MAT 161-004 and MAT 161-300
Main Topics for Test 2
(Sections 2.8 through 3.10)
Tuesday, Oct. 18, 2011

Finding derivatives

Be able to calculate the derivative of a given function using these rules, and in combination:

- the derivative of a constant is zero
- the Power Rule
- the Constant Multiple Rule
- the Sum and Difference Rules
- the Product Rule
- the Quotient Rule
- the Chain Rule

Be able to:

- recognize a given limit as a derivative
- find derivatives involving the six trig. functions, logarithmic and exponential functions, $\sin^{-1} x$ and $\tan^{-1} x$
- find a derivative by implicit differentiation
- find a derivative by logarithmic differentiation

Applications of derivatives

Be able to:

- find the equation of the tangent line to a function at a point
- given a graph, estimate the derivative at various points, and sketch a graph of the derivative
- given a graph, determine where the function is not differentiable
- interpret the derivative as a rate of change, including:
  - calculation and interpretation of marginal cost
  - calculation of velocity and acceleration and interpretation of the direction of motion and whether the object is speeding up or slowing down
- do related rates problems
- calculate the linearization of f(x) at a, and use it to make an approximation
- find differentials and use them to make approximations of change

Miscellaneous

Be able to:

- properly apply the fact that $\lim_{h \to 0} \frac{\sin h}{h} = 1$, to calculate other limits
- solve problems involving population growth and radioactive decay