

Mathematics Department  
MATH 141 - Worksheet #6

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. Name: - - - - -

Q1. Find the volume of the solid generated by revolving the region bounded by  $y = \sqrt{x}$ ,  $y = 2$ ,  $x = 0$  about

- $x$ -axis (Shell Method)
- $y$ -axis (Disk Method)
- $x = 4$  (Shell Method) & (Washer Method)
- $y = 2$  (Disk Method)

Q2. Find the volume of the solid generated by revolving the region bounded by  $y = \frac{1}{x}$ ,  $y = \frac{1}{2}$ ,  $x = 1$ ,  $x = 2$  (Don't Evaluate Integrals)

- About  $x$ -axis using Washer Method
- About  $x$ -axis using Shell Method
- About the line  $x = 2$  Using Washer Method
- About the line  $x = 2$  Using Shell Method
- About the line  $x = 1$  Using Disk Method.

## Short Answers:

Q<sub>1</sub> (a)  $V = \int_0^2 2\pi (y)(y^2) dy = 8\pi$

(b)  $V = \int_0^2 \pi (y^2)^2 dy = \frac{32}{5} \pi$

(c) Shell Method  $V = 2\pi \int_0^4 (4-x)(2-\sqrt{x}) dx = \frac{224}{15} \pi$

Washer Method  $V = \pi \int_0^2 [4^2 - (4-y^2)^2] dy = \frac{224}{15} \pi$

(d)  $V = \pi \int_0^4 (2-\sqrt{x})^2 dx = \frac{8\pi}{3}$

Q<sub>2</sub> (1)  $V = \pi \int_1^2 \left[ \left(\frac{1}{x}\right)^2 - \left(\frac{1}{2}\right)^2 \right] dx$

(2)  $V = 2\pi \int_{1/2}^1 (y) \left(\frac{1}{y} - 1\right) dy$

(3)  $V = \pi \int_{1/2}^1 \left[ (1)^2 - \left(2 - \frac{1}{y}\right)^2 \right] dy$

(4)  $V = 2\pi \int_1^2 (2-x) \left(\frac{1}{x} - \frac{1}{2}\right) dx$

(5)  $V = \pi \int_{1/2}^1 \left(\frac{1}{y} - 1\right)^2 dy$

