Calculus 1, Chapter 4 Study Guide
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The following is a *brief* list of topics covered in Chapter 4 of *Thomas' Calculus*. Test questions will be chosen directly from the text. This list is not meant to be comprehensive, but only gives a list of several important topics. I reserve the right to ask you definitions and theorems on the tests. If I do so, then I will choose from the **bold-faced** items below.

4.1 Extreme Values of Functions. Definition of absolute minimum and maximum, **Extreme Value Theorem**, definition of local maximum and minimum, critical point, absolute extrema of continuous function on a closed interval.

4.2 Mean Value Theorem. Rolle's Theorem, **Mean Value Theorem**, "same derivative implies differ by a constant," Properties of logarithms and exponentials.

4.3 Monotonic Functions and the First Derivative Test. Increasing/decreasing, First Derivative Test.

4.4 Concavity and Curve Sketching. Concavity, Second Derivative Test for Concavity, point of inflection, Second Derivative Test for Extrema.

4.5 Applied Optimization Problems. Maximum/minimum problems (we use a 4 step process to solve).

4.6 Indeterminate Forms and L'Hôpital's Rule $0/0$ and ∞/∞ indeterminate forms, L'Hôpotal's Rules, other indeterminate forms.

4.7 Newton's Method. Procedure for Newton's Method.

<u>4.8 Antiderivatives.</u> Antiderivatives and indefinite integrals (and the difference between), differential equations, initial value problems.