

PROBLEM SET #3

Due Thursday, February 25, 2021 @ midnight
Submit as single pdf file to onCourse

Remember that you need to explain and show the steps in your answers!

Let R be the region bounded by the graphs of $y = x^2$ and $y = \sqrt{\cos(\pi x) + 2}$

1. Approximate the area of R accurate within 0.001 using Simpson's rule.
Be sure to explain how you know your approximation is this accurate.
2. Consider the solid formed when R is rotated about the x -axis
 - (a) Sketch the solid.
 - (b) Set up the integral that gives the volume of the solid.
 - (c) Find the volume of the solid.
3. Consider the solid formed when R is rotated about the line $y = -3$.
 - (a) Sketch the solid.
 - (b) Set up the integral that gives the volume of the solid.
 - (c) Use S_{20} to approximate the volume of the solid.
 - (d) How accurate is your approximation?
4. Consider the solid formed when R is rotated about the line $y = 2$.
 - (a) Sketch the solid.
 - (b) Set up the integral that gives the volume of the solid.
 - (c) Use S_{20} to approximate the volume of the solid.
 - (d) How accurate is your approximation?
5. The purpose of this problem is to find the total perimeter of R
 - (a) Set up the integral that gives the length of the top boundary of R
 - (b) Use S_{20} to approximate the length of the top boundary of R
 - (c) Set up the integral that gives the length of the bottom boundary of R
 - (d) Use S_{20} to approximate the length of the bottom boundary of R
 - (e) What is the total perimeter of R ?