1. (15 points) Let $f$ and $g$ be two differentiable functions, which of the following is NOT correct?

(a) \[ \frac{d}{dx} [f(x) + g(x)] = f'(x) + g'(x); \]

(b) \[ \frac{d}{dx} [(f(x))(g(x))] = (f'(x))(g(x)) + (f(x))(g'(x)); \]

(c) \[ \frac{d}{dx} [f(g(x))] = f'(g(x)) + f(g'(x)); \]

(d) \[ \frac{d}{dx} \left[ \frac{f(x)}{g(x)} \right] = \frac{(f'(x))(g(x)) - (f(x))(g'(x))}{g^2(x)}, \text{ assuming } g(x) \neq 0. \]

2. (35 points) Compute \( \frac{d}{dx} [\cos^2(e^{\cot x})] \).

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3. (15 points) Among the following formulas, which one is NOT correct?

(a) \( \frac{d}{dx} \csc(x) = -\csc(x) \cot(x); \)

(b) \( \frac{d}{dx} \sec(x) = \sec(x) \tan(x); \)

(c) \( \frac{d}{dx} \tan(x) = \sec^2(x); \)

(d) \( \frac{d}{dx} \cot(x) = \csc^2(x). \)

4. (35 points) Find an equation of the tangent line to the graph of \( y = \ln(e^{-3x} + xe^{-3}) \) at the point \( (0,0) \).

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