

## Chapter 2: The Derivative

Upon successful completion of Chapter 2, the student should be able to:

State the definition of  $f'(x)$

Recognize and use the common equivalent notations for the derivative

State the graphic and rate meanings of  $f'(x)$  and apply the correct units to the result

Estimate a tangent line slope, an instantaneous rate of change from the graph of a function

Write the equation of the line tangent to the graph of a function

Calculate the derivatives of the elementary functions !!!

Calculate the derivatives of combinations (including compositions) of elementary functions !!!

Calculate second and higher derivatives and state what they measure

Calculate the derivatives of functions given as parametric equations and interpret their meanings geometrically and physically

State whether a function (given by a graph or formula) is continuous or differentiable at a point or on an interval

Solve related rate problems using derivatives.

Approximate the solutions of equations by using derivatives (Newton's method).

Approximate the values of "difficult" functions by using derivatives.

Calculate the differential of a function using derivatives and show what the differential represents on a graph

Calculate the derivatives of "really difficult" functions by using the methods of Implicit Differentiation and Logarithmic Differentiation.