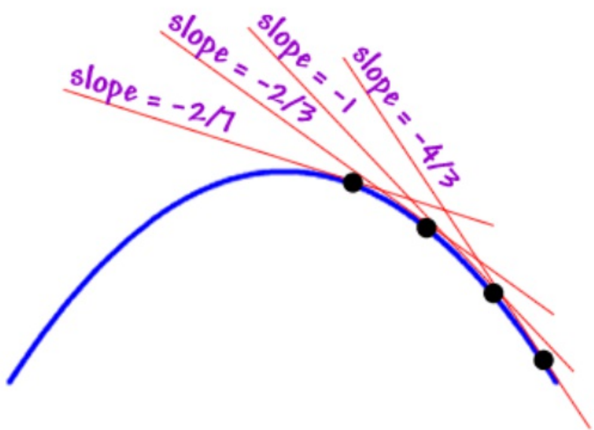
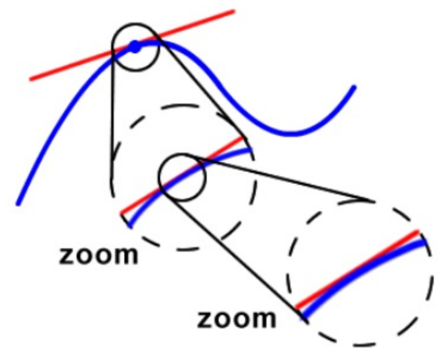
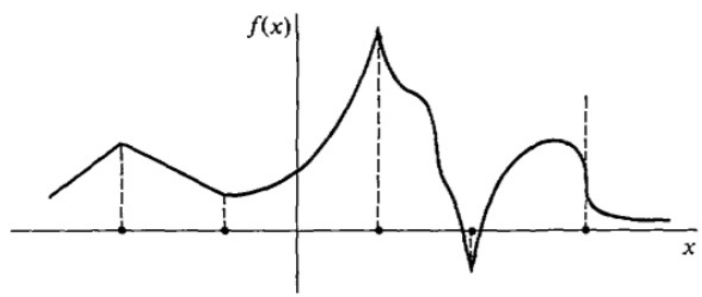
Good afternoon: Assessments are being passed back; if you got it yesterday, please get it out when the bell rings





'Free' retake of Wednesday's test will be on Monday 😁



D-AD2: Power Rule, All 6 Trig Derivatives, Exponential Derivatives

D-AD2b: Inverse Trig, Log Derivatives, Chain Rule versions of above

D-AD3: Product and Quotient Rules (will need to simplify Monday)

D-AD4: Chain Rule, algebraically and from table

D-CD4: Show continuity and (non)differentiability, make differentiable, find non differentiable points on a given graph

#3

$$y = 6^x - \sec x - \tan x$$

$$\frac{dy}{dx} = \cancel{x \cdot 6^{x-1}}$$

6^x exp $\rightarrow 6^x \cdot \ln 6$

x^6 power $\rightarrow 6x^5$

$$\frac{dy}{dx} = 6^x \cdot \ln 6 - \sec x \cdot \tan x - \sec^2 x$$

#1

$$6x^{-3}-\frac{1}{2}x^{2}-x^{-4/3}$$

$$\boxed{-18x^{-4}-x+\frac{4}{3}x^{-7/3}}$$

#2

$$-5\cot r$$

$$-\csc^2$$

$$5\csc^2 r$$

#4 and
some chain rule
generalizations

$$y = e^{5t^2} \quad 10t$$

$$y = 10t\, e^{5t^2}$$

$$\frac{d}{dx} f(g(x)) = f'(g(x))\, g'(x) \quad \text{chain}$$

$$\frac{d}{dx} e^{g(x)} = e^{g(x)} \cdot g'(x)$$

$$\frac{d}{dx} 7^{f(x)} = 7^{f(x)} \cdot \ln 7 \cdot f'(x)$$

$$\frac{d}{dx} \cos(f(x))$$

$$= -\sin(f(x)) \cdot f'(x)$$

#5

$$y' = \frac{6x-2}{3x^2-2x}$$

$$\frac{1}{3x^2-2x} \cdot 6x-2$$

$$\frac{6-2}{3-2} = \frac{4}{1} = 4$$

generalization of ln rule

$$(\ln x)' = \frac{1}{x}$$

$$\boxed{\frac{d}{dx}\left(\ln f(x)\right) = \frac{1}{f(x)} \; f'(x)}$$

$$\ln(3x^2-2x) = \frac{1}{3x^2-2x} \cdot 6x-2$$

$$\frac{1}{3} \cdot 4$$

$$\frac{4}{3}$$

#6

$$y = \sqrt{3x}$$

$$y = (3x)^{1/2}$$

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

$$\frac{3}{2}(3x)^{-1/2} \rightarrow \frac{3}{2\sqrt{3x}}$$

$$y = \sqrt{3x} = (3x)^{1/2}$$

$$y = 3\sqrt{x}$$

$$= 3x^{1/2}$$

#9

$$y = (5x^2 - 3x + 2)^{40}$$

$$y' = 40(5x^2 - 3x + 2)^{39} \cdot (10x - 3)$$

#10

$x^2 \neq 2^x$

$y = \sin^2(2x)$

$y = [\sin(2x)]^2$

$y' = \boxed{2}[\sin(2x)]^1 \cdot \cos(2x) \cdot \boxed{2}$

$4\sin(2x)\cos(2x)$

#11

$$f'(g(\overset{3}{\cancel{x}}))\cdot g'(\overset{3}{\cancel{x}})$$

$$f'(2) \qquad -\tfrac{3}{2}$$

$$\cancel{-\tfrac{1}{2}}\ \ \tfrac{3}{2} \cdot -1$$

#13 $f(x)=\begin{cases} ax^2+bx-3, & x<1 \\ -x^2+3x+6, & x\geq 1 \end{cases}$

$\begin{cases} a+b-3=8 \\ -1+3+6=8 \end{cases}$ $+3$

$f'(x)\begin{cases} 2ax+b=2a+b=1 \\ -2x+3=1 \end{cases}$

$\begin{cases} a+b=11 \\ 2a+b=1 \end{cases}$

$b=-a+11$

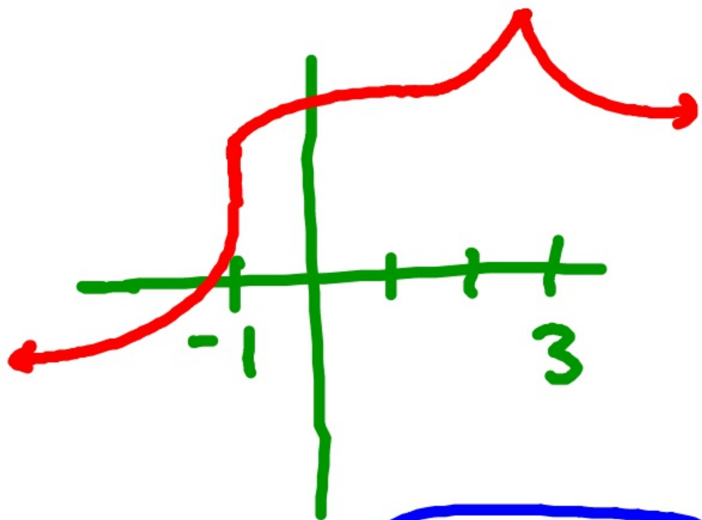
$2a-a+11=1$

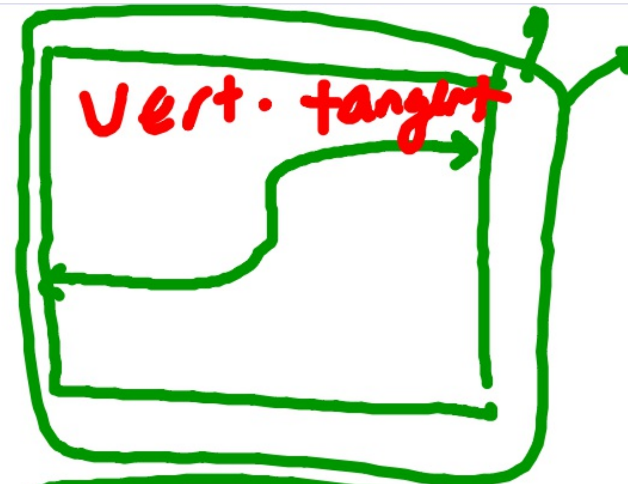
$a=-10$

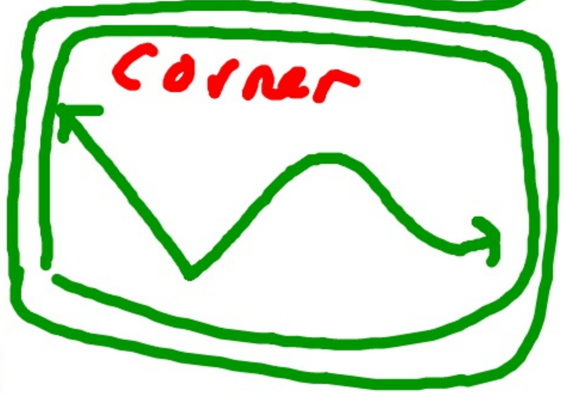
$-10+b=11$

!! $b=21$

#14







$$y = \sin^{-1}(3x)$$

Inverse Trig Deriv.

$$y = \arcsin(3x)$$

$$\frac{dy}{dx}\sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$$

$$y' = \frac{1}{\sqrt{1-(3x)^2}} \cdot 3 \rightarrow \frac{3}{\sqrt{1-9x^2}}$$

$$y = \arctan(e^x)$$

$$y' = \frac{1}{1+(e^x)^2} \cdot e^x$$

$$\frac{1}{1+e^{2x}} \cdot e^x$$

$$\arctan(\ln x)$$

$$\frac{1}{1+(\ln x)^2} \cdot \frac{1}{x}$$

$$\frac{1}{x(1+(\ln x)^2)}$$