Math 116 Quiz 3: § 7.5, 8.1-8.2 (sans arc length) **Tue 25 Sep 2012**

Name: _____

You have 25 minutes to complete this quiz. Eyes on your own paper and good luck!

1. **Definitions/Concepts.** (2 pts) Fill in the following inequalities using the symbols TRAP(n) or MID(n).

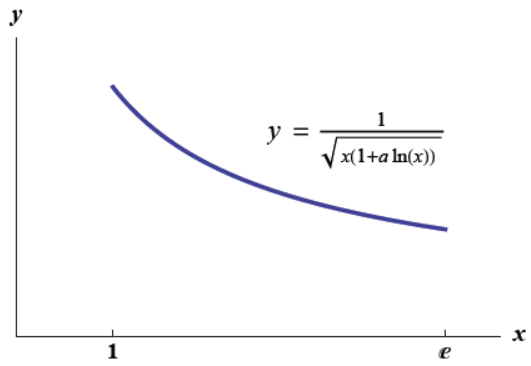
   If the graph of f is concave down on $[a, b]$, then

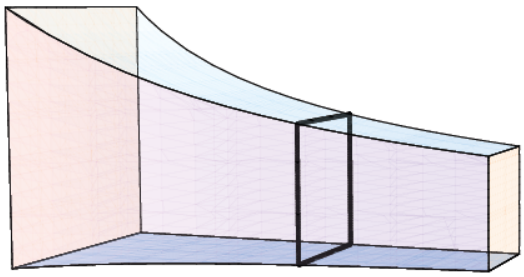
   $$\leq \int_a^b f(x)dx \leq$$

   If the graph of f is concave up on $[a, b]$, then

   $$\leq \int_a^b f(x)dx \leq$$

2. **Questions/Problems.** (8 pts) Let S be the solid whose base is the region bounded by the graph of the curve $y = \frac{1}{\sqrt{x(1+a\ln x)}}$ (for some positive constant $a > 0$), the x-axis, the lines $x = 1$ and $x = e$. The cross-sections of S perpendicular to the x-axis are squares. Find the exact volume of S.





MORE QUIZ ON THE BACK –>

3. **Computations/Algebra.**

(a) $\int_0^6 \pi(3 - y/2)^2 dy$

i. (1 pt) Which shape is being integrated? Choose one:
   A. triangle
   B. part of a circle
   C. hemisphere
   D. cone

ii. (2 pts) If you chose triangle, write down the base and height, indicating which is which. If you chose part of a circle or hemisphere, write down the radius. If you chose cone, write down the radius and the height, indicating which is which.

iii. (2 pts) Draw a picture to justify your answers to parts i. and ii.

(b) $\int_{-9}^9 \sqrt{81 - x^2} dx$

i. (1 pt) Which shape is being integrated? Choose one:
   A. triangle
   B. part of a circle
   C. hemisphere
   D. cone

ii. (2 pts) If you chose triangle, write down the base and height, indicating which is which. If you chose part of a circle or hemisphere, write down the radius. If you chose cone, write down the radius and the height, indicating which is which.

iii. (2 pts) Draw a picture to justify your answers to parts i. and ii.

ChAlLeNgE pRoBlEm: Rotate the bell curve $y = e^{-x^2/2}$ around the y-axis, forming a hill-shaped solid of revolution. Using horizontal slices, find the exact volume of this hill.