

# MATEMÁTICA

## Aula 8

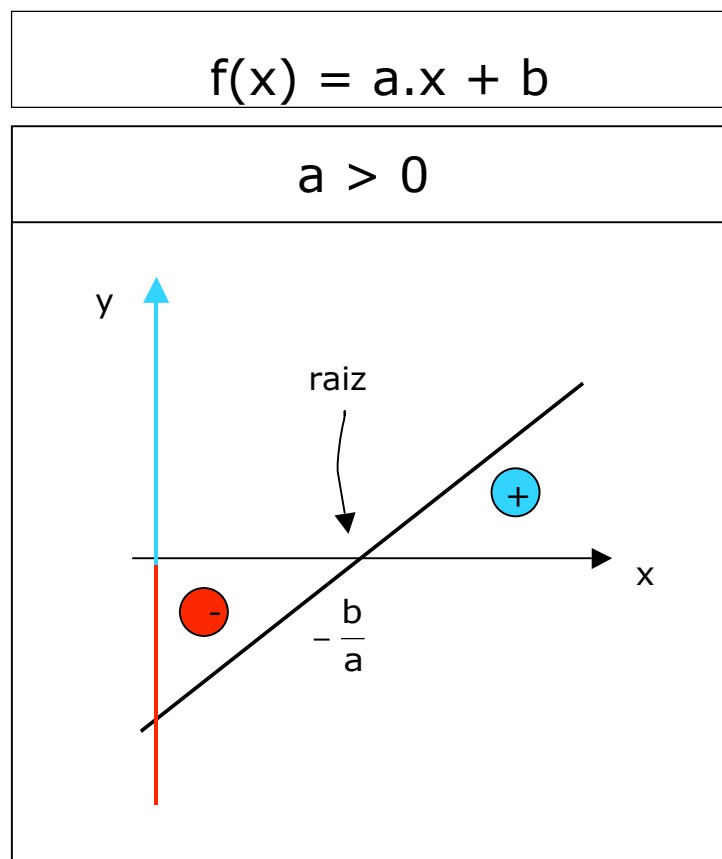
### INEQUAÇÕES DE 1º E 2º GRAUS

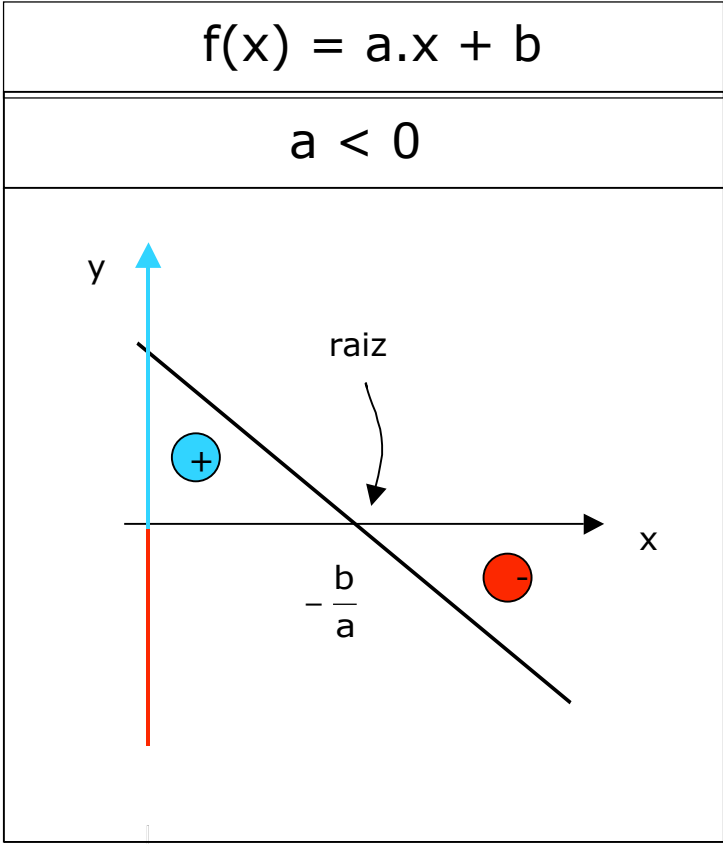
#### TÓPICOS

- ESTUDO DE SINAIS
- SISTEMAS DE INEQUAÇÕES
- INEQUAÇÕES PRODUTO E QUOCIENTE

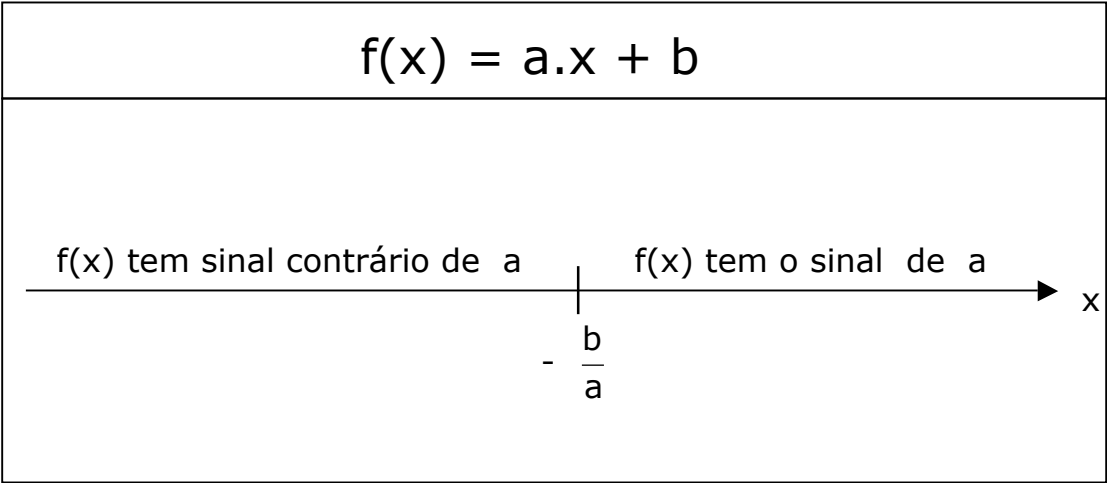
#### Funções do 1º grau

Dependendo do coeficiente angular, como visto na aula passada, temos:





Genericamente temos:



## Exemplo de Inequação de 1º grau

Para que valores de  $x$  a função  $f(x) = 4 - 2.x$  é positiva?

Resolvendo pelas propriedades de desigualdade temos:

$$\begin{aligned}f(x) \text{ é positiva} &\Rightarrow f(x) > 0 \\ &\Rightarrow 4 - 2.x > 0 \\ &\Rightarrow -2.x > -4 \\ &\Rightarrow 2.x < 4 \\ &\Rightarrow x < 2\end{aligned}$$

$$\Rightarrow S = \{x \in \mathbb{R} / x < 2\}$$

Resolvendo pelo estudo de sinais temos:

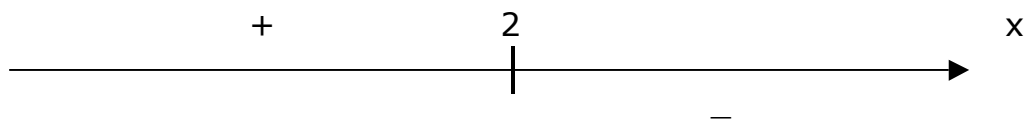
I) Raiz:  $f(x) = 0$

$$f(x) = 4 - 2.x > 0$$

$$\begin{aligned}&\Rightarrow 4 - 2.x = 0 \\ &\Rightarrow -2.x = -4 \\ &\Rightarrow 2.x = 4 \\ &\Rightarrow x = 2\end{aligned}$$

II)  $a = -2 < 0$



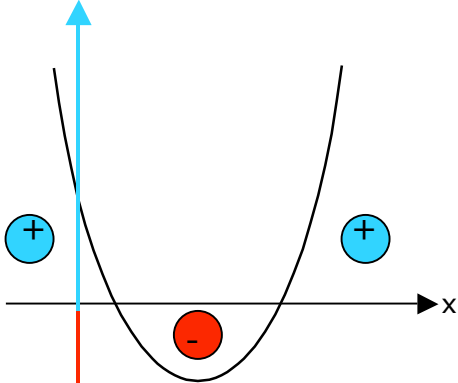
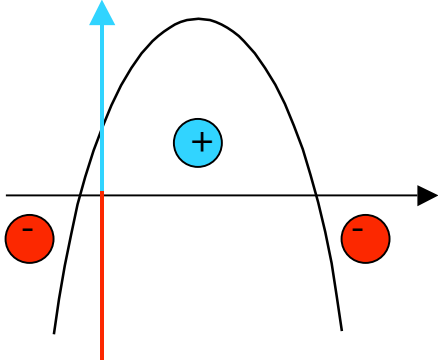
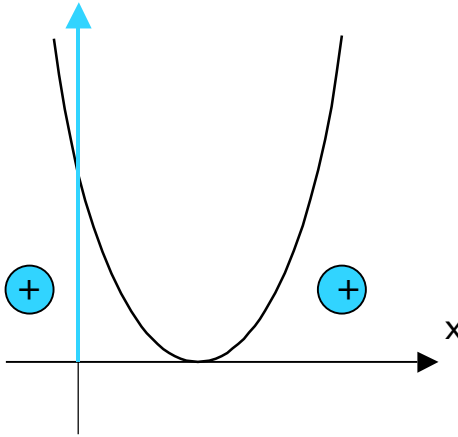
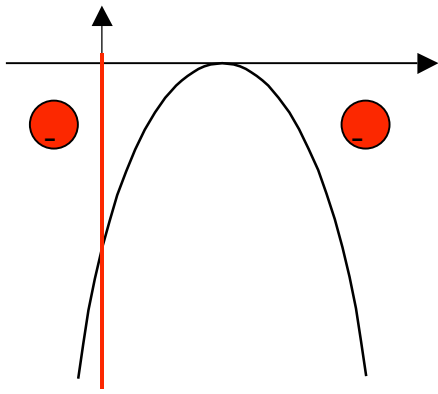
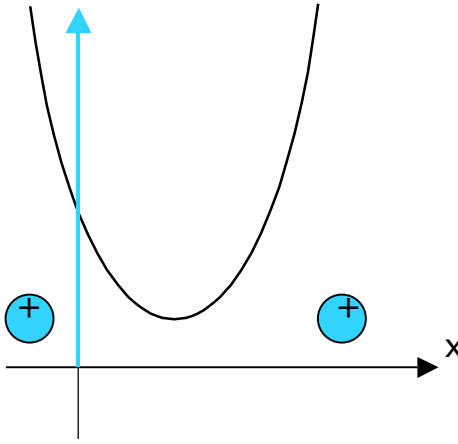
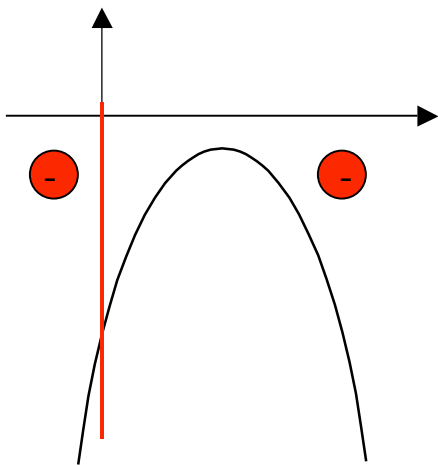
$$f(x) = 4 - 2.x > 0$$



III)  $S = \{x \in \mathbb{R} / x < 2\}$

# Funções do 2º grau

Dependendo do coeficiente  $a$ , como visto na aula passada, temos:

	$a > 0$ 	$a < 0$ 
$\Delta > 0$		
$\Delta = 0$		
$\Delta < 0$		

## Exemplo de Sistema de Inequações

Resolver o sistema 
$$\begin{cases} x^2 - 6x + 5 \leq 0 \\ 2x - 4 > 0 \end{cases}$$

1)  $x^2 - 6x + 5 \leq 0$

$$\Delta = b^2 - 4ac$$

$$\Delta = (-6)^2 - 4 \cdot 1 \cdot 5$$

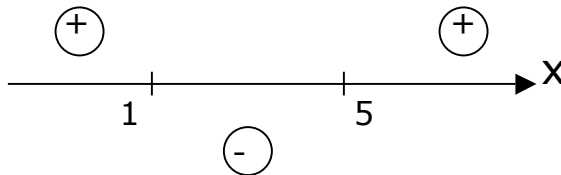
$$\Delta = 36 - 20$$

$$\Delta = 16 > 0 \Rightarrow \text{raízes distintas}$$

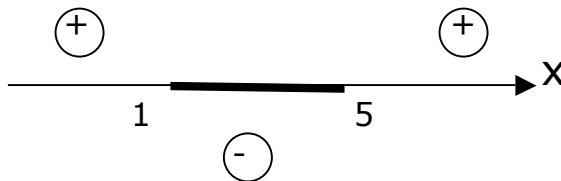
$$x = \frac{6 - 4}{2} = \frac{2}{2} = 1$$

$$x = \frac{6 + 4}{2} = \frac{10}{2} = 5$$

$$a = 1 > 0 \Rightarrow \text{concavidade para cima}$$



$$x^2 - 6x + 5 \leq 0$$



$$\Rightarrow S_1 = \{x \in \mathbb{R} / 1 \leq x \leq 5\}$$

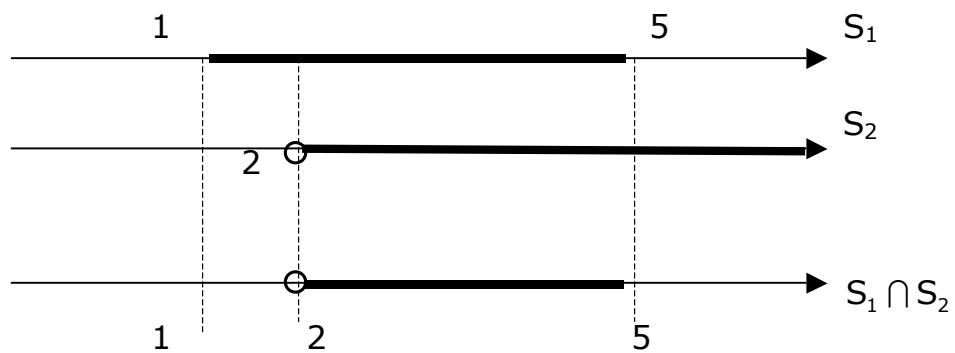
$$2) \quad 2x - 4 > 0$$

$$\Rightarrow 2x > 4$$

$$\Rightarrow x > 2$$

$$\Rightarrow S_2 = \{x \in \mathbb{R} / x > 2\}$$

$$3) \quad \begin{cases} S_1 = \{x \in \mathbb{R} / 1 \leq x \leq 5\} \\ S_2 = \{x \in \mathbb{R} / x > 2\} \end{cases}$$

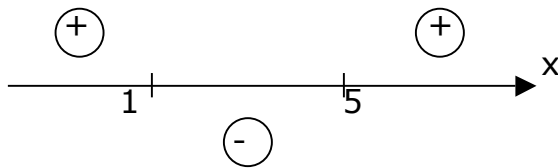


$$S = \{x \in \mathbb{R} / 2 < x \leq 5\}$$

## Exemplo de Inequação Quociente

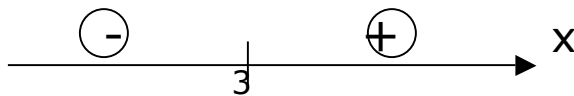
Resolver, em  $\mathfrak{R}$ ,  $\frac{x^2 - 6x + 5}{x - 3} \leq 0$

1)  $f(x) = x^2 - 6x + 5$

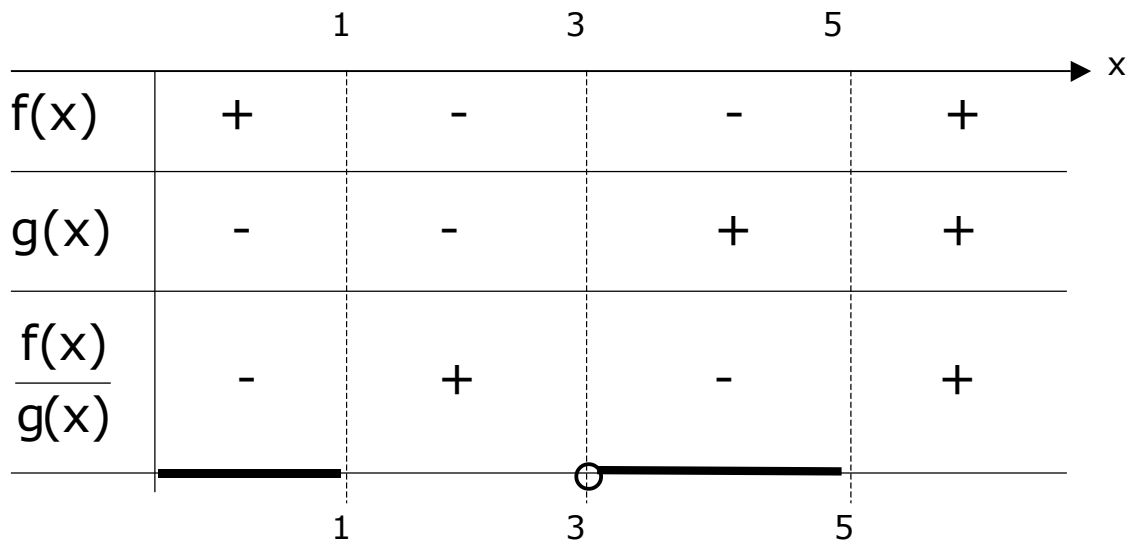


2)  $g(x) = x - 3$

Raiz:  $x - 3 = 0 \Rightarrow x = 3$



3)  $\frac{x^2 - 6x + 5}{x - 3} \leq 0$



$$S = \{x \in \mathbb{R} / x \leq 1 \text{ ou } 3 < x \leq 5\}$$

Procure refazer os exemplos da aula.

Depois, pegue funções de 1º e 2º graus que você conhece e misture formando sistemas, inequações quociente e inequações produto. Envie um desses para verificação.