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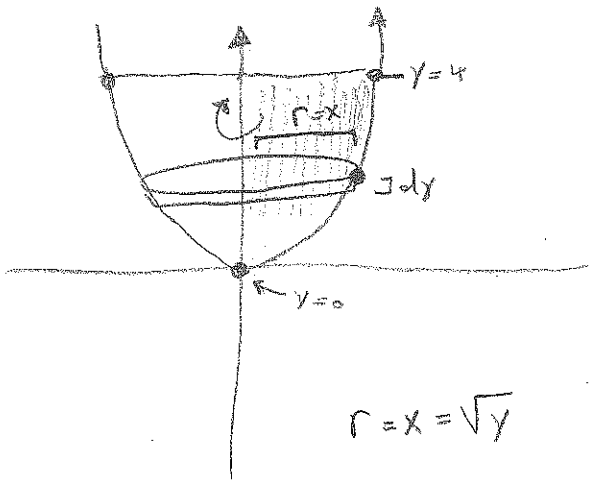
Quiz 1

NAME:_____

RECITATION : Mon8 Mon9 Wed8 Wed9

1. Find the volume of revolution defined by rotating the region above $y = x^2$ and below $y = 4$ around the y-axis.



$r = x = \sqrt{y}$

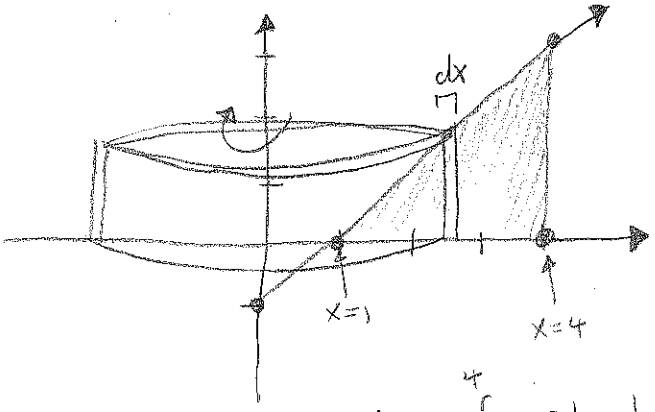
$$V = \int_0^4 \pi r^2 \, dy$$

$$= \int_0^4 \pi y \, dy$$

$$= \frac{\pi y^2}{2} \Big|_0^4$$

$$= 8\pi$$

2. Set up (only!) an equation for the volume of revolution defined by rotating the region D around the y-axis, where D is the region below $y = x - 1$, left of $x = 4$, and above $y = 0$.



$r = x$

$h = y = x - 1$

USE SHELLS: $V = \int_1^4 2\pi r h \, dx$

$= \int_1^4 2\pi x(x-1) \, dx$

OR WASHERS:

$r_{IN} = x$ ALONG $y = x - 1$

$r_{IN} = y + 1$

$V = \pi \int_0^3 r_{OUT}^2 - r_{IN}^2 \, dy$

$= \pi \int_0^3 4^2 - (y+1)^2 \, dy$