

Good afternoon and welcome back! Warm up in notes:

Find the equation of the line tangent to  $y=(x^2-2x-3)(2x+5)$  when  $x=1$ .

$$\begin{aligned}y - \underline{\underline{y_1}} &= m(x - x_1) \quad \left\{ \begin{array}{l} y' = f'g + fg' \\ y' = (2x-2)(2x+5) \\ \quad + (x^2-2x-3)(2) \\ y'(1) = 0 + (-4)(2) \\ \quad - 8 \end{array} \right. \\y(1) &= \dots = -28 \\y + 28 &= -8(x-1) \\y &= -8x - 20\end{aligned}$$

$f: x^2-2x-3$   
 $g: 2x+5$   
 $f': 2x-2$   
 $g': 2$

Derivative of  $\tan(x)$

(Notes).

$$y = \tan(x)$$

$$y = \frac{\sin(x)}{\cos(x)} - f$$

$$\frac{d}{dx} \left[ \frac{f}{g} \right] = \frac{f'g - fg'}{g^2}$$

$$f = \sin(x) \quad g = \cos(x)$$

$$f' = \cos(x) \quad g' = -\sin(x)$$

$$y' = \frac{\cos(x)\cos(x) + \sin(x) \cdot (-\sin(x))}{\cos^2(x)}$$

$$y' = \frac{\cancel{\cos^2(x)} + \sin^2(x)}{\cancel{\cos^2(x)}}$$

$$y' = \frac{1}{\cos^2(x)} \Rightarrow \sec^2(x)$$



$$\frac{d}{dx} [\tan(x)] = \sec^2(x)$$

$$\frac{d}{dx} [\csc(x)] = -\csc(x)\cot(x)$$

$$\frac{d}{dx} [\sec(x)] = \sec(x)\tan(x)$$

$$\frac{d}{dx} [\cot(x)] = -\csc^2(x)$$

$$\frac{d}{dx} \sin(x) = \cos(x)$$

$$\frac{d}{dx} \cos(x) = -\sin(x)$$

NOTE CORRECTION  
FROM CLASS

HW: same as before,  
p. 105: # 75-80, #87-90  
p. 125: #3-33 (mult of 3)