TEST PREP on 6.1, 6.2 and 6.3 - Dr. Loveless

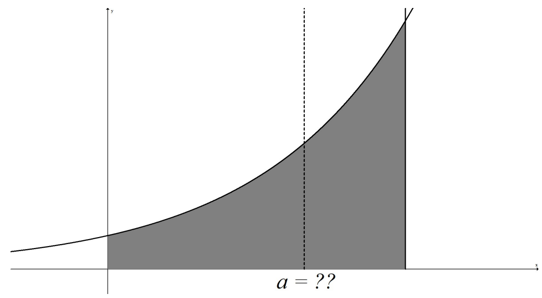
- These problem comes *directly* from the Dr. Loveless Exam archive on my review materials page. You can find solutions in that archive.
- Try to put yourself in an exam like situation as you attempt these. Could you do this on an exam?

Remember: Please ask your TA for the participation code and enter it in the quiz!

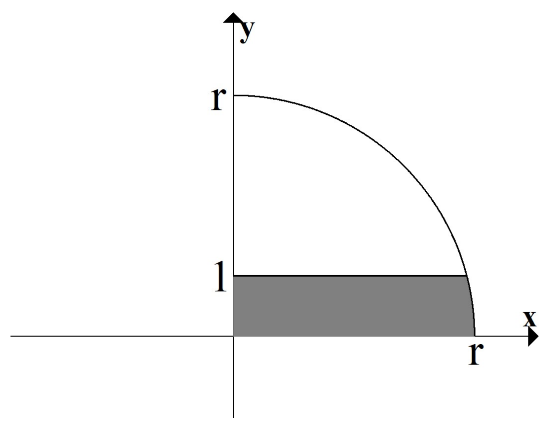
Spring 2018 - Exam 1 - Problem 4 - Dr. Loveless: *Areas and Volumes*

4. (12 pts) The two problems below are unrelated.

   (a) Consider the region bounded by $y = e^x$, $y = 0$, $x = 0$ and $x = 2$. Find the value of a such that the vertical line $x = a$ divides this region into two sub-regions of equal area.



   (b) Suppose r is a number bigger than 1. Let A be the region in the first quadrant that is below $y = 1$ and inside the circle $x^2 + y^2 = r^2$. Find the volume of the solid obtained by rotating A about the y-axis. (Answer will involve r).



Winter 2019- Exam 1 - Problem 5 - Dr. Loveless: *Volumes of Revolution*

5. (12 pts) Consider the region, R, in the first quadrant that is bounded by the y-axis, the circle $x^2 + y^2 = 4$, and the line $\sqrt{3}y = x$ (shown below). You are given the picture multiple times for ease of labeling. Use any correct method.

   (a) Set up (but DO NOT EVALUATE) an integral for the volume of the solid obtained by rotating R about the x-axis.

   (b) Set up (but DO NOT EVALUATE) an integral for the volume of the solid obtained by rotating R about the horizontal line $y = 2$.

   (c) Find the volume of the solid obtained by rotating R about the y-axis. Hint: Shells! **Set-up AND evaluate**.

Fall 2017 - Exam 1 - Problem 3 - Dr. Loveless: *Average Value*

3. (14 pts)

   (a) Let R be the region bounded by $y = x^3$, $x = 2$ and the x-axis. Set up (DO NOT EVALUATE) integrals that represent the volumes of the solids obtained by rotating R about the given axis:

      i. ... about the y-axis (any method):

      ii. ... about the **horizontal** line $y = -2$, using dx:

      iii. ... about the **horizontal** line $y = -2$, using dy:

   (b) Compute the **area** of the region bounded by $y^2 + x - 2 = 0$ and $x = y$.
   (Note: This is a new region, unrelated to the previous question).