(5 points) Name:

## Test 4 Spring 2007 MTH121 Section 02 April 19, 2007

**Directions :** You have 50 minutes to complete all 5 problems on this exam. There are a possible 100 points to be earned. You may not use your book, notes, or any graphing/programmable calculator. Please be sure to show all pertinent work. An incorrect answer with no work will receive no credit! If any portion of the exam is unclear please come to me and I will elaborate provided I can do so without giving away the problem.

# 1. (35 points) Consider the curve

$$y = x^3 + x.$$

- (a) What is the domain of the curve?
- (b) What are the x and y intercepts if any?
- (c) Where is the curve increasing/decreasing?
- (d) Identify all critical points as local maxima, minima, or neither.
- (e) Where is the curve concave up/down?
- (f) Identify all inflection points if any.
- (g) Sketch the graph (on the next page).



2. (20 points) If 1200  $\rm cm^2$  of material is available to make a box with a square base and an open top, find the largest possible volume of the box.

3. (20 points) The graph of f is shown. Evaluate the integral  $\int_0^9 f(x) dx$  by interpreting it in terms of areas.



4. (20 points) Use the Fundamental Theorem of Calculus to compute the following:

a) 
$$\frac{d}{dx} \int_{x}^{2} \cos(t^{2}) dt$$
 b)  $\int_{0}^{2} x(2+x^{5}) dx$