

Math 135, Calculus 1, Fall 2020

Weekly Quiz 11-11

Show all work: clearly indicate your answer and the reasoning used to arrive at the answer. Unsupported answers may not receive full credit.

Problem 1. For the equation $xy + 3x + 4y = -2$, calculate the derivative $\frac{dy}{dx}$ at the point $(1, -1)$.

$$\frac{d}{dx}(xy + 3x + 4y) = \frac{d}{dx}(-2)$$

$$(1)y + x \cdot \frac{dy}{dx} + 3 + 4 \frac{dy}{dx} = 0$$

$$x = 1, y = -1$$

$$(1)(-1) + (1) \frac{dy}{dx} + 3 + 4 \frac{dy}{dx} = 0$$

$$2 + 5 \frac{dy}{dx} = 0$$

$$\boxed{\frac{dy}{dx} = -\frac{2}{5}}$$

Problem 2. Use logarithmic differentiation to compute $f'(x)$ if $f(x) = x^{8x}$. You must show all work.

$$\frac{d}{dx} \left(\ln(f(x)) = \ln(x^{8x}) = 8x \cdot \ln(x) \right)$$

$$\frac{f'(x)}{f(x)} = (8) \ln(x) + 8x \cdot \frac{1}{x}$$

$$\boxed{f'(x) = (8 \ln(x) + 8) (x^{8x})}$$