Practice Test 1
BUSA130
7 Nov 2014

This exam is graded out of 100 points. Show all work necessary to solve the problems. You have 65 minutes.

1) Find any relative extrema of the following functions. Remember a relative extrema is a **point** and should be written as $(x, f(x))$. (10pts each)

- $f(x) = |x + 1| - 2$. (Hint: Look at the graph!)

- $g(x) = x^3 - 3x^2 - 9x + 3$.

2) Sketch the graph of $f(x) = x - 2\sqrt{x}$. (20pts)

3) A ferry fueled by diesel gets $\frac{10}{x}$ nautical miles per gallon of fuel if it is travelling at x nautical miles per hour (where x is between 5 and 10 nautical miles per hour). If the price of diesel is \$5 per gallon and the ferry's crew has a total wage of \$64 per hour, at what speed should the ferry travel to minimize costs? What is this minimal cost rate? (15pts)

4) Determine if it is better to receive a 6% annual interest rate compounded daily or a 6.15% annual interest rate with no compounding. (10pts)

5) Use the laws of logarithms to expand and simplify the expression $\log \frac{2(10^x)}{x^2}$. (10pts)

6) Solve $4^x = \dfrac{1}{16^{-x^2}}$ for x. (10pts)

7) The differential dy is given by $dy = f'(x)dx$. If $f(x) = \sqrt[4]{x}$, use the differential to estimate the value of $\sqrt[4]{16.5}$ by calculating $f(16) + \left(dy \Big|_{x=16, dx=0.5} \right)$. (15pts)

There will be a bonus question! (3pts)