Math 1152 Written Homework 2

Due: Tuesday, May 24th in Gradescope.

- Calculators are permitted EXCEPT those calculators that have symbolic algebra or calculus capabilities.
- SHOW ALL WORK!
- A completed version of this document is due to be uploaded to Gradescope by 11:59pm on **Tuesday, May 24jth**.
- If you have difficulties using Gradescope, see pages under the Gradescope header in the Modules section of our Carmen page for help.
- Ideally, this can be completed on an iPad or android tablet using an app like One Note, Notability, Papyrus, etc. - if you don't have access to one of these options,then printing and scanning or using a smartphone document-scanning feature to generate a pdf to upload will also work.
- If you have difficulties uploading the assignment, email a pdf to your recitation instructor.
- This homework will be graded via random subset selection - not every part of every question will be looked at by the grader.
- Rubrics to applicable questions will be provided later.

Question 1. The region R is bounded by the curves $x = y^2 - 4$ and $y = x - 6$.

A. Suppose that R is rotated around the line $x = 10$ to form a solid, S. Set-up, but **do not evaluate**, a **Riemann Sum** which represents the volume of the resulting solid of rotation using the Method of Washers.

B. Suppose that the *density* of the resulting solid, S, varies depending on the position of the point in R which passes through it, according to the formula $\rho(p) = x^2$ where x is the x-coordinate of the point in R which passes through p in S when R is rotated about the line $x = 10$. Write down the Riemann sum which represents the *mass* of the solid S.

You should use the formula mass = density $\times$ volume, true for constant density. Why is it applicable here?

C. Using part (B), write down an integral representing the mass of the solid, S. Clearly explain why the density formula leads to an integral which represents the exact mass even though the density of the solid is not constant.