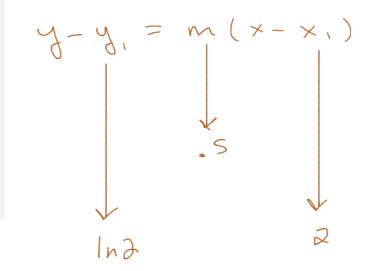
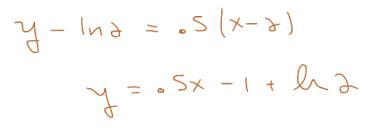
If a ball is thrown into the air with a velocity of 40 ft/s, its height in feet after t seconds is given by $y = 40t - 16t^2$. (a) Find the average velocity for the time period beginning with t=2 and (1) lasting 0.5 seconds: ft/s ft/s (2) lasting 0.1 seconds: (3) lasting 0.05 seconds: ft/s []0,6] (4) lasting 0.01 seconds: ft/s -24 ft/s y'(2) = 40 - 32(2) = -24(b) Find the instantaneous velocity when t=2: derivative of y when t = 2we'll use the Power Rule for derivatives. y' = 40 - 32tnow, "t " is the variable, not x so we'll take the derivative with respect to t $\frac{d}{dt}(y) = y' = \frac{dy}{dt}$

(b) Guess the slope of the tangent line to the curve at P.

(c) Using the slope from part (b), find the equation of the tangent line to the curve at ${\cal P}.$

(1)		
(2)		
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(b) (c)	.5	
(c)		





Power Rule

$$f(x) = x^{n}, \quad think \quad n = 2, 3, 4, 5, ...$$

$$f'(x) = \lim_{h \to 0} \frac{(x+h)^{n} - x^{n}}{h}$$

$$= \lim_{h \to 0} \frac{x^{n-1}h + {\binom{n}{2}x^{n-2}} + \frac{n^{n-3}}{(n^{n-3})x^{n-3} + ... + {\binom{n}{n-1}} + \frac{n^{n-1}}{(n^{n-1})x^{n-1}} + \frac{n^{n-1}}{(n^{n-1}$$

51 = 5.4.3.2.1

Reminder of two important denv. properties -----

$$\frac{d}{dx} = symbol for the derivative with respect to x''
x is the variable
$$\frac{d}{dx} \left(\frac{1}{2}(x) + \frac{1}{2}(x) \right) = \frac{d}{dx} \left(\frac{1}{2}(x) + \frac{1}{2}(x) \right) = \frac{d}{dx} \left(\frac{1}{2}(x) + \frac{1}{2}(x) \right)$$

$$E_{+}$$

$$E_{$$$$

$$\widehat{\bigoplus} \frac{d}{dx} \left(k \cdot f(x) \right) = k \cdot \frac{d}{dx} \left(f(x) \right)$$

$$k \in \mathbb{R}$$

$$F(x) = \partial 3x^{3}$$

$$F'(x) = \partial 3x^{3} = 69x^{3}$$

Power Rule -

works for any $n \in \mathbb{R}$ eq., n = 1, 2, 3, ...n = 1/2, 3/2 $n = \tau, e$,

$$E \times f(x) = \sqrt{x}, \quad f'(x) = \frac{1}{2} \times \frac{\pi}{2}$$
$$= \frac{\pi}{2}$$
$$E \times f(x) = x^{\pi}, \quad f'(x) = \pi \times \frac{\pi}{2}$$

Ex Coreful! the x must be in the k

$$f_{i}(x) = 2$$
 $f'_{i}(x) = power rule$
doesn't opply

