

· FUNÇÃO LOGARITMO ·

DEFINIÇÃO

A função $f: \mathbb{R}_+^* \rightarrow \mathbb{R}$ que associa a cada $x \in \mathbb{R}_+^*$ o número $\log_a x$ é a função logarítmica de base a : $f(x) = \log_a x$

EXEMPLO :

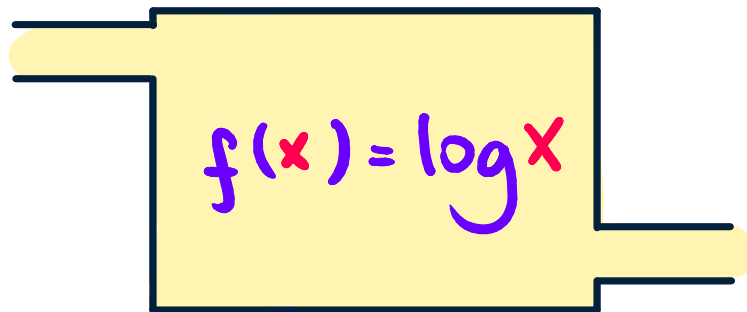
$$(i) f(x) = \log_2 x \quad \begin{array}{l} \nearrow f(1) = 0 \\ \rightarrow f(2) = 1 \\ \searrow f(8) = 3 \end{array}$$

$$(ii) g(x) = \log_3 x$$

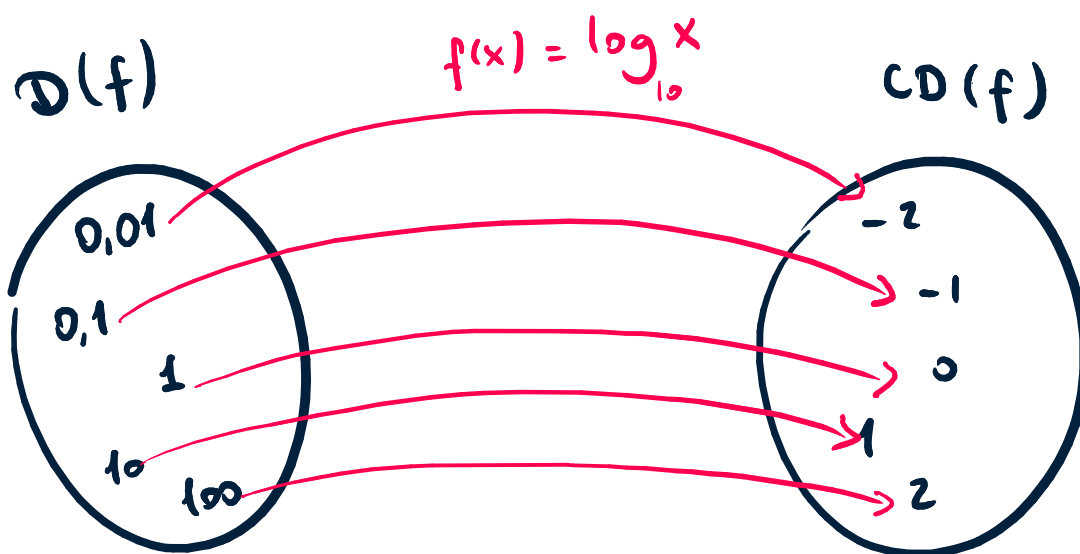


Domínio e Imagem

= $\boxed{x}$



= $\boxed{y}$



Domínio : $\mathbb{R}_+^*$

Imagem : $\mathbb{R}$



DOMÍNIO e IMAGEM : EXEMPLOS

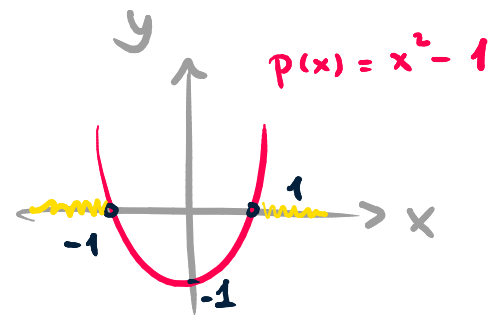
Determine o domínio da função :

$$a) f(x) = \log_4(x+1)$$

$$x+1 > 0 \quad \therefore \quad x > -1$$

$$D(f) = x \in \mathbb{R} \mid x > -1$$

$$b) g(x) = \log_5(x^2 - 1)$$



$$\hookrightarrow x^2 - 1 > 0$$

$$D(g) = x \in \mathbb{R} \mid x > 1 \text{ ou } x < -1$$

$$c) h(x) = \log_{\underbrace{3-2x}_{10}}$$

$$i) 3-2x \neq 1 \quad \therefore \quad \boxed{x \neq 1}$$

$$ii) 3-2x > 0 \quad \therefore \quad 2x < 3 \quad \therefore \quad \boxed{x < 3/2}$$

$$D(h) = x \in \mathbb{R} \mid x \neq 1 \text{ e } x < 3/2$$

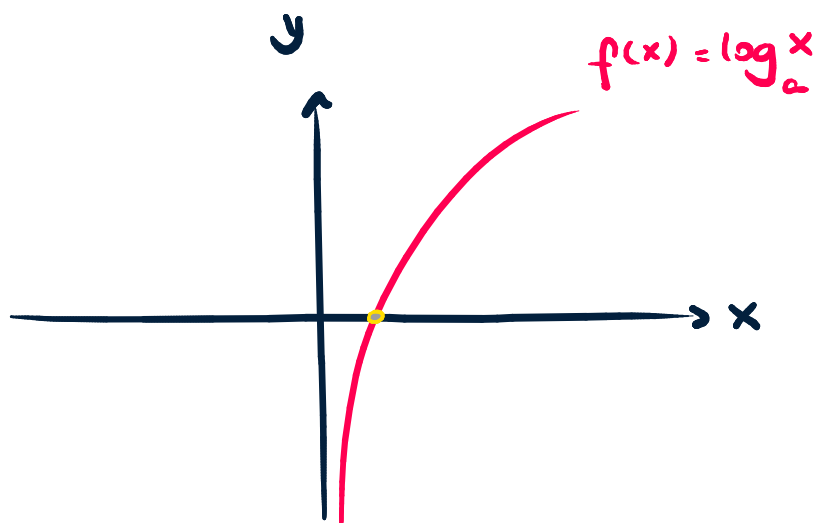


GRÁFICOS

$$f(x) = \log_a x$$

$$a > 1$$

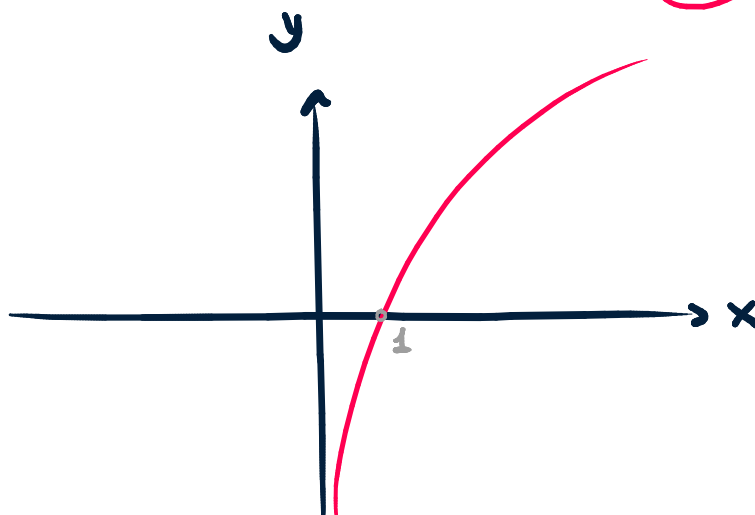
$f(x)$ é crescente



EXEMPLO : $f(x) = \log_{10} x$

$$\log_{10} 100 = 2$$

x	f(x)
0	X
1	0
10	1
100	2
1000	3

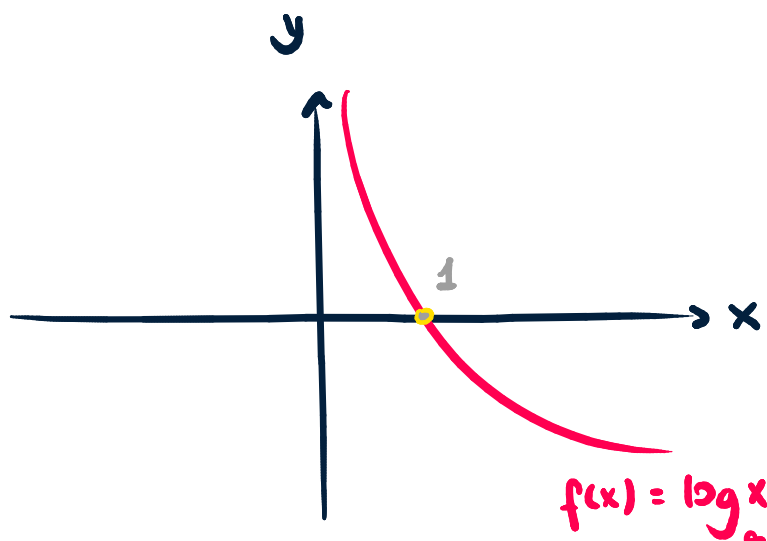


GRÁFICOS

$$f(x) = \log_a x = y$$

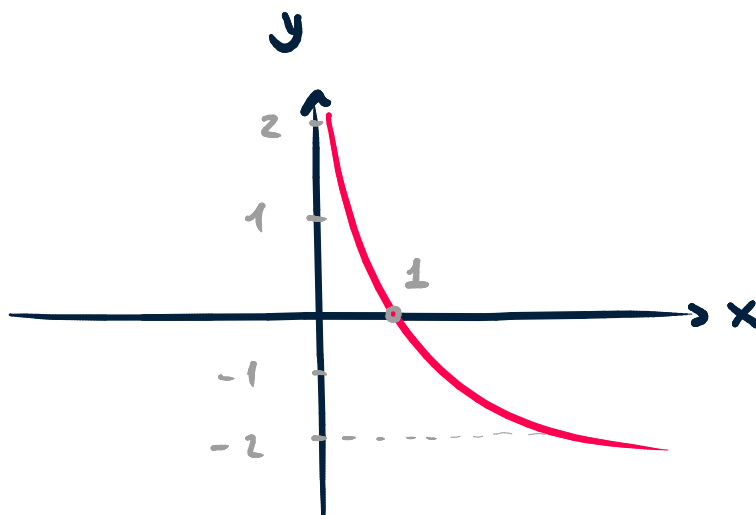
$$0 < a < 1$$

$f(x)$ é decrescente



EXEMPLO : $f(x) = \log_{1/2} x$

x	f(x)
0,25	2
0,5	1
1	0
2	-1
4	-2



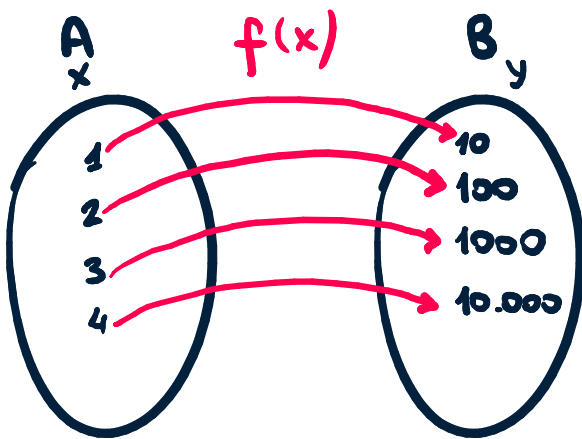
EXPONENCIAL

$$f(x) = 10^x$$

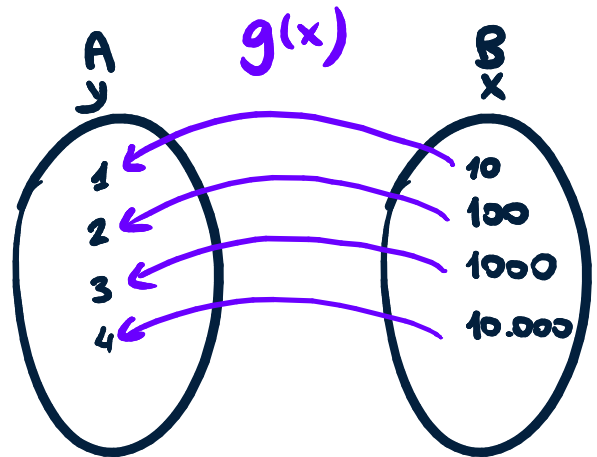


LOGARITMO

$$g(x) = \log_{10} x$$

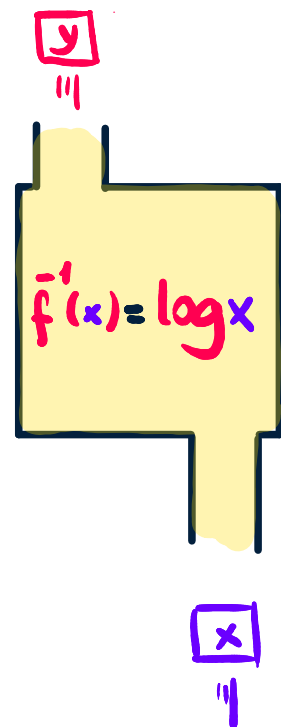
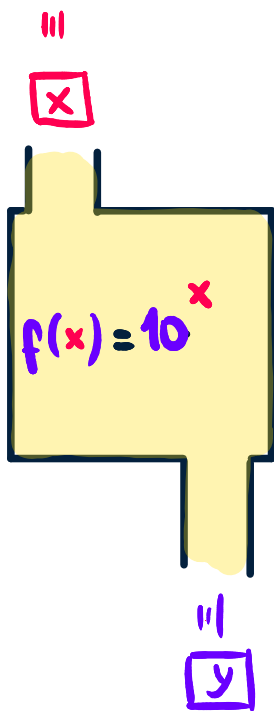


$$f: A \rightarrow B$$

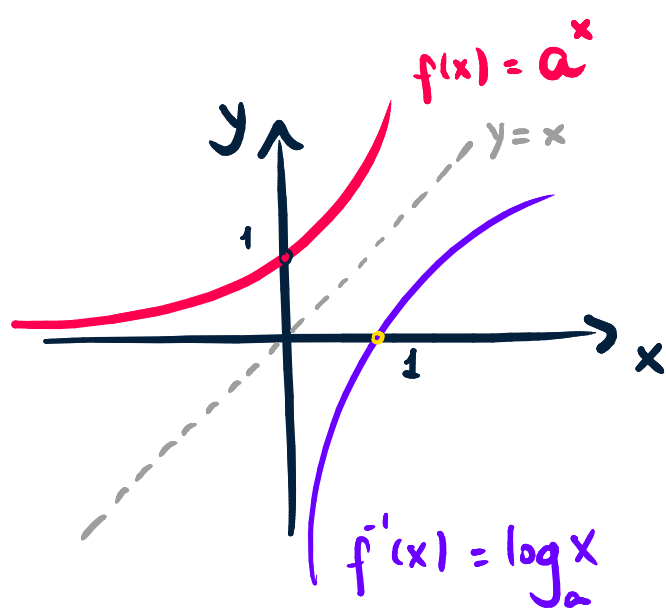
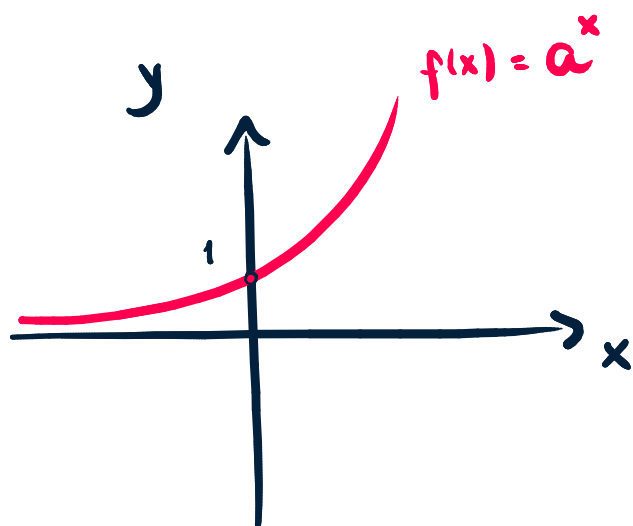


$$g: B \rightarrow A$$

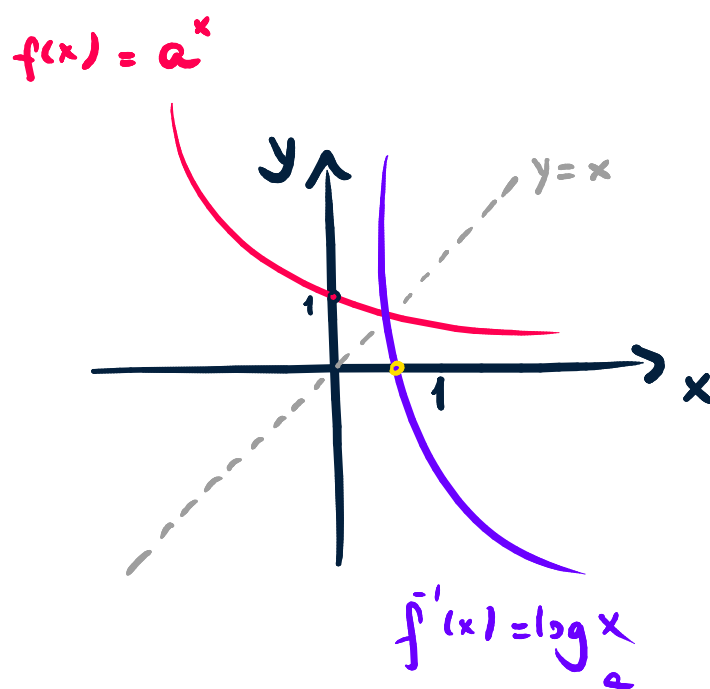
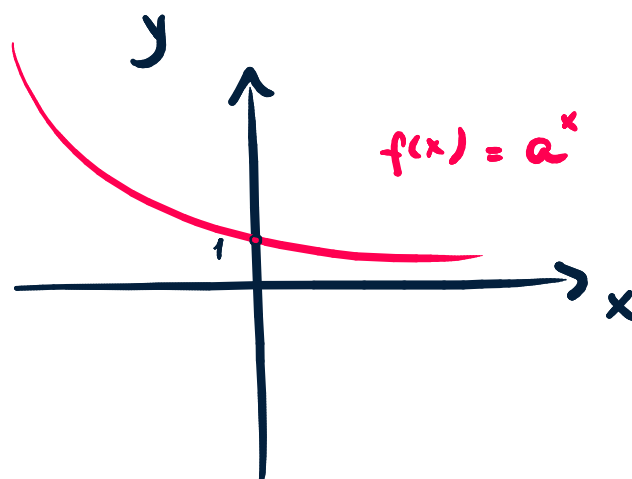
$$g(x) = f^{-1}(x)$$



$$a > 1$$



$$0 < a < 1$$



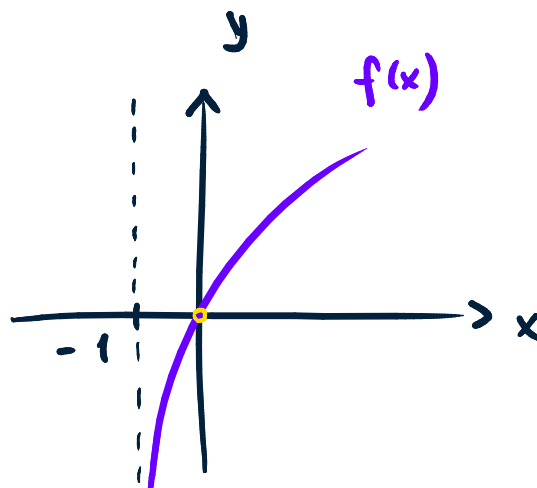
EXEMPLO 01

Construa o gráfico da função $f(x) = \log(x+1)$

R :

$$x+1 > 0 \therefore x > -1$$

$$f(0) = \log(0+1) = \log 1 = 0$$



EXEMPLO 02

Construa o gráfico da função $g(x) = |\log_2 x|$

R :

