

Math 1080: Calculus of One Variable II  
**Written Homework 1 (20 points)**  
(Sections 6.3 - 6.6, part 1 of 6.7)  
**Due in Canvas by 11:59 pm on Friday, Sept. 4**

Do the problems below. You are allowed to discuss these problems with your classmates, but the work you hand in must be your own. Remember to:

- Write your **name** on your homework.
- Write neatly, show all work, use proper mathematical notation, and organize your work clearly. If the grader cannot follow your work or certain steps are missing or not justified, you may not receive full credit.
  - Note: It may take you a few tries to figure out the method of solution on a problem. Work through the problem on scratch paper first, then re-write your final solution that you will turn in. This will help in clearly organizing your work and will reinforce the concepts involved in the solution.

**Submit your written homework in Canvas:** You will submit a pdf file of your homework in Canvas. Go to Written Homework 1 in Canvas and upload the pdf file of your homework solutions. Then click submit assignment. Remember that it is your responsibility to make sure that your scanned work is readable. If the scan is poor quality and cannot be read by the grader, you may not receive credit for your work. After the homework is graded, you will be able to see your grade and any comments on your homework in Canvas.

1. (6 points) Consider the region  $R$  bounded by  $y = e^{-x}$ ,  $y = 1$ , and  $x = 2$ . For the following problems, **set up**, but **do not evaluate or simplify**, the requested integral.
  - (a) The integral that gives the volume of the solid obtained by rotating the region  $R$  around the line  $y = 2$  using the **disk/washer method**.
  - (b) The integral that gives the volume of the solid obtained by rotating the region  $R$  around the line  $x = 2$  using the **disk/washer method**.
  - (c) The integral that gives the volume of the solid obtained by rotating the region  $R$  around the line  $x = -2$  using the **shell method**.
2. (5 points) Find the **arc length** of the curve  $y = \frac{2}{3}x^{3/2} - \frac{1}{2}x^{1/2}$  on  $[1, 9]$ .
3. (5 points) Find the **area of the surface** generated when the curve  $y = \sqrt{5x - x^2}$  for  $1 \leq x \leq 4$  is revolved about the  $x$ -axis.
4. (4 points) A spring requires 2 J of work to be stretched 0.1 m from its equilibrium position. How much work is required to stretch the spring 0.4 m from its equilibrium position? Assume Hooke's law is obeyed.