FINAL EXAM REVIEW

General Information

The time and locations of the final exam are as follows:

- Date: Thursday, December 15
- Time: 8:30-11:30am
- Locations: We have been assigned three different rooms. Please go to the room based on your recitation section as designated below:
  - Recitations M and N: Porter Hall 100
  - Recitation O: Porter Hall 125B
  - Recitation P : Porter Hall 126A

The exam will be cumulative; that is, it will cover all material from:

- Chapter 2: Section 2.1-2.4;
- Chapter 3: Sections 3.1-3.9
- Chapter 4: Section 4.1-4.8;
- Chapter 5: Sections 5.1- 5.3 and 5.5-5.6
- Chapter 6: Section 6.1

You'll need a scientific calculator to perform some of the computations. Graphing calculators will not be permitted. You may bring notes on the front and back of a **full sheet of paper**. The exam will have three sections, including around 7-10 true or false questions, 5-7 short answer questions, 7-10 free response questions, and possibly a bonus question.

Tips for studying

I recommend the following strategy:

1. Start early.
2. Review old exams (there are blank copies and solutions on the "Pages" tab of Canvas)
3. Review old exam reviews (there are blank copies and solutions on my site)
4. Review all worksheets (there are blank copies and solutions on my site).
5. Review relevant concept quizzes.
6. Review examples from lecture.
7. Review previous homework assignments.
8. Do some additional odd-numbered problems from our text (note that the answers are in the back of the book).

Topics

Here are some key words to help you study.

Chapter 2: Limits and Derivatives

- The (informal) definition of a limit
- One-sided limits
- Limits that don't exist
- Limit laws
- Computing limits using algebra
- Computing limits using squeeze theorem
- The definition of continuity
- Types of discontinuities (removable, jump, and infinite)
- Intermediate value theorem (how to use this to show that an equation has a solution in a particular interval.

Chapter 3: Differentiation

- Computing derivatives **by definition**
- Finding equations of tangent lines
- Sketching the graph of the derivative function
- Functions that are not differentiable
- Higher derivatives
- Power, sum and constant multiple rules
- Product and quotient rules
- Chain rule
- Implicit differentiation
- Derivatives of inverse functions
- Derivatives of trig and inverse trig functions
- Derivatives of exponential and logarithmic functions
- Logarithmic differentiation

Chapter 4:

- Related rates; I suggest you put the following on your notecard:
  - Formulas for the area of circles, rectangles and triangles
  - Formulas for volumes of boxes and spheres
  - Examples of modeling related rates problems using trigonometry
- Linear approximation
- Critical points
- Local and absolute (or global) extrema

- The Mean Value Theorem and its consequences
- Graph sketching
  - Finding local extrema with first and second derivative test
  - Concavity and inflection points
  - Horizontal and vertical asymptotes
- L'Hopital's Rule
- Optimization

Chapter 5: Integration

- Approximating areas with Riemann sums
  - Left and right Riemann sums
- Definition of the integral (as the area under a curve).
- Computing the definite integral through area computations.
- The Fundamental Theorem of Calculus I and II
  - Interpreting what the definite integral measures in the context of a real world problem
  - Computing the definite integral with antiderivatives
- Solving integrals by substitution.
- Integrals of exponential and logarithmic functions.

Chapter 6: Applications of Integration

- Areas between curves.
- The definition of the integral as a limit of Riemann sums. **Note:** this is what we've been using to derive our formulas in sections 6.4 and 6.6. While I won't test you on these sections in particular, I will test you on your conceptual understanding of the definite integral.