Math 12002 Exam I Important Topics

Exam I will be given in class on Tuesday, September 13, 2016. It will cover Chapter 1 (Section 1 and 2 will not be covered explicitly). The problems will be similar to the homework problems, though you will also be required to state certain definitions (they are listed below). You will be expected to explain your answers and use proper notation. There may be short answer or short discussion questions on the concepts covered in Chapter 1.

Concepts, Definitions, and Theorems

- Limits — be able to state the definition given in class (Definition 1 & 4 of Section 1.3); one sided limits; relation between limits and one sided limits; limit laws; Squeeze Theorem
- Infinite limits; vertical asymptotes; limits at infinity; horizontal asymptotes
- Continuity — be able to state the definition of continuity at a point (Definition 1 of Section 1.5); Intermediate Value Theorem
- Types of discontinuities (removable, infinite, jump), left continuity, right continuity, and continuity on intervals will **not** be covered.

Basic Skills

- Compute $\lim_{x\to a} f(x)$ for function f of the type in examples and homework of Section 1.3 and 1.4, algebraically and visually. If a limit does not exist, explain why.
- Compute one-sided limits and determine if $\lim_{x\to a} f(x)$ exists by computing and comparing $\lim_{x\to a^-} f(x)$ and $\lim_{x\to a^+} f(x)$
- Use limit laws to compute limits. Be aware of when properties are not valid.
- Compute $\lim_{x\to a} f(x)$, $\lim_{x\to a^-} f(x)$, $\lim_{x\to a^+} f(x)$ when these limits are infinite; find all vertical asymptotes of a given function.
- Compute $\lim_{x\to+\infty} f(x)$ and $\lim_{x\to-\infty} f(x)$; find all horizontal asymptotes of a given function.
- Spell the word "asymptote."
- Given a "position function" (such as the altitude of a ball at time t), compute average velocity on an interval and estimate or compute exactly instantaneous velocity at a given time.
- Determine if a given function is continuous at a given point, or determine all points where a function is continuous; explain why a function is or is not continuous at a given point in terms of the limit definition of continuity.