

PUNTOS CRITICOS - FUNCION CRECIENTE FUNCION DECRECIENTE

$$1. f(x) = x^3 - 3x^2$$

$$f'(x) = 3x^2 - 6x$$

$$3x^2 - 6x = 0 \quad \text{Factor comun}$$

$$3x(x-2) = 0$$

$$3x = 0$$

$$x = \frac{0}{3}$$

$$x = 0$$

$$x - 2 = 0$$

$$x = 2$$

$$f(x) = x^3 - 3x^2$$

$$f(0) = (0)^3 - 3(0)^2$$

$$f(0) = 0 \quad \text{MAXIMO}$$

$$f(x) = x^3 - 3x^2$$

$$f(2) = (2)^3 - 3(2)^2$$

$$f(2) = 8 - 12$$

$$f(2) = -4 \quad \text{MINIMO}$$

$$(-\infty, 0)$$

$$(0, 2)$$

$$(2, +\infty)$$

$$f''(3x^2 - 6x)$$

$$f''(6x - 6)$$

$$f''(6) - 6$$

$$f'' = 0 - 6$$

$$= -6 \quad \text{maximo}$$

$$f = 3(-3)^2 - 6(-3) = +45$$

$$f' = 3(-1)^2 - 6(-1) = -3$$

$$f' = 3(3)^2 - 6(3) = 9$$

$$f''(6(2) - 6)$$

$$12 - 6$$

$$= 6 \quad \text{minimo}$$

$$5) f(x) = \frac{x^2 + 2x + 1}{x}$$

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

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

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

$$= \frac{x^2-1}{x^2}$$

$$2) f(x) = x^2 + 2x + 2$$

$$f(x) = 2x + 2$$

$$f(x) = 2(x+1)$$

$$0 = 2(x+1)$$

$$x = -1$$

$$f(-1) = -1^2 + 2(-1) + 2$$

$$f(-1) = -1 - 2 + 2$$

$$f(-1) = -1$$

$$f'' = 2x + 2$$

$$f'' = 2 \text{ minimo}$$

Pontos críticos

$$(-1, 2)$$

$$4) f(x) = \sqrt{x^2 + 1}$$

$$f'(x) = \frac{1}{2} (x^2 + 1)^{\frac{1}{2} - 1} \cdot (x^2 + 1)$$

$$f(0) = \frac{0}{\sqrt{0^2 + 1}} = 0$$

$$f(x) = \frac{x^2 + 1}{2\sqrt{x^2 + 1}}$$

$$(-\infty, 0)$$

$$f(x) = \frac{2x + 0}{2\sqrt{x^2 + 1}}$$

$$\frac{(-1)}{\sqrt{(-1)^2 + 1}} = \frac{-1}{\sqrt{2}} = -0$$

$$(0, 1)$$

$$f(x) = \frac{x}{\sqrt{x^2 + 1}}$$

$$\frac{(0, 5)}{\sqrt{(0, 5)^2 + 1}} = \frac{1}{\sqrt{5}} = 0,44 \text{ minimo}$$

$$0 = \frac{x}{\sqrt{x^2 + 1}}$$

$$3 f(x) = 3x^5 - 5x^3$$

$$f'(x) = 15x^4 - 15x^2 \rightarrow 15x^2(x^2 - 1) = 0$$

$$f'(x) = 0$$

$$15x^2 - 15x^4 = 0$$

$$15x^2(x^2 - 1) = 0$$

$$15x^2(x-1)(x+1) = 0$$

$$15x^2 = 0$$

$$x^2 = 0$$

$$x = 0$$

$$x - 1 = 0$$

$$x = 1$$

$$x + 1 = 0$$

$$x = -1$$

Pontos críticos

$$(0, 0) \Rightarrow m$$

$$(-1, 2) \Rightarrow \text{máximo}$$

$$(1, -2) \Rightarrow \text{mínimo}$$

$$f(x) = 3x^5 - 5x^3$$

$$f(1) = 3(1)^5 - 5(1)^3$$

$$f(-1) = 3(-1)^5 - 5(-1)^3$$

$$f(0) = 3(0)^5 - 5(0)^3$$

$$f(1) = -2$$

$$f(-1) = -2$$

$$f(0) = 0$$

$$(-\infty, -1)$$

$$f(x) = 15x^4 - 15x^2$$

$$f(-2) = 15(-2)^4 - 15(-2)^2$$

$$f(-2) = 180$$

$$(-1, 0)$$

$$f(x) = 15x^4 - 15x^2$$

$$f(-0,5) = 15(-0,5) - 15(0,5)^2$$

$$f(-0,5) = \frac{-45}{16} = 2,81$$