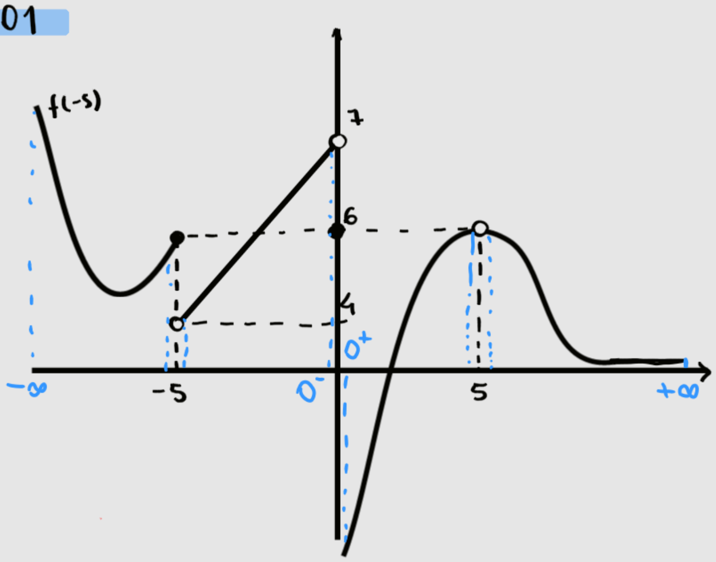
# Prova 1 - Limites

## 01




$f(-5) = 6$

$f(0) = 6$

$f(5) = \nexists$ (bola aberta)

## 2

$$\lim_{x \to 1} \frac{x^2 + 10x - 11}{x^2 - 1} = \lim_{x \to} \frac{\cancel{(x-1)}(x+11)}{\cancel{(x-1)}(x+1)} = \frac{1+11}{1+1} = \frac{12}{2} = \boxed{6}$$

## 3

$$\lim_{x \to 1} \frac{\text{sen}\,(x^2 - 6x + 5)}{x^2 - 1} = \lim_{x \to 1} \frac{\cancel{\text{sen}\,(x-1)(x-5)}}{(\cancel{x-1})(x+1)} \cdot \frac{(x-5)}{(\cancel{x-5})} = \lim_{x \to 1} \frac{(x-5)}{(x+1)} = \frac{-4}{2} = -2$$

## 4

$$\lim_{x \to 2} \boxed{\frac{x^2 - 4}{2x - 4}} = \lim_{x \to 2} \frac{(x - \cancel{2})(x+2)}{2(x - \cancel{2})} = \frac{4}{2} = \boxed{2}$$

## 5 (inteiro negativo)

$$\lim_{x \to \text{🍍}} \frac{x + |\text{🍍}|}{x - \text{🍍}} = \lim_{x \to \text{🍍}} \frac{\cancel{x - \text{🍍}}}{\cancel{x - \text{🍍}}} = \boxed{1}$$

## 6

$$\lim_{x \to +\infty} \frac{-4x^3 + x - 7}{1 - 2x^3} = \lim_{x \to +\infty} \frac{\cancel{x^3}\left(-4 + \cancel{\frac{x}{x^3}}^{0} - \cancel{\frac{7}{x^3}}^{0}\right)}{\cancel{x^3}\left(\cancel{\frac{1}{x^3}}^{0} - 2\right)} = \frac{-4}{-2} = \boxed{2}$$

## 7 (ax + b + 2)

$$\lim_{x \to 0^-} \cancel{15x}^{0} + 7 + 2 = 7 + 2 = \boxed{9}$$

## 8

09 $f(x) = \frac{1}{(x+1)}$

$$\lim_{h \to 0} \frac{\frac{1}{x+h+1} - \frac{1}{x+1}}{h}$$

$$\lim_{h \to 0} \left( \frac{1}{x+h+1} - \frac{1}{x+1} \right) \frac{1}{h}$$

$$\lim_{h \to 0} \frac{\cancel{x}\cancel{+1} - \cancel{x} \cancel{h} \cancel{-1}}{(x+h+1)(x+1)} \cdot \frac{1}{\cancel{h}}$$

-1

$$= \frac{-1}{(x+1)(x+1)} = \boxed{\frac{-1}{(x^2+1)}}$$

*Equação da reta

10 $f(x) = \frac{1}{x^2}$ em $x = 1 \longrightarrow f(1) = 1$

$$\lim_{h \to 0} \frac{\frac{1}{(x+h)^2} - \frac{1}{x^2}}{h}$$

$$\lim_{h \to 0} \frac{x^2 - (x+h)^2}{(x+h)^2 \cdot x^2} \cdot \frac{1}{h}$$

$$f'(1) = \frac{-2}{1^3} = -2$$

$$\lim_{h \to 0} \frac{\cancel{x^2} - \cancel{x^2} - 2 \cdot xh - h^2}{(x+h)^2 \cdot x^2 \cdot h}$$

-1

$$\lim_{h \to 0} \frac{\cancel{-h}(2x - h)}{(x+h)^2 \cdot x^2 \cdot \cancel{h}} = \frac{-2x}{x^2 \cdot x^2} = \frac{-2x}{x^4} = \boxed{\frac{-2}{x^3}}$$

$$y = m(x - x_0) + y_0$$

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

$$y = -2x + 2 + 1$$

$$\boxed{y = -2x + 3}$$