

AP Calc AB  
Partner POP quiz

21 pts

Find the derivative: 3pts each

1.  $y = \log_3(\sin x)$

$$y = \frac{\ln(\sin x)}{\ln 3}$$

$$y' = \frac{1}{\ln 3} \cdot \frac{1}{\sin x} \cdot \cos x$$

$$y' = \frac{\cot x}{\ln 3}$$

3.  $y = \frac{\ln x}{x}$

$$y' = \frac{x(\frac{1}{x}) - \ln x}{x^2}$$

$$y' = \frac{1 - \ln x}{x^2}$$

5.  $y = x^{\cot x}$

$$\ln y = \cot x \cdot \ln x$$

$$\frac{1}{y} y' = \ln x (-\csc^2 x) + \cot x \cdot \frac{1}{x}$$

$$y' = y \left( -\ln x \csc^2 x + \frac{\cot x}{x} \right)$$
$$= x^{\cot x} \left( -\ln x \csc^2 x + \frac{\cot x}{x} \right)$$

7. Given  $y = xe^{2x}$  find  $\frac{d^2y}{dx^2}$ :

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

$$= e^{2x} + 2xe^{2x}$$

$$y'' = 2e^{2x} + e^{2x} \cdot 2 + 2x \cdot 2e^{2x}$$

$$y'' = 2e^{2x} + 2e^{2x} + 4xe^{2x}$$

names Key

2.  $y = 7^{4x-x^2}$

$$y' = 7^{4x-x^2} \cdot \ln 7 (4-2x)$$

4.  $y = e^{\ln^2 x}$

$$y' = e^{\ln^2 x} \cdot 2 \ln x \cdot \frac{1}{x} =$$

6.  $y = x^{\sqrt{3}+1}$

$$y' = (\sqrt{3}+1) x^{\sqrt{3}}$$