Math 20A, Fall 2009, Review for Final Exam

Chapter 3(continued)

- derivatives:
  for trigonometric functions, page 169.
  Chain rule.
  Implicit differentiation.
  of inverse functions.
  of exponential and log functions.
  related rates.

- Ex: compute y': $ye^{\tan(x)-y} = 2\ln x$.
  Ex: p210 problem 115.

Chapter 4

- approximation:
  for $\triangle f = f(a+\triangle x) - f(x)$.
  for $f(x)$.

- extreme values:
  process of finding absolute extrema for closed interval.
  applied optimization.
  Mean value theorem for derivatives (Rolle's theorem).

- geometric interpretation of derivatives:
  intervals of monotonicity, concavity.
  critical pts, inflection pts.
  1st and 2nd derivative test.
  asymptotes, sketch of the graph.

- limits for indefinite forms:
  L'Hopital's rule.
  for rational functions: page 252

- antiderivatives:
  definition.
  formulas for polynomials, trigonometric functions, exponental, log functions.

- Ex: Find the linearization of $y(x) = e^{-x^2/2}$ at $a = 1$.
  Ex: Find the extrema, intervals of monotonicity and concavity of $f = \sin\theta - \cos\theta, [0, 2\pi]$,
  Ex: Compute $\lim_{x\to\infty} \frac{\ln(t+2)}{log_2 t}$.
  Ex: calculate $\int \frac{3x^3-9}{x^2}dx$, $\int \cos(5+2\theta)d\theta$, $\int (x+2)^3 dx$.
  Ex: page 296, problem 76.

Chapter 5

- Riemann Sum:
  N-th end pt approximation, midpt approximation.
  compute the area under the given curve.

- definite integral:
  graphical interpretation.
  properties of definite integral.
  use fundamental theorem of calculus to calculate the definite integral. part 1, 2.

- net(total) change:

- Ex: Use Nth right endpt approximation to calculate $\int_0^4 x^3 dx$.
  Ex: Use geometric interpretation of definite integral to calculate $\int_{-1}^2 2x dx$.
  Ex: compute $\frac{d\int_0^{\sin x} t^3 dx}{dx}$, $\int_1^4 |x^2 - 9| dx$.