Topics for Exam 2
Math 30, Fall 2018

General information. Exam 2 will be a timed test of 75 minutes, covering 2.7–2.8, THE BOX, 3.1–3.4, and 3.7 of the text. Most of the exam will be based on the homework assigned for those sections. If you can do all of that homework, and you know and understand all of the ideas behind it, you should be in good shape. As before, you are allowed to use a calculator and notes on **ONE** 3×5 note card (both sides).

As mentioned above, your first priority should be to understand the homework and quizzes and the ideas behind them. Besides the list of things you should know, below, you should also be familiar with everything specially emphasized in the text. If time permits, try to do some of the problems that have answers in the back of the book.

Note that because Sections 2.7–2.8 and THE BOX are critical to the course, and more conceptual, you should expect problems from those sections to make up 40–50% of the exam.

Section 2.7. Definition of tangent line, definition of instantaneous velocity. Finding tangent line from slope. Definition of derivative (h form, $(x-a)$ form). Calculating derivatives from definition and limit laws, using data, using graphs. Relation of derivative to tangent line, velocity. Derivative as rate of change; real-life interpretations of derivatives, units of derivative.

Section 2.8. Definition of derivative function f', relation of derivative function to derivative at a point. Computing derivative functions: from definition and limit laws, using data, using graphs (drawing graph of f', given graph of f). Recongnizing when a function is and is not differentiable (corners, etc.). Differentiability implies continuity.

THE BOX.

f	$\nearrow$	$\searrow$	$\smile$	$\frown$
f'	$+$	$-$	$\nearrow$	$\searrow$
		f''	$+$	$-$

Section 3.1. Derivative of a constant function, power rule; Constant Multiple Rule, Sum Rule. Definition of e; derivative of e^x.

Section 3.2. Product Rule, Quotient Rule.

Section 3.3. Derivatives of $\sin x$, $\cos x$; derivatives of $\tan x$, $\cot x$, $\sec x$, $\csc x$.

Section 3.4. Chain rule: $f(x)$ notation, Leibnitz notation. Power-Chain Rule, derivative of a^x.

Section 3.7. Applications of derivatives. Derivative of position is velocity; second derivative is acceleration. Other interpretations of derivatives as rates of change. Higher derivatives: definition, interpretation.