MATH 1A: PRACTICE MIDTERM 2

November 4, 201(50 minutes)

Write in complete sentences and show all work.

1.

Find the equation of the tangent line to the curve $y = 2x^3 - 5x$ at the point where $x = -1$.

2. If $y^{3x} = (\sin x)^{(e^{2x})}$. Find $\dfrac{dy}{dx}$.

3.

I start with 100 grams of a radioactive isotope. It has a half life of 3 weeks. How long will it take for there to be 40 grams of the isotope left?

[*Hint: The half-life tells you how long it will take for there to be half of the isotope left.*]

4.   A ladder 10 ft long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 1 ft/s, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is 6 ft from the wall?

Remember to define all of your variables!

5.

A box with a square base and open top must have a volume of $32,000cm^3$. Find the dimensions of the box that minimizes the amount of material used.

6.   Sketch the curve $y = \sqrt[3]{x^3 - x}$.

Your sketch should show the domain of the function, local maxima and minima, where the function is increasing or decreasing, any zeros of the function, the behavior for large positive and negative values of x, and the behavior near $x = 0$ and points where the function is not differentiable. You need **NOT** show convexity or points of inflection.

[This page is voluntarily blank. It is for extra space to solve any of the problems.]

This space is for any comments about this discussion section. Please leave any criticisms you have and also ideas for improvement!