MTH 252Z Lab
Day One

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Prompts

1. The syllabus has a *lot* of important information. Use it to answer the following questions:

   (a) What does your instructor prefer to be called?

   (b) When are your instructor's office hours?

   (c) What should you do if you don't finish an assignment, will be late for class, will have to miss class, or have a question about class?

   (d) What kind of book does your Reference Book have to be?

   (e) Under what circumstances does your instructor accept late work?

2. In order to succeed in this course, you must understand what a derivative represents. Given the equation $y = f(x)$, respond to the following prompts.

   (a) Write down an expression that represents the derivative of y with respect to x in prime notation.

   (b) Write down an expression that represents the derivative of y with respect to x in Leibniz notation.

   (c) In your group, come up with a description of what the derivative of a function $f(x)$ at a number $x = a$ means.

3. In order to succeed in this course, you must be able to differentiate effectively! Differentiate the following equations with respect to x.

   (a) $y = e^{3x} - 8x + \sqrt{x} - 0.5$

   (b) $g(x) = \dfrac{3}{x}$

   (c) $y = 7^x$

   (d) $c(x) = x^2 \cos 2x$

   (e) $t(x) = \tan(x^2)$

   (f) $T(x) = \arctan x$

   (g) $L(x) = \ln(x^3)$

4. The following function may or may not have been introduced to you before, but I will be asking you to be familiar with it through this class.

   $$f(x) = \sqrt{r^2 - x^2} \quad , r > 0$$

   Use this function to work through the following.

   (a) If you have a computer or phone, open `https://www.desmos.com/calculator/0zbuzhslm2`. Use the slider for r to get an understanding of how the graph of f works.

   (b) What is the domain of f?

   (c) What is the area of the region enclosed between the graph of $y = f(x)$ and the x-axis?

5. Solve $\dfrac{dy}{dx} = 0$ if $y = e^{2x}(2 - x)$.