Math 220 (section AD?) **Quiz 11** **Fall 2013**

Name _____

- You have 15 minutes
- No calculators
- Show sufficient work

1. (6 points) Let **R** be the finite region bounded by the graphs of $y = \ln x$, $y = 2$, $y = 5$ and $x = 0$. Set up, but do not evaluate, definite integrals which represent the volumes of the following solids.

   (a) The volume of the solid formed when **R** is revolved around the horizontal line $y = 6$. Determine this volume in the following two ways.

   i. Integrate with respect to x.

   ii. Integrate with respect to y. (Use different integrands in parts *i* and *ii*.)

(b) The volume of the solid with base **R** for which the cross-sections perpendicular to the x-axis are squares.

2. (4 points) Find the average value of the function $f(x) = 3x\sqrt{x^2+9}$ on the interval $[0, 4]$. Simplify your answer.