There is a small amount of Calculus I material that you are expected to know perfectly. The material is listed below. But first, there are four very important things you need to be aware of.

1. You will have to demonstrate this knowledge under test conditions **without a calculator**. That is, no books, no notes, no calculator, no internet access, no anything.

2. You will be tested on this at several points during Calculus II. The tests will happen without a calculator.

3. The first one will be on **Wednesday, Jan 20**, during your regular class period.

4. In order to prepare for this, you should practice by working WebAssign problems with no books, no notes, no calculator, and no internet access.

Here is the Calc I material:

* Basic derivatives.

  \[
  \frac{d}{dx} (x^n) = nx^{n-1}
  \]

  \[
  \frac{d}{dx} (\ln x) = \frac{1}{x}
  \]

  \[
  \frac{d}{dx} (e^x) = e^x
  \]

  \[
  \frac{d}{dx} (\sin x) = \cos x
  \]

  \[
  \frac{d}{dx} (\cos x) = -\sin x
  \]

* Product and Quotient Rules.

  \[
  (fg)' = f'g + fg'
  \]

  \[
  \left( \frac{f}{g} \right)' = \frac{gf' - fg'}{g^2}
  \]

* **Chain Rule**
• Basic antiderivatives.

\[ \int x^n \, dx = \frac{1}{n+1} x^{n+1} + C; \quad n \neq -1 \]
\[ \int \frac{1}{x} \, dx = \ln |x| + C \]
\[ \int e^x \, dx = e^x + C \]
\[ \int \sin x \, dx = -\cos x + C \]
\[ \int \cos x \, dx = \sin x + C \]
\[ \int (ax+b)^n \, dx = \frac{1}{a} \cdot \frac{1}{n+1} (ax+b)^{n+1} + C \]
\[ \int \frac{1}{ax + b} \, dx = \frac{1}{a} \ln |ax + b| + C \]
\[ \int e^{ax+b} \, dx = \frac{1}{a} e^{ax+b} + C \]
\[ \int \sin(ax+b) \, dx = -\frac{1}{a} \cos(ax+b) + C \]
\[ \int \cos(ax+b) \, dx = \frac{1}{a} \sin(ax+b) + C \]

• Use of the Fundamental Theorem of Calculus to compute basic integrals.

- Here is the formal theorem:

\[ \text{If } F'(x) = f(x), \text{ then } \int_a^b f(x) \, dx = F(b) - F(a) \]

- Here’s how you use it to compute integrals:

\[ \int_a^b \text{ formula with } x \, dx \]
\[ \downarrow \]
\[ \text{guess antiderivative} \]
\[ \downarrow \]

Answer: \[ \text{plug in } b \quad - \quad \text{plug in } a \]

- Here are some videos:
  - Khan Academy
  - Patrick JMT