

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

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

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

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

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

$$x^2 = 0 \quad -x^2 + 1 = 0$$

$$x = 0$$

$$x^2 = 1$$

$$x = \pm 1$$

$$f''(x) = -60x^3 + 30x$$

$$f''(0) = 0 \quad \text{inflection point}$$

$$f''(1) = -60 + 30 = -30$$

$$f''(-1) = 30$$



$$x = 1 \quad \text{max}$$

$$x = -1 \quad \text{min}$$

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

$$f(x) = (x^2 + 1)^{1/2}$$

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

$$0 = x(x^2 + 1)^{-1/2}$$

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

$$x = 0$$

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

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

$$f''(0) = 1^{-1/2} = 1$$

minimum @ $x = 0$



