• There is a set of derivative rules that you will be expected to know perfectly. This assignment covers the basic derivative rules you will have to know.

• **You will be tested** on this material two times. Exam 1 and another time in Exam 2. See the [course calendar](#) for dates.

• **You cannot use calculators or notes on the exams.**

• You should practice the derivative rules without using a calculator/computer to prepare for the quizzes.

• You should learn the derivative rules by practicing them until committed to memory. The only way to see all the possible combinations and get enough practice is to use the practice another version on WebAssign.

• The quick derivative rules we have covered so far are

\[
\frac{d}{dx}(c) = 0 \\
\frac{d}{dx}(mx) = m \\
\frac{d}{dx}(x^n) = nx^{n-1} \\
\frac{d}{dx}(e^x) = e^x
\]

where any letter other than \( x \) is a constant.

• Learn some new quick derivative rules

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

• Be able to use any of the above derivative rules in **linear combinations.**

\[
\frac{d}{dx}(af \pm bg) = a\frac{df}{dx} \pm b\frac{df}{dx}
\]

Where \( a \) and \( b \) are constants and \( f \) and \( g \) are functions of \( x \).

• Be able to use the derivative rules with unknown constants.
Know how to find the **equation of a tangent line** to \( y = f(x) \) at the a given point, \( x = a \).

1. Find the slope of the tangent line by using the derivative
   \[ m = f'(a) \]

2. Find the point on the curve the line passes though
   \[ (x_1, y_1) = (a, f(a)) \]

3. Write the equation to the line with slope \( m \) and passes through the point \( (x_1, y_1) \) using the slope-intercept equation of a line
   \[ y = m(x - x_1) + y_1 \]

Here is an example of finding the equation of a tangent line at [Khan Academy](https://www.khanacademy.org).

Know what an **antiderivative** is. An antiderivative is any function whose derivative gives you the original function.

Know how to check if a antiderivative is correct by taking its derivative and comparing with the original function.

Know how to find antiderivatives by first **guessing** a possible answer, then **checking** the answer by taking its derivative.

Know there are multiple possible antiderivatives for a given function.