Math 1203 Quiz 9
March 26, 2019

Name: _____

Instructions: Answer <u>all</u> problems in the space provided! Do your rough work on scrap paper.

1. Let $f(x)$ and $g(x)$ be differentiable functions of x, c a constant. Complete the following formulas. (You may use $f'$and g' as shorthand):

   (a) $\frac{d}{dx}(x^n) =$ _____ (b) $\frac{d}{dx}e^u =$ _____

   (c) $\frac{d}{dx}\ln u =$ _____ (d) $\frac{d}{dx}(f(x)\cdot g(x)) =$ _____

   (e) $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) =$ _____ (f) $\frac{d}{dx}f\big(g(x)\big) =$ _____

   (g) $\frac{d}{dx}(a^u) =$ _____

2. Differentiate, or find y' in, the following (you don't have to simplify):

   (a) $x^2 + y^2 = 4 \Rightarrow y' =$ _____ (d) $xy + e^y + \ln x = x^2 \Rightarrow y' =$ _____

3. Use log differentiation to compute $\frac{d}{dx}x^x =$ _____

Bonus:

1. Use log differentiation to compute $\frac{d}{dx}\frac{\sqrt{x}(x+1)^3}{e^x(x^2+1)} =$ _____

2. Let $f(x)$ be a differentiable function. Write down the linear approximation formula for $f(x)$ at $x = a$.

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