

Quiz #8

Directions: Carefully read each question below and answer to the best of your ability in the space provided. You **MUST** show your work to receive full credit!

1. (5 points) Find the derivative of the following function:

$$(x^3 + \sin(5x^2))^4.$$

Solution:

$$\begin{aligned}\frac{d}{dx} ((x^3 + \sin(5x^2))^4) &= 4 (x^3 + \sin(5x^2))^3 \cdot \frac{d}{dx} (x^3 + \sin(5x^2)) \\ &= 4 (x^3 + \sin(5x^2))^3 \cdot \left(3x^2 + \cos(5x^2) \cdot \frac{d}{dx} (5x^2) \right) \\ &= 4 (x^3 + \sin(5x^2))^3 (3x^2 + \cos(5x^2) \cdot 10x) \\ &= \boxed{4 (x^3 + \sin(5x^2))^3 (3x^2 + 10x \cos(5x^2))}\end{aligned}$$

2. (5 points) Find the equation of the tangent line to the curve $y = x^3 + e^{2x}$ at the point (0,1).

Solution: First, let's find the derivative at $x = 0$, that is

$$\left. \frac{d}{dx} (x^3 + e^{2x}) \right|_{x=0} = (3x^2 + 2e^{2x}) \Big|_{x=0} = 2.$$

And then you can use for example point-slope formula to find the tangent line equation:

$$y - 1 = 2(x - 0) \quad \Leftrightarrow \quad \boxed{y = 2x + 1}.$$

Name: _____

Section (circle one): 003 004

Question:	1	2	Total
Points:	5	5	10
Score:			