Calculus I

Exam 2 - Review

The second exam will cover section 3.9 and chapter 4 of Stewart's text, *Single Variable Calculus, 6e* except for section 4.6. Exam date is Tuesday, April 7th — start time is 11:00am, finish time is 12:30pm. The exam will include several computational problems and one proof. There will definitely be a question from section 4.5 asking you to "put it all together" and a question from section 4.7. I may also explicitly ask for a definition or theorem statement. The chapter review provides a good source of problems for practice and consideration. As you prepare for the exam, please remember the writing expectations that I have set forth. Class-time on April 6th is devoted to your questions.

Definitions and facts to know

- differential

- absolute maximum, maximum value, absolute minimum, minimum value

- local maximum, local minimum

- limit at infinity and $\lim_{x \to \infty} \frac{1}{x^r} = 0$ for $r > 0$ a rational number.

Theorems to know

- Extreme Value Theorem

- Fermat's Theorem

- Rolle's Theorem

- Mean Value Theorem

- Closed Interval method

Computational problems

- Find the linear approximation (linearization) of a function.

- Find critical points. Use the first derivative test and/or second derivative test determine nature of a critical point.

- Compute limits at infinity to determine horizontal asymptotes.

- Sketch a function by method introduced in Section 4.5: find domain, x-intercepts, y-intercept, symmetry, horizontal and vertical asymptotes, intervals of increase and decrease, local maximum and minimum, concavity and points of inflection.

- Find the antiderivative of a polynomial and $\sin x$ and $\cos x$.

- Apply Newton's method to approximate the root of a polynomial.

Proofs

- Prove Fermat's theorem

- Prove Rolle's Theorem

- Prove the Mean Value Theorem