Análise Matemática (1ª aula)

$$\boxed{\begin{array}{l}\text{Derivada de } 2x = x^2 \\ \text{Primitiva de } x^2 = 2x\end{array}}$$

← Estudar Derivadas e primitivas.

Ex:

Determine o domínio da função:

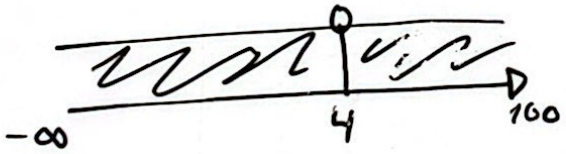
$$f(x) = \frac{\sqrt{x+3}}{x-4} + \log_4 (2-x)$$

R:

$$D_f : \{ x \in \mathbb{R} : \underbrace{x - 4 \neq 0}_{①} \wedge \underbrace{x + 3 \geq 0}_{②} \wedge \underbrace{2 - x > 0}_{③} \}$$

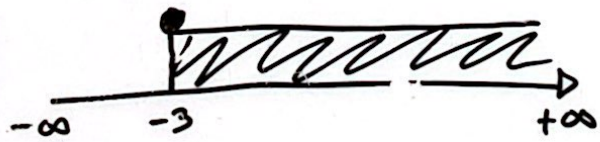
①

$x - 4 \neq 0 \Leftrightarrow x \neq 4$



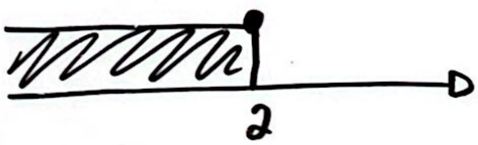
②

$x + 3 \geq 0 \Leftrightarrow x \geq -3$



③

$2 - x > 0 \Leftrightarrow 2 > x \Leftrightarrow x < 2$



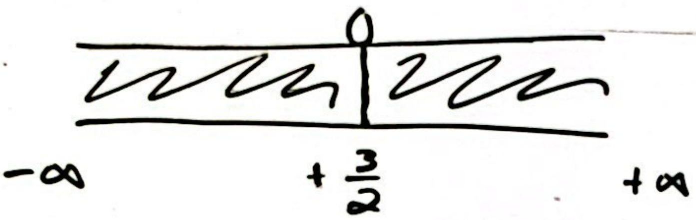
R: $D = [-3 ; 2]$

①

a) $f(x) = \sqrt[3]{\dfrac{x}{2x - 3}}$

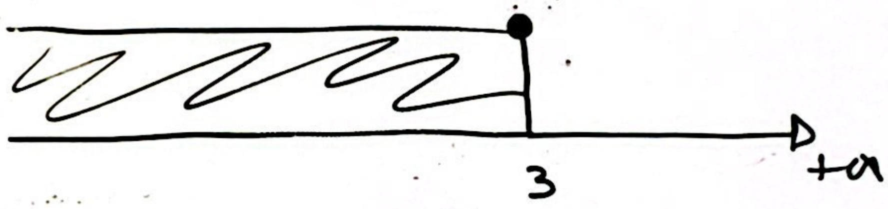
$Df = \{ x \in \mathbb{R} : 2x - 3 \neq 0 \wedge x > 0 \}$

$2x - 3 \neq 0 \Leftrightarrow x \neq +\frac{3}{2}$



$\boxed{\mathbb{R} \setminus \{ \frac{3}{2} \}}$

$x + 3 > 0 \Leftrightarrow x < 3$

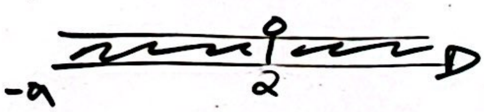


$D =]-\infty ; 3]$

b) $f(x) = \sqrt{\dfrac{x+3}{x-2}}$

$Df = \{ x \in \mathbb{R} : x - 2 \neq 0 \wedge \frac{x+3}{x-2} \geq 0 \}$

$x - 2 \neq 0 \Leftrightarrow x \neq 2$



$\dfrac{x+3}{x-2} \geq 0 \rightarrow$ Quadro sinais

$\downarrow$

	$-\infty$	-3		2	$+\infty$
$x+3$	$-$	0	$+$	$+$	$+$
$x-2$	$-$	$-$	$-$	0	$+$
$\frac{x+3}{x-2}$	$+$	0	$-$	S.S	$+$

$Df =]-\infty ; -3] \cup]2 ; +\infty[$

c) $f(x) = \frac{\ln(x+2)}{x-1}$

$Df = \{x \in \mathbb{R} : x-1 \neq 0 \wedge \ln(x+2) > 0\}$

$x - 1 \neq 0 \Leftrightarrow x \neq 1$

$\mathbb{R} \setminus \{1\}$

$\ln(x+2) > 0 \Leftrightarrow x > 0$

$D =]0 ; +\infty[$

e) $f(x) = \dfrac{\sqrt{x-3}}{x} + \ln(4+3x \cdot x^2)$

$Df = \{ x \in \mathbb{R} : \underbrace{x - 3 \geq 0}_{1} \wedge \underbrace{x \neq 0}_{2} \wedge \underbrace{4 + 3x - x^2 > 0}_{3} \}$

1. $x - 3 \geq 0 \Leftrightarrow x \geq 3 \Leftrightarrow x \in [3 ; +\infty[$

2. $x \neq 0 \Leftrightarrow x \in \mathbb{R} \setminus \{0\}$

3. $4 + 3x - x^2 > 0 \Leftrightarrow x \in]-1, 4[$