

Quiz 3A - MTH 1410

1:21

Give 15 minutes.

Name: Key

1) (4 points) Calculate $f'(x)$ if

$$f(x) = 7 \cdot e^{2x} \cdot \sin(x^3)$$

Simplify your answer by factoring out common factors (if any).

$$f'(x) = 7 \left[\left(\frac{d}{dx} e^{2x} \right) \cdot \sin(x^3) + e^{2x} \cdot \left(\frac{d}{dx} (\sin(x^3)) \right) \right] \checkmark$$
$$= 7 \left(e^{2x} \cdot 2 \cdot \sin(x^3) + e^{2x} \cdot \cos(x^3) \cdot 3x^2 \right) \checkmark$$

$$= 7e^{2x} (2\sin(x^3) + 3x^2 \cos(x^3)) \checkmark$$

2:08

2:10

2) (3 points) Find $s'(t)$ if $s(t) = \frac{t^2 + 2t + 7}{t + 3}$. Simplify your answer.

$$\begin{aligned}
 s'(t) &= \frac{\frac{d}{dt}(t^2 + 2t + 7)(t + 3) - \frac{d}{dt}(t + 3)(t^2 + 2t + 7)}{(t + 3)^2} \quad \checkmark \\
 &= \frac{(2t + 2)(t + 3) - 1(t^2 + 2t + 7)}{(t + 3)^2} \\
 &= \frac{2t^2 + 2t + 6t + 6 - t^2 - 2t - 7}{(t + 3)^2} \\
 &= \boxed{\frac{t^2 + 6t - 1}{(t + 3)^2}} \quad \checkmark
 \end{aligned}$$

3) (3 points) Find $\frac{dy}{dx}$ if $\cot y = 9y^2 + 4x^2$.

$$\begin{aligned}
 \frac{d}{dx}(\cot y) &= \frac{d}{dx}(9y^2 + 4x^2) \quad \checkmark \\
 -\csc^2 y \cdot \frac{dy}{dx} &= 9(2y) \cdot \frac{dy}{dx} + 8x \quad \checkmark \text{ 1/2} \\
 (-\csc^2 y - 18y) \frac{dy}{dx} &= 8x \quad \checkmark \\
 \boxed{\frac{dy}{dx} = \frac{8x}{-\csc^2 y - 18y}}
 \end{aligned}$$

Quiz 3B - MTH 1410

Name: Key

1) (3 points) Find $\frac{dy}{dx}$ if $\tan y = 4y^2 + 9x^2$.

$$\frac{d}{dx} (\tan y = 4y^2 + 9x^2) \quad 1/2$$

$$\Rightarrow \sec^2 y \cdot y' = 8y \cdot y' + 18x \quad 1.5$$

$$\Rightarrow (\sec^2 y - 8y) y' = 18x \quad \checkmark$$

$$y' = \frac{18x}{\sec^2 y - 8y}$$

2) (3 points) Find $s'(t)$ if $s(t) = \frac{t^2 + 3t + 5}{t + 2}$. Simplify your answer.

$$s'(t) = \frac{(2t + 3)(t + 2) - (t^2 + 3t + 5) \cdot 1}{(t + 2)^2} \quad \checkmark \checkmark$$

$$= \frac{2t^2 + 7t + 6 - t^2 - 3t - 5}{(t + 2)^2} \quad \text{all}$$

$$= \frac{t^2 + 4t + 1}{(t + 2)^2} \quad \checkmark$$

3)(4 points) Calculate $f'(x)$ if

$$f(x) = 7 \cdot e^{3x} \cdot \cos(x^2)$$

Simplify your answer by factoring out common factors (if any).

$$f'(x) = 7 \frac{d}{dx} (e^{3x} \cdot \cos(x^2))$$

$$= 7 [e^{3x} \cdot 3 \cdot \cos(x^2) + e^{3x} \cdot (-\sin(x^2)) \cdot 2x]$$

$$= 7e^{3x} (3 \cos(x^2) - 2x \sin(x^2))$$