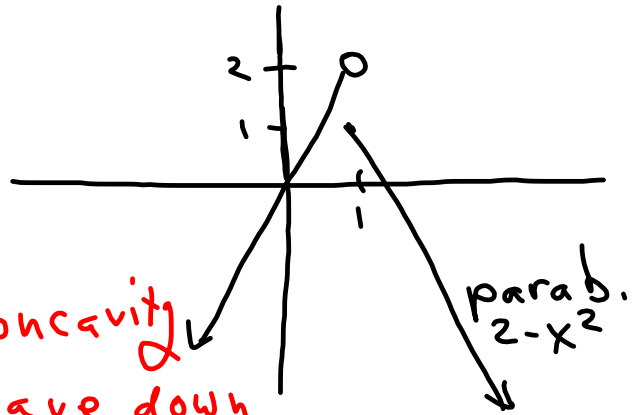


p. 215 #11

$$y' = \begin{cases} 2, & x < 1 \\ -2x, & x \geq 1 \end{cases}$$

$$y = \begin{cases} 2x, & x < 1 \\ 2 - x^2, & x \geq 1 \end{cases}$$

$$y'' = \begin{cases} 0, & x < 1 \\ -2, & x \geq 1 \end{cases}$$



for  $x < 1$ , no concavity  
 for  $x \geq 1$ , concave down  
 b/c  $y'' < 0$

#13

$$y = x \cdot e^x \quad y'' < 0$$

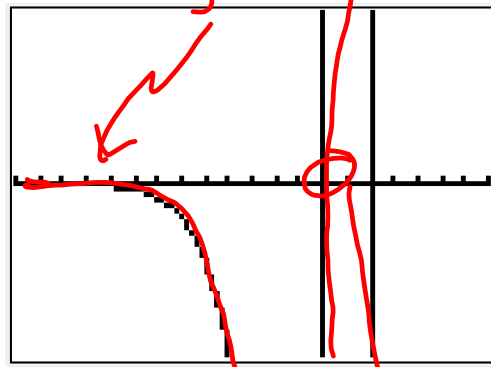
$$y' = e^x + x e^x$$

$$y'' = e^x + e^x + x e^x$$

$$= 2e^x + x e^x$$

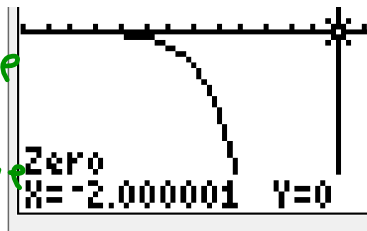
$$y'' = e^x (2 + x)$$

$$y'' = 0 @ x = -2$$

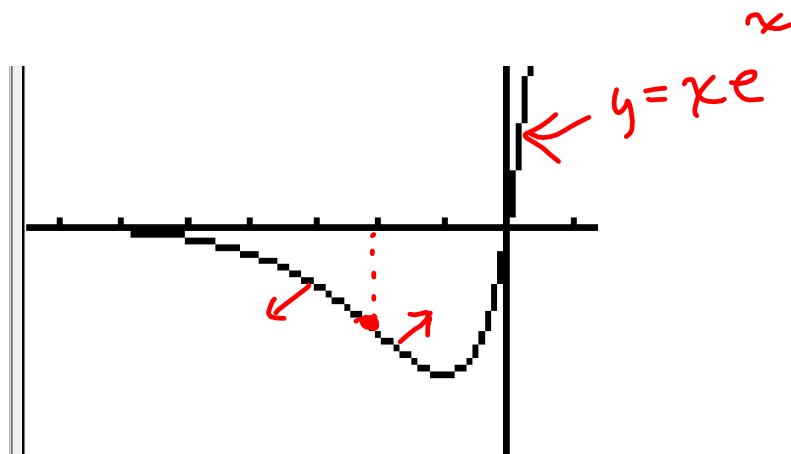


$x < -2$  concave down

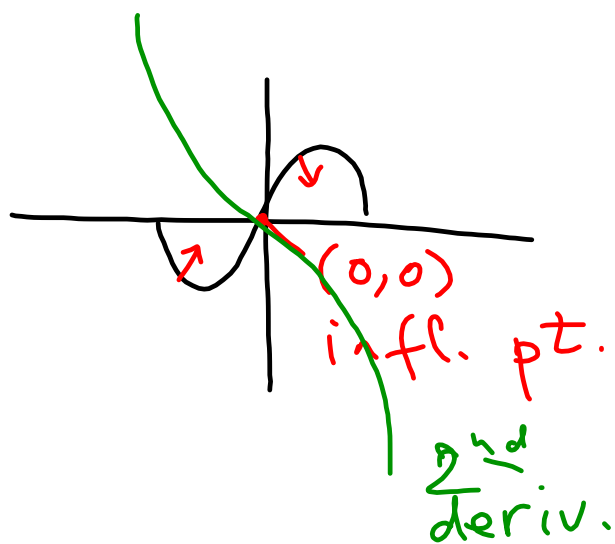
$x > -2$  concave up



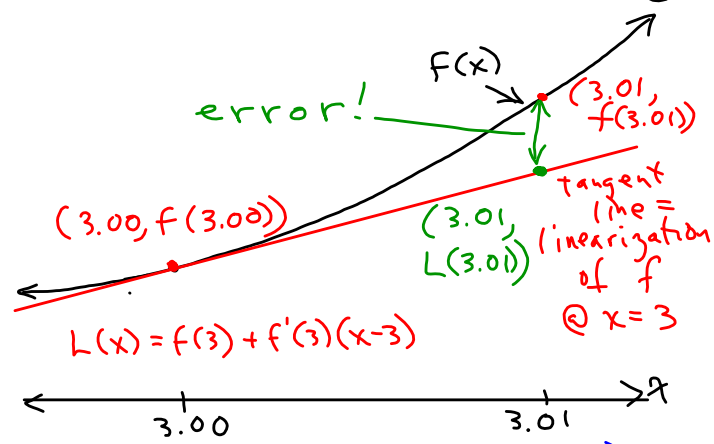
$y'' = 0 @ x = -2$



#14  $y = x\sqrt{9-x^2}$   $|x| \leq 3$



Topic: linearization,  
estimate of change.

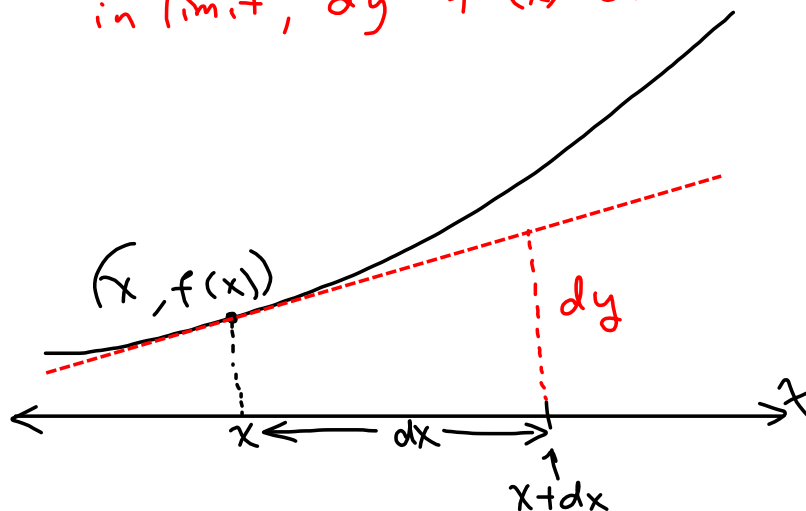


estimate  $f(3.01)$   
using  $L(x)$ ?

$$\text{error} = |L(3.01) - f(3.01)|$$

Topic: differentials

$$\text{in limit, } dy = f'(x) \cdot dx$$



$$\#19 \quad y = x^3 - 3x$$

$$y' = 3x^2 - 3$$

$$x = 2, \quad dx = .05$$

$$dy = y'(x) \cdot dx$$

↑                    ↑                    ↑  
                          2                    .05

estimate of  
change in  $y$  at .05  
distance from 2