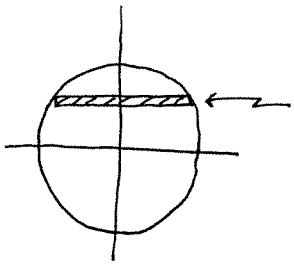
Math 172
29 Jan 2016

Quiz 2
Show Appropriate Work

Name: _____
Point Values in boxes.

1. [2] A solid is formed with base given by the unit circle $x^2+y^2=1$ and cross sections perpendicular to the $y$-axis are squares. Express the volume of the solid as an integral. **Do not evaluate the integral.**



$V_i = (\text{side})^2 \Delta y$

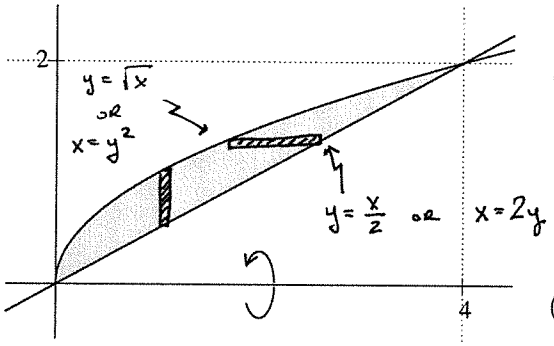
$= (2x)^2 \Delta y$

$= 4x^2 \Delta y$

$= 4(1-y^2)\Delta y$

$$\text{Volume} = \int_{-1}^{1} 4(1-y^2)\,dy$$

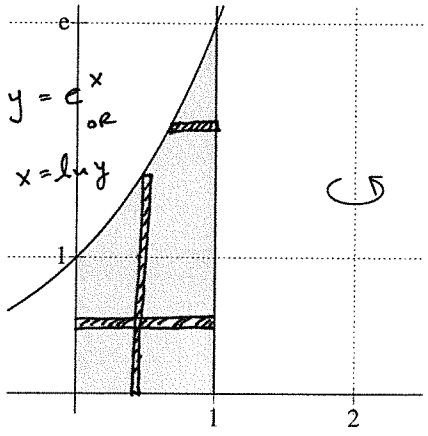
2. [4] The region bounded by the graphs of $y=\sqrt{x}$ and $y=x/2$, the shaded region in the figure, is revolved around the $x$-axis. Express the volume of the resulting solid as an integral using the Disk Method and the Shell Method. **Do not evaluate either integral.**




(a) $V_{Disk} = \pi \int_0^4 \left[ (\sqrt{x})^2 - \left(\frac{x}{2}\right)^2 \right] dx$

(b) $V_{Shell} = 2\pi \int_0^2 (y)(2y - y^2)\,dy$

3. [4] The region in the first quadrant bounded by the graphs of $y=e^x$ and $x=1$, the shaded region in the figure, is revolved around the line $x=2$. Express the volume of the resulting solid as an integral using the Disk Method and the Shell Method. **Do not evaluate either integral.**




(a) $V_{Disk} = \pi \int_0^1 (2^2 - 1^2)\,dy + \pi \int_1^e \left[ (2-\ln y)^2 - 1^2 \right] dy$

(b) $V_{Shell} = 2\pi \int_0^1 (2-x)(e^x)\,dx$