

Calculus 1, Chapter 3 Study Guide

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The following is a *brief* list of topics covered in Chapter 3 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.

3.1 Derivative as a Function. **Definition of Derivative**, one sided derivatives, “differentiable implies continuous” (**Theorem 1**).

3.2 Differentiation Rules for Polynomials, Exponentials, Products and Quotients. Derivative of a constant, Power Rule for Positive Integers, Derivative of the Natural Exponential, Product Rule, Quotient Rule, Power Rule for Negative Integers, my square bracket notation.

3.3 The Derivative as a Rate of Change. Instantaneous rate of change, velocity, speed, acceleration, jerk.

3.4 Derivative of Trig Functions. Derivatives of sine, cosine, and the rest.

3.5 The Chain Rule and Parametric Equations. **Chain Rule**, parametric formula for dy/dx , and d^2y/dx^2 .

3.6 Implicit Differentiation. **Definition of “function f is implicit to an equation $F(x, y) = 0$ ”**, implicit differentiation, normal line, Power Rule for Rational Powers.

3.7 Derivatives of Inverse Functions and Logs. Theorem 5, derivatives of logarithm functions, derivatives of exponentials base a , loga-

rithmic differentiation, the General Form of the Power Rule, e as a limit.

3.8 Inverse Trig Functions. Definitions of inverse trig functions, identities involving inverse trig functions, finding values of some trig functions given the values of other trig functions, derivatives of inverse trig functions.

3.9 Related Rates. The 5 steps involved in a related rates problem.

3.10 Linearization and Differentials. Linearization, differentials, differentials as estimate of change, absolute/relative/percentage change.