EXAM 2 - MATH 152 Friday, October 15

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. (a) Sketch the region enclosed by the three curves $y = \frac{1}{x}, y = x$ and $y = \frac{1}{4}x, x > 0$.

   (b) Decide and set up an integral for computing the area of that region.

   (c) Compute the area of the region using the integral you set up.

2. (a) Sketch the region bounded by the curves $y = x$ and $y = \sqrt{x}$.

(b) Set up an integral for computing the volume of the solid obtained by rotating the region about the x-axis, using the washer method.

(c) Compute the volume of the solid of revolution using the integral you set up.

3. Use **cylindrical shells** (not disks) to compute the volume of a right circular cone with base of radius r and height h. This is a problem you have seen before.

4. (a) Set up an integral for computing the length of the curve $y = \frac{x^2}{2} - \frac{\ln x}{4}$, $2 \leq x \leq 4$.

(b) Compute the length, using the integral you set up.

5. Solve the differential equation

$$\frac{dy}{d\theta} = \frac{e^y \sin^2 \theta}{y \sec \theta}.$$

(Hint: You will need to use integration by-parts.)