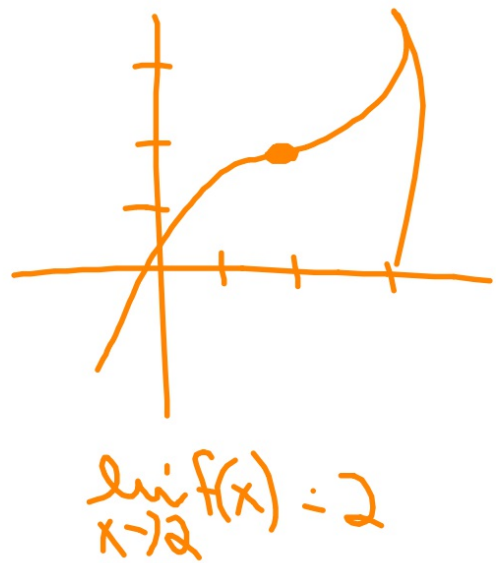


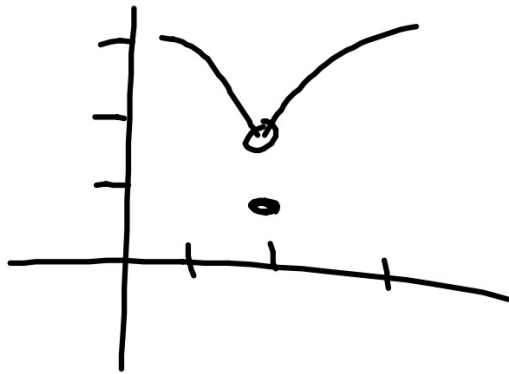
# Limits

$$\lim_{x \rightarrow 4} 2x + 8 = 16$$

$$\lim_{x \rightarrow 2} \frac{x^2 + 5x + 6}{x^2 - 4} = \frac{0}{0}$$

$$\lim_{x \rightarrow 2} \frac{(x+3)(x+2)}{(x+2)(x-2)} = \frac{1}{4}$$





$$\lim_{x \rightarrow 2^+} f(x) = 2 \quad f(2) = 1$$

$$\lim_{x \rightarrow 2^-} f(x) = 2$$

Ch. 2

$$f(x) = 5x^2$$

$$\frac{dy}{dx} = 10x$$

$$f(x) = x^2 \sin x$$
$$2x \sin x + x^2 \cos x$$

$$g(x) = \frac{x^2}{\tan x}$$

$$\frac{2x \tan x - x^2 \sec^2 x}{(\tan x)^2}$$

$$h(x) = (2x+3)^{20}$$

$$u = 2x+3$$

$$y = u^{20}$$

$$du = 2dx$$

$$dy = 20u^{19}$$

$$40(2x+3)^{19}$$

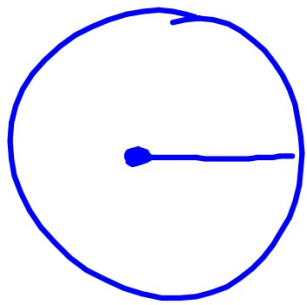
$$xy = 8$$

Implicit

$$\frac{dx}{dx} y + x \frac{dy}{dx} = 0$$

$$x \frac{dy}{dx} = -y$$

$$\frac{dy}{y} = -\frac{dx}{x}$$



1. Want
2. Have
3. Picture
4. Equation
5. Derive

Radius changes at  $3 \frac{\text{cm}}{\text{sec}}$

'How fast does area change

when  $r = 4$

1.  $\frac{dA}{dt}$

4.  $A = \pi r^2$

2.  $r, \frac{dr}{dt}$

5.  $\frac{dA}{dt} = 2\pi r \frac{dr}{dt}$

3.  $0$