Quiz 3

MATH 19B - Discussion Section B
October 27, 2016

Name & ID # : ____________________

Directions: Make sure to show all of your work for numbers (1), (3), and (4), and box in your final answers.
Formulas:

(i) Disk Method: Given a perpendicular cross section to the axis of rotation let $R(x)$ and $r(x)$ represent the outer and inner radii respectively. The volume of a rotated region bounded on $[a, b]$ is given by:

$$V = \pi \int_a^b \left[(R(x))^2 - (r(x))^2 \right] \, \mathrm{d}x$$

(ii) Cylindrical Shells Method: Given a parallel cross section to the axis of rotation let $r(x)$ and $h(x)$ represent the radius and height of the *shell* respectively. The volume of a rotated region bounded on $[a, b]$ is given by:

$$V = 2\pi \int_a^b r(x)h(x) \, \mathrm{d}x$$

For all questions the curves of interest are given by:

$$x = y^2 \quad \text{and} \quad y = \begin{cases} \frac{1}{2}x, & x \leq \frac{1}{2} \\ x^2, & x > \frac{1}{2} \end{cases}$$

(1) Sketch the region contained between the curves and make sure to identify all of the boundary points.

(2) What is the area of the region you sketched in (1)?

a) $\frac{5}{16}$ b) $\frac{1}{4}$ c) $\frac{\pi}{4}$ d) $\frac{5\pi}{16}$

(3) Write down the integral(s), but do **not evaluate**, to calculate the volume generated by rotating the region in (1) around the x-axis using the Disk Method:

(4) Write down the integral(s), but do **not evaluate**, to calculate the volume generated by rotating the region in (1) around the x-axis using the Cylindrical Shells Method: