1.1 Day 1

1.1.1 Logistics

1. **Syllabus:** Everyone look this over. Put the exam dates in your calendars. Sign the unattached page and pass it forward.

2. **WebAssign Homeworks:** Go to the Colorado WebAssign through the link on the course webpage. The first one is due Wednesday (at 11:59pm).

3. **Written Homeworks:** Also listed on the course website (under "Homework"). The first one is due Thursday

4. In general, there are a lot of assignments. Don't waste your time by cheating. It takes time to put effort into learning and practicing this material, and if you are just googling the answers then you are wasting time that could be put towards that.

5. Start these assignments early, late work is not accepted.

6. If you have any issues, **email me**. I want to keep the lines of communication very open. We are all in this together with the goal of you learning this material very well.

1.1.2 Big Picture of Calc 1

In Math 1300 (Calc 1), you learned about derivatives (which are rate-of-change functions) and anti-derivatives (which are accumulation functions).

In general, if you have a function $f(x)$, then:

- $f'(c)$ describes the rate of change of the function f at the particular point in time c

- $\int_a^b f(x)dx$ describes the accumulation of f over the period of time from $x = a$ to $x = b$.

A common "real-world" example would be if $f(x)$ describes the velocity of a car. In this case, $f'(c)$ is the acceleration of the car at time c (the rate of change in velocity), and $\int_a^b$ is the change in position (think of this as the accumulation of distance/time over time, where distance/time = velocity).

1.1.3 Derivative Techniques

A large portion of Calc 1 focused on techniques for finding $f'(x)$ given $f(x)$. It may take some time to remember all of the derivative rules - I recommend writing them down on a reference notecard until you have them re-memorized.

1.1.3.1 Example

$$\frac{d}{dx}(3x^2 - \sin(x) + \ln(x-2)) = 6x - \cos(x) + \frac{1}{x-2}$$

1.1.4 Integration Techniques

At the end of Calc 1, you started to learn some integration techniques. This is where Calc 2 picks up from.

1. $\int x^5 dx = \frac{x^6}{6} + C$

2. $\int \frac{1}{x} dx = \ln|x| + C$

3. $\int e^x dx = e^x + C$

4. $\int \sin(x) dx = -\cos(x) + C$

5. $\int \sec^2(x) dx = \tan(x) + C$

6. $\int \frac{1}{1+x^2} dx = \arctan(x) + C$

7. $\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin(x) + C$

I have a formula sheet of more common antiderivatives that you should know linked on my website.

1.2 Big Picture of Calc 2

You know how Pre-Calculus is just a hodge-podge of stuff you need to know to get from Algebra to Calc 1? Calc 2 is kind of that for going between Calc 1 and Calc 3. It doesn't have a single unifying theme. We will learn a number of new integration techniques, sequences and series, ... a bunch of stuff. It is a fast-paced course, and requires a lot of time outside of class. Please think carefully about your semester schedule and make sure you budget a lot of time for this. If this is not possible, it might not be the right time for you to take this course.