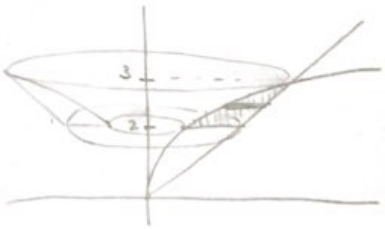
Calculus II. Quiz 2. Name _____ Time_____ 10

Show all work on this page for full and/or partial credit. Put a box around your final answers in each part.

1. Find the volume of: the region bounded by: $y = 2,\ y = 3,\ x = 3y,\ x = y^2$; rotated around the $y-$axis. You may use a calculator, but make sure to show the entire set-up. 5 pts



Set-up Only

$$V = \int_2^3 \pi\left((3y)^2 - (y^2)^2\right) dy$$

$$= \pi \int_2^3 \left(9y^2 - y^4\right) dy$$

$$dV = \pi\left((3y)^2 - (y^2)^2\right) dy$$

(Optional)

$$= \pi\left[3y^3 - \frac{y^5}{5}\right]_2^3$$

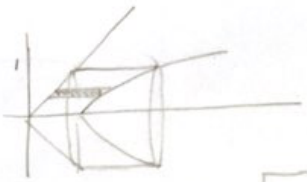
$$= \pi\left(\left(3(27) - \frac{3^5}{5}\right) - \left(3(8) - \frac{32}{5}\right)\right)$$

$$= \pi\left(57 - \frac{243}{5} + \frac{32}{5}\right)$$

$$= \frac{74\pi}{5}$$

$$= 46.496$$

2. Find the volume of: the region bounded by: $y = 0,\ y = 1,\ y = x,\ y = \sqrt{\ln(x)}$; rotated around the $x-$axis. Hint: solve that last equation for x. You may use a calculator, but make sure to show the entire set-up. 5 pts



$y = \sqrt{\ln x}$

$y^2 = \ln x$

$e^{y^2} = x$

$e^{y^2} - y$

$dV = 2\pi y\left(e^{y^2} - y\right) dy$

$$V = \int_0^1 2\pi y\left(e^{y^2} - y\right) dy$$

$$= 2\pi\left(\int_0^1 y e^{y^2} dy - \int_0^1 y^2 dy\right)$$

$$= 2\pi\left(\left[\frac{1}{2}e^{y^2}\right]_0^1 - \left[\frac{y^3}{3}\right]_0^1\right)$$

$$= 2\pi\left(\frac{1}{2}e - \frac{1}{2} - \left(\frac{1}{3} - 0\right)\right) = 3.3037$$

$$= \pi(e - 1) - \frac{2\pi}{3} = \pi\left(e - \frac{5}{3}\right)$$