

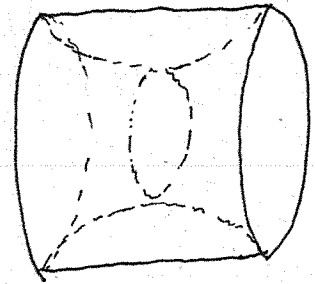
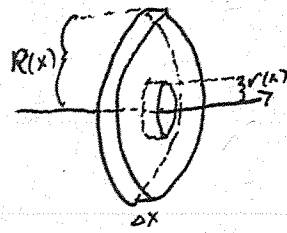
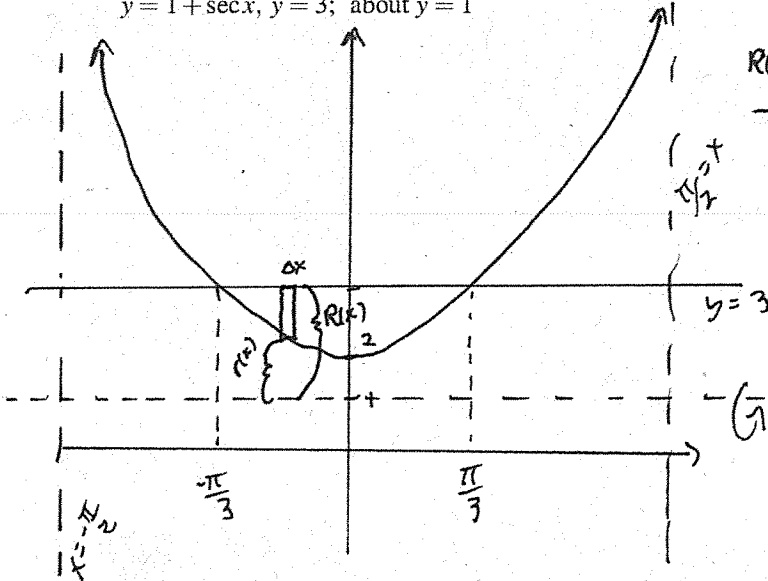
Quiz 9

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. (5 marks) §7.2 #4 Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region, the solid, and a typical disk or washer.

$$\Delta V = \pi [(R(x))^2 - (r(x))^2] \Delta x = \pi [2^2 - \sec^2 x] \Delta x$$

$y = 1 + \sec x, y = 3$; about $y = 1$



$$V = \int_{-\pi/3}^{\pi/3} \pi (2^2 - \sec^2 x) dx$$

$$= [\tan x + 4x]_{-\pi/3}^{\pi/3}$$

$$= -\tan \frac{\pi}{3} + 4\frac{\pi}{3} + \tan \frac{\pi}{3} + \frac{4\pi}{3}$$

$$= -\sqrt{3} + \frac{8\pi}{3} + \sqrt{3}$$

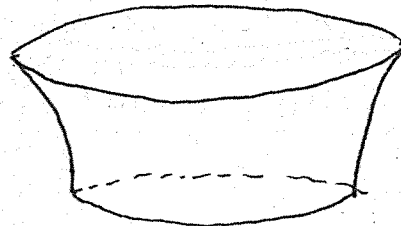
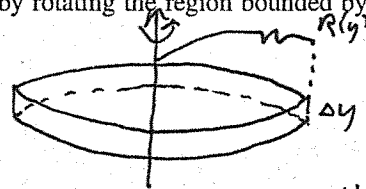
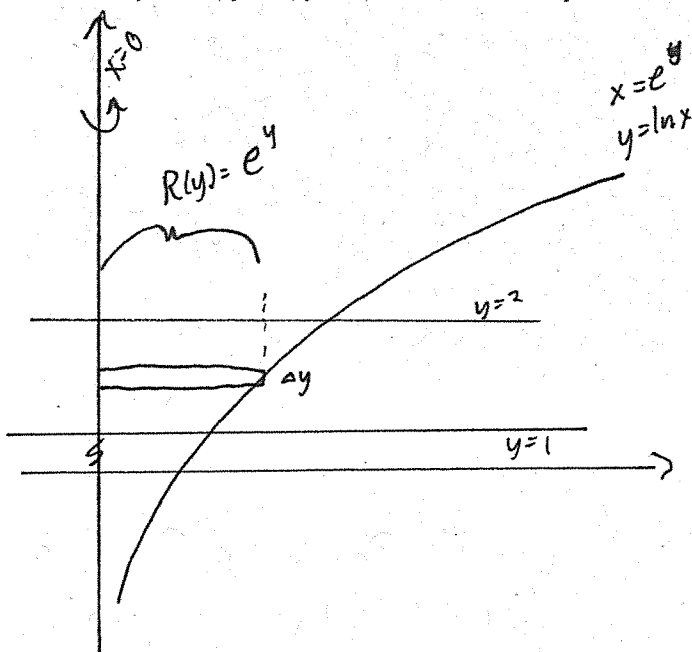
$$= \frac{8\pi}{3}$$

Intersection:

$$\begin{aligned} 1 + \sec x &= 3 & r(x) &= 1 + \sec x - 1 \\ \sec x &= 2 & &= \sec x \\ x &= \pm \frac{\pi}{3} & R(x) &= 2 \end{aligned}$$

Question 2. (5 marks) §7.2 #11 Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region, the solid, and a typical disk or washer.

$y = \ln x, y = 1, y = 2, x = 0$; about the y-axis



$$\Delta V = \pi [R(y)]^2 \Delta y$$

$$V = \int_1^2 \pi e^{2y} dy$$

$$= \left[\frac{\pi}{2} e^{2y} \right]_1^2$$

$$= \frac{\pi}{2} e^4 - \frac{\pi}{2} e^2$$