Review for Exam 2

What follows is intended as a guide to focus your study for Exam 2. Read the Overview and the Study Tips. After that there is list of Problem Types that you need to know how to do.

Overview

• Expect to see about ten to twelve problems that look very much like homework problems.

• You will have 50 minutes for the exam, so, on average, you will have to work a problem every 4-5 minutes. In practice, some of the problems should go MUCH faster than that, so you have extra time for the harder stuff.

• A large portion of the exam will be problems that are simply “find a derivative”. You should be able to do these very quickly using the rules from chapter three.

• A small portion of the exam will consist of theoretical problems much like the worksheets from Week 5 and Week 6. These problems must be done without using the rules from Chapter Three. (In other words, “factor and cancel”).

• The rest of the exam will be applications of derivatives, abstract problems, or word problems.

• You will have a related rates problem (Section 3.9). It will count for between 15% and 20% of your exam.

Study Tips

• Memorize the following derivatives.

\[
\begin{align*}
\frac{d}{dx} x^n &= nx^{n-1} \\
\frac{d}{dx} e^x &= e^x \\
\frac{d}{dx} \ln x &= \frac{1}{x} \\
\frac{d}{dx} \sin x &= \cos x \\
\frac{d}{dx} \cos x &= -\sin x \\
\frac{d}{dx} \tan x &= \sec^2 x \\
\frac{d}{dx} \cot x &= -\csc^2 x \\
\frac{d}{dx} \sec x &= \sec x \tan x \\
\frac{d}{dx} \csc x &= -\csc x \cot x
\end{align*}
\]

• Know the product, quotient and chain rules. Recognize when and where each applies

• Know how differentiate abstract and/or implicit functions.

• You can only acquire this skill by repetition. I suggest that you work problems 1–44 on pages 228-229.
Problem Types. Here is a brief list of the things you have to know how to do with derivatives. (As always, you need to understand that “slope” and “rate of change” are really the same thing.)

1. Find slope at a point.
2. Find the equation of a tangent or a normal line.
3. Compute higher derivatives.
4. Find velocity and/or acceleration.
5. Abstract derivative problems. For example, graded homework week 8.
6. Any combination of the above
7. Related Rates!