Math 1203 Quiz 5
February 12, 2019

Name: _____
Instructions: No calculators. Answer <u>all</u> problems in the space provided! Do your rough work on scrap paper.

1. Complete the following rules:

(a) $\log_a(x^n) =$ _____ (b) $\log_a a^x =$ _____ (c) $\log_a(xy) =$ _____

(d) $\log_a\left(\frac{x}{y}\right) =$ _____ (e) $\log_a 1 =$ _____ (f) $\log_a 0 =$ _____

(g) $\log_a b = c$ means _____

2. Simplify the expressions:

(a) $\ln\left(\frac{x^3e^{4x}}{\sqrt{x+1}}\right) =$ _____ (b) $e^{2\ln 4x} =$ _____

(c) $\ln x - \ln\sqrt{x} + 3\ln 4x =$ _____ (combine)

3. Graph the following functions below their definitions:
$y = \ln x$ $y = e^x$

4. Solve the following equations:

(a) $2e^{3x-1} = 5: \Longrightarrow x =$ _____ (b) $\ln\sqrt{x+1} = 3: \Longrightarrow x =$ _____

5. For $f(x) = \frac{1}{x+2}$, find and simplify its average rate of change on [1,3]. $f_{avg} =$ _____

Bonus:

1. Compute the following limits:

(a) $\lim_{x\to\infty} \frac{2+3x^2-x^9}{e^x+2x^9} =$ _____ (b) $\lim_{x\to 1^+} \frac{x^2-1}{(x-1)^2} =$ _____ (c) $\lim_{x\to-\infty} \frac{3+2x-3x^3}{2x^3-12x+1} =$ _____