightarrow 3$

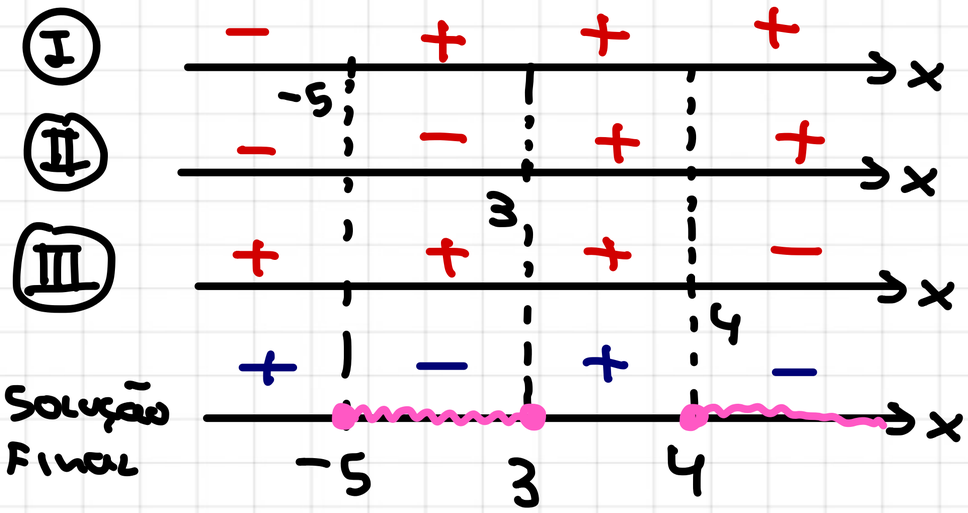


(III) $y = -x+4$

Raiz $\longrightarrow 4$



Quadro de sinais



$S = \{x \in \mathbb{R} / -5 \leq x \leq 3 \text{ ou } x \geq 4\}$

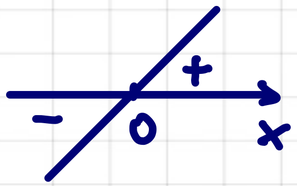
b) $x \cdot (x-2)(x^2-5x+6) \geq 0$

(I) (II) (III)

Estudo do Sinal

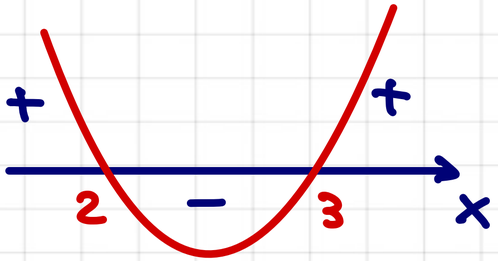
(I) $y = x$

Raiz → 0



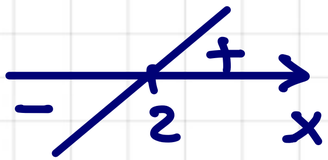
(III) $y = x^2-5x+6$

Raízes: 2 e 3

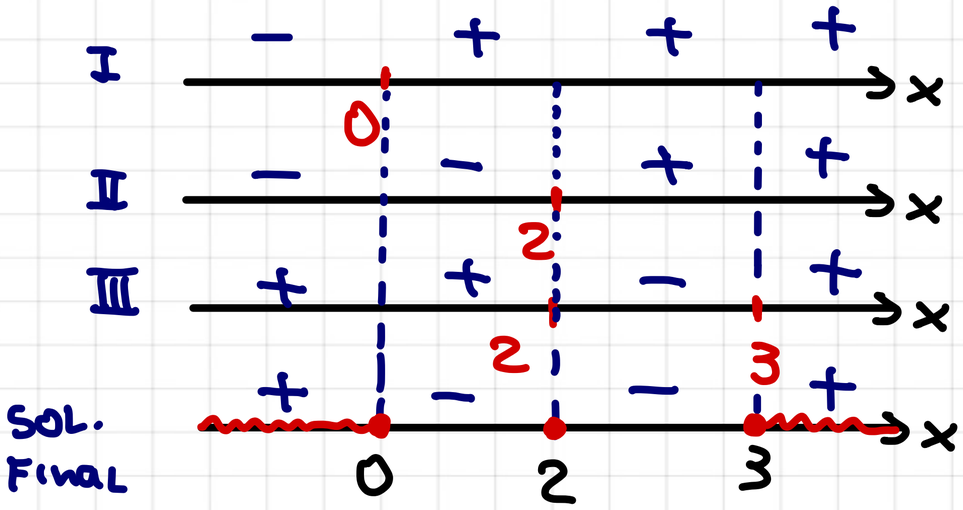


(II) $y = x-2$

Raiz → 2



Quadro de Sinais



$S = \{x \in \mathbb{R} / x \leq 0 \text{ ou } x = 2 \text{ ou } x \geq 3\}$