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 **Tangents and the Derivative at a Point.** Slope of a Curve, tangent line, derivative at a point, instantaneous velocity.

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

3.3 **Differentiation Rules.** Derivative of a constant, Power Rule for Positive Integers, Binomial Theorem, Derivative of the Natural Exponential, Product Rule, Quotient Rule, my square bracket notation, higher order derivatives.

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

3.5 **Derivatives of Trigonometric Functions.** Derivatives of sine, cosine, and the rest.

3.6 **The Chain Rule.** Chain Rule.

3.7 **Implicit Differentiation.** Definition of “function *f* is implicit to an equation *F*(*)x*, *y*) = 0”, implicit differentiation, normal line.

3.8 **Derivatives of Inverse Functions and Logarithms.** Theorem 3, derivatives of logarithm functions, derivatives of exponentials base
$a$, logarithmic differentiation, the General Form of the Power Rule, $e$ as a limit.

**3.9 Inverse Trigonometric Functions.** Definitions of inverse trig functions, identities involving inverse trig functions, derivatives of inverse trig functions.

**3.10 Related Rates.** The 6 steps involved in a related rates problem.

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