Solution

Quiz 2

MATH 172 Lab: Section 7

Lab Instructor (TA): Mohammed Kaabar

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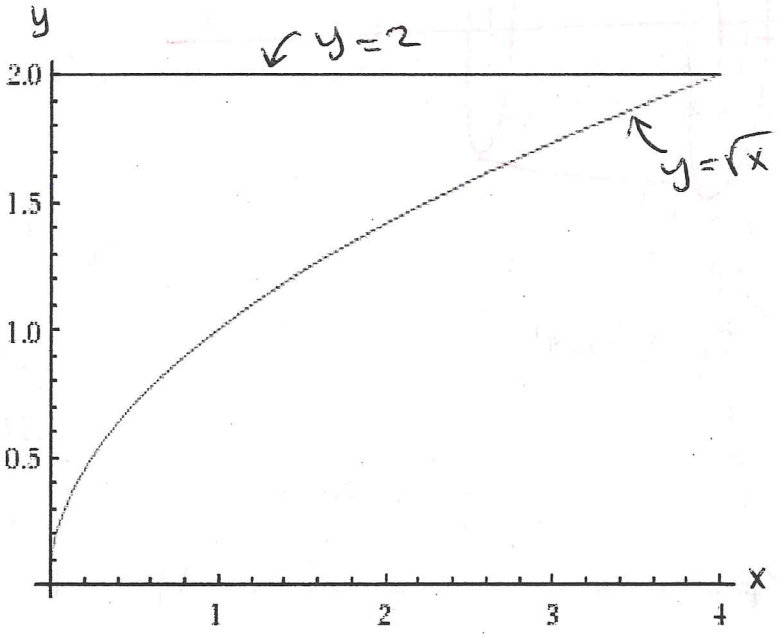
Student's Name: -Solution-

Student's ID:----------

Note: This quiz covers only the volumes by slicing and shells.

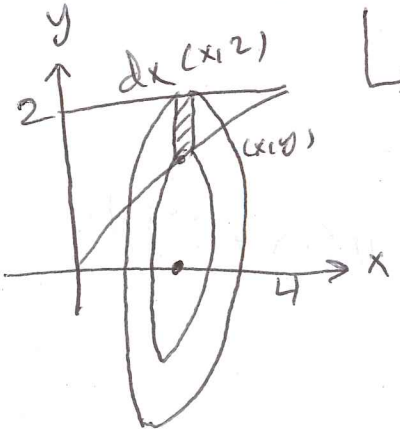
Show your work and circle your answers. Neatness and organization count!

Question 1: (3 points) Let R be a region bounded by $y = \sqrt{x}$, $y = 2$, and $y - axis$ as shown in the figure below:



Find the volume of the above region generated by revolving R about the $x - axis$.

Washer Method



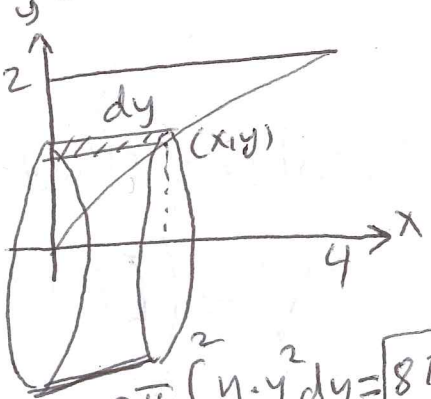
$$\hookrightarrow V = \int_0^4 (\pi(2)^2 - \pi y^2)\,dx$$

$$= \pi \int_0^4 (4 - x)\,dx$$

$$= \boxed{8\pi}$$

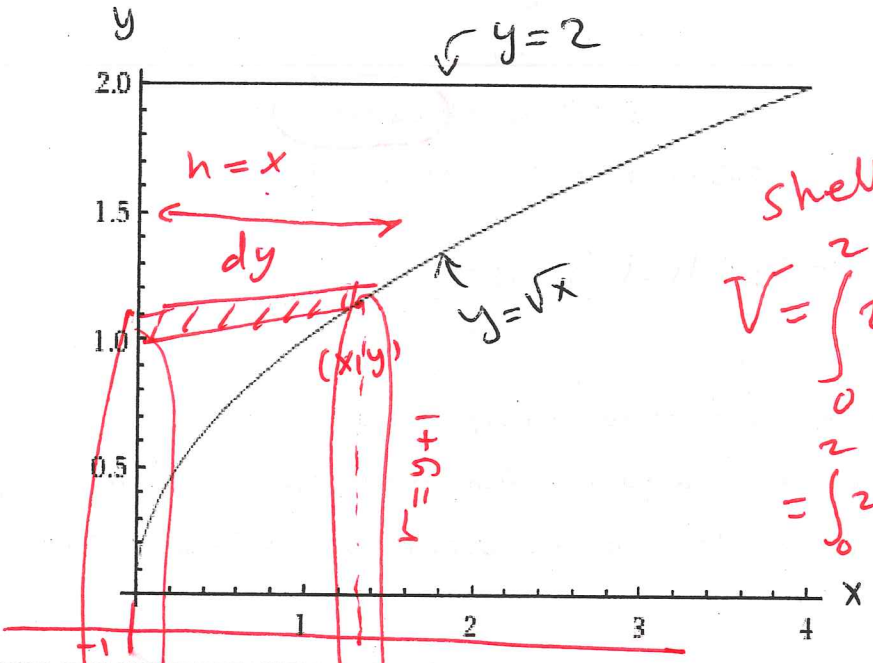
OR

Shell Method



$$V = \int_0^2 2\pi y \times dy = 2\pi \int_0^2 y \cdot y^2\,dy = \boxed{8\pi}$$

Question 2: (2 points) Let R be a region bounded by $y = \sqrt{x}$, $y = 2$, and $y - axis$ as shown in the figure below:



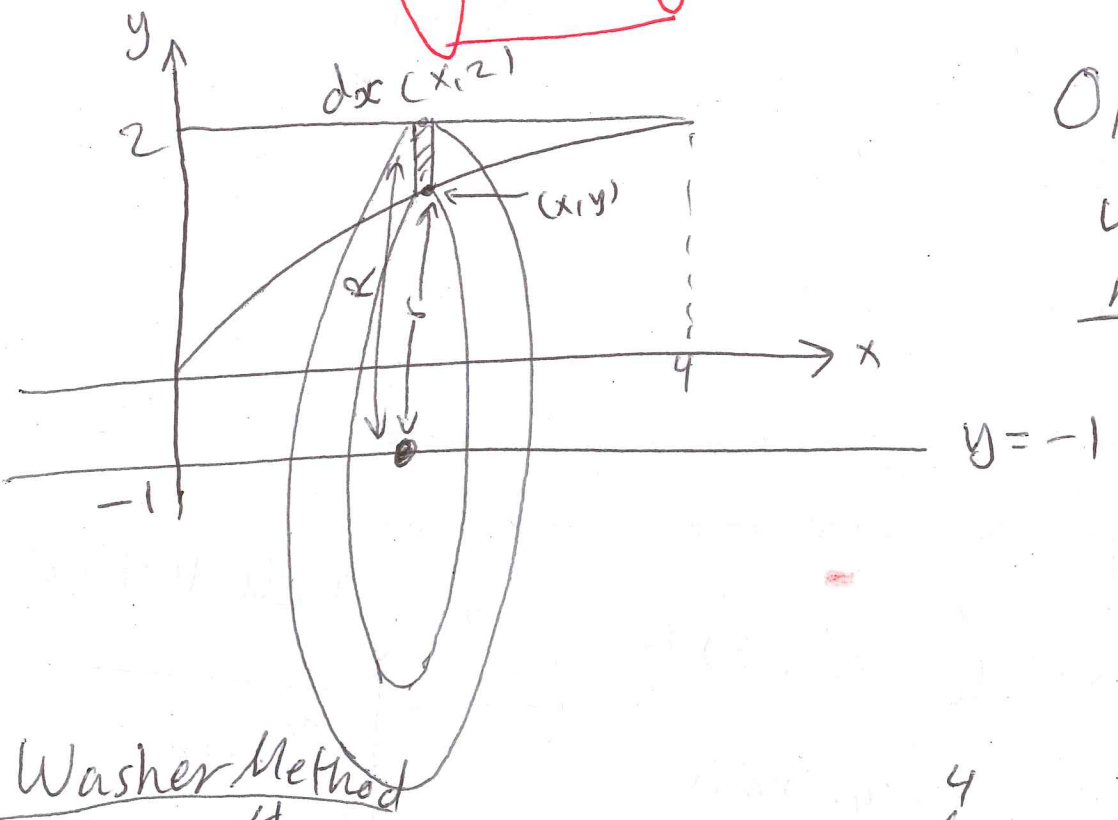
Shell Method

$$V = \int_0^2 2\pi(y+1)x\,dy$$

$x = y^2$

$$= \int_0^2 2\pi(y+1)y^2\,dy$$

SET UP ONLY (DO NOT EVALUATE) an integral that represents the volume of the above region generated by revolving R about $y = -1$.



OR you can use shell method.

Washer Method

$$V = \int_0^4 [\pi(3)^2 - \pi(y+1)^2]\,dx = \int_0^4 (\pi(3)^2 - \pi(\sqrt{x}+1)^2)\,dx$$

$y = \sqrt{x}$