Name:_____

Test 1
Spring 2007
MATH 122 Section 01
February 2, 2002

Directions : You have 50 minutes to complete all 6 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. (20 points)

   Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle and label its height and width. Then find the area of the region.

   $$y = x + 1, \quad y = 9 - x^2, \quad x = -1, \quad x = 2$$

2. (20 points)
   Find the volume of the solid obtained by rotating the region bounded by
   the given curves about the specified line. Sketch the region, the solid, and
   a typical disk, washer, or cylinder.

   $$y^2 = x, \qquad x = 2y, \qquad \text{about the } y\text{-axis.}$$

3. (20 points)
   A 500 ft cable that weighs 2 lb/ft is used to lift 800 lb of coal up a mineshaft 500 ft deep. Find the work done.

4. (20 points)
   Find the average value of the function $f(t) = t\sqrt{1 + t^2}$ on the interval $[0, 5]$.

5. (10 points)
   Suppose g is the inverse function of f and $f(4) = 5$, $f'(4) = 2/3$. Find $g'(5)$.

6. (10 points)
   Find an equation of the tangent line to the curve $y = e^{2x}\cos(\pi x)$ at the point $(0, 1)$.