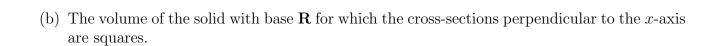
Name
------

• 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  $\mathbf{R}$  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.)



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.