

# CÁLCULO

## AULA 18

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# INTRODUÇÃO



- **Hoje: Limites.**

# INDETERMINAÇÕES

$\frac{0}{0}$	$0^0$	$1^\infty$	$\infty^0$
$\frac{\pm\infty}{\pm\infty}$	$(+\infty) - (+\infty)$	$(-\infty) + (+\infty)$	$0 \cdot (\pm\infty)$

# EXERCÍCIO 1

Calcule os limites abaixo:

a)  $\lim_{x \rightarrow -1} \frac{-2x^3 + x^2 - 3x + 4}{6x^3 + 2x^2 - 5x}$

10

b)  $\lim_{x \rightarrow -3} \frac{x^2 - 9}{x + 3}$

$$a^2 - b^2 = (a + b)(a - b)$$

- 6

c)  $\lim_{x \rightarrow 2} \frac{x^2 - 5x + 6}{x^2 - 12x + 20}$

$$ax^2 + bx + c = a(x - x_1)(x - x_2)$$

1/8



# OPERAÇÕES COM O INFINITO

$$-(+\infty) = -\infty$$

$$-(-\infty) = +\infty$$

$$(+\infty) \cdot (+\infty) = +\infty$$

$$(-\infty) \cdot (-\infty) = +\infty$$

$$(-\infty) \cdot (+\infty) = -\infty$$

$$k \cdot (+\infty) = +\infty, \quad (k > 0)$$

$$k \cdot (+\infty) = -\infty, \quad (k < 0)$$

$$k \cdot (-\infty) = -\infty, \quad (k > 0)$$

$$k \cdot (-\infty) = +\infty, \quad (k < 0)$$

$$\frac{k}{+\infty} = 0 \quad \frac{k}{-\infty} = 0$$

$$\frac{k}{0} = \pm\infty \quad \frac{-\infty}{0} = -\infty$$

$$\frac{\infty}{0} = \infty \quad \frac{+\infty}{0} = +\infty$$

$$\frac{+\infty}{k} = +\infty, \quad (k > 0)$$

$$\frac{-\infty}{k} = -\infty, \quad (k > 0)$$



# EXERCÍCIO 2

Calcule os limites abaixo:

a)  $\lim_{x \rightarrow +\infty} (3x^3 - 4x^2 + 5)$   
**+ INF**

b)  $\lim_{x \rightarrow +\infty} (1 - \frac{1}{x} + \frac{4}{x^2})$   
**1**

c)  $\lim_{x \rightarrow 1^-} \frac{10}{x^2 - 1}$   
**- INF**

d)  $\lim_{x \rightarrow 1} \frac{10}{x^2 - 1}$   
**NÃO EXISTE**



# EXERCÍCIO 3

Calcule os limites abaixo:

a)  $\lim_{x \rightarrow +\infty} \frac{2x+3}{5x-1}$   
**2/5**

b)  $\lim_{x \rightarrow +\infty} \frac{4x-6}{x^2-2x+9}$   
**0**

c)  $\lim_{x \rightarrow -\infty} \frac{4x^3-1}{10x^2+3x+1}$   
**- INF**



# EXERCÍCIO 4

Calcule os limites:

a)  $\lim_{x \rightarrow -1} \frac{2x+1}{x^2-3x+4}$

b)  $\lim_{x \rightarrow -1} (x^3 - 2x^2 + 3x - 4)$

c)  $\lim_{x \rightarrow -3} \frac{x^2+5x+6}{x^2-x-12}$

d)  $\lim_{x \rightarrow 2^-} \frac{2x}{x^2-4}$

e)  $\lim_{x \rightarrow 2^+} \frac{2x}{x^2-4}$

f)  $\lim_{x \rightarrow +\infty} (2x^3 - 8x^2 - 1)$

g)  $\lim_{x \rightarrow -7} \frac{49-x^2}{7+x}$

h)  $\lim_{x \rightarrow 6^-} \frac{4}{x-6}$

i)  $\lim_{x \rightarrow 0^+} \frac{x+5}{x}$

j)  $\lim_{x \rightarrow +\infty} \frac{x^3+5}{2-4x-x^2}$

k)  $\lim_{x \rightarrow +\infty} \frac{-3x^2-5x+9}{8-5x+12x^2}$

l)  $\lim_{x \rightarrow -\infty} \frac{x-6x^2}{x^3-2x^2+10}$





# GABARITO

- a)  $-1/8$
- b)  $-10$
- c)  $1/7$
- d)  $-\text{INF}$
- e)  $+\text{INF}$
- f)  $+\text{INF}$
- g)  $14$
- h)  $-\text{INF}$
- i)  $+\text{INF}$
- j)  $-\text{INF}$
- k)  $-0,25$
- l)  $0$

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