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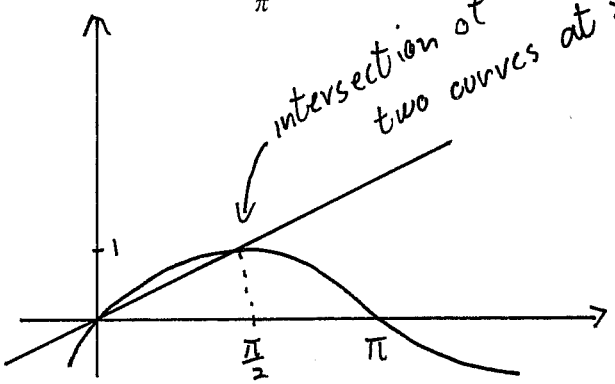
Quiz 8

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)* §7.1 #14
Sketch the region enclosed by the given curves. Then find the area of the region.

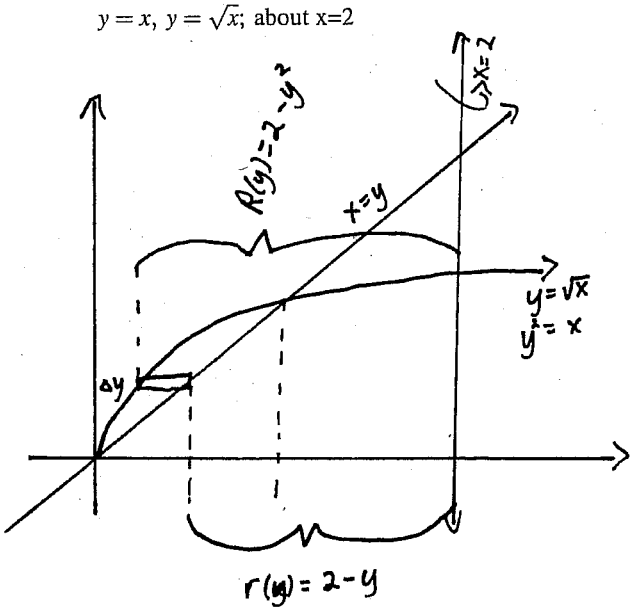
$y = \sin x,\ y = \frac{2}{\pi}x,\ x \geq 0$



$$A = \int_0^{\pi/2} \sin x - \frac{2}{\pi}x\,dx$$
$$= \left[-\cos x - \frac{x^2}{\pi}\right]_0^{\pi/2}$$
$$= \left[-\cos\frac{\pi}{2} - \frac{(\frac{\pi}{2})^2}{\pi}\right] - \left[-\cos 0 - \frac{0^2}{2}\right]$$
$$= 1 - \frac{\pi}{4}$$

Question 2. *(5 marks)* §7.2 #12
Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

$y = x,\ y = \sqrt{x}$; about x=2



rep. element:

$$\Delta V = \pi\left[(R(y))^2 - (r(y))^2\right]\Delta y$$
$$= \pi\left[(2-y^2)^2 - (2-y)^2\right]\Delta y$$
$$= \pi\left[4 - 4y^2 + y^4 - 4 + y - y^2\right]\Delta y$$
$$= \pi\left[y^4 - 5y^2 + 4y\right]\Delta y$$

$$V = \int_0^1 \pi\left[y^4 - 5y^2 + 4y\right]dy$$
$$= \pi\left[\frac{y^5}{5} - \frac{5y^3}{3} + \frac{4y^2}{2}\right]_0^1$$
$$= \pi\left[\frac{1}{5} - \frac{5}{3} + 2\right]$$
$$= \frac{8}{15}\pi$$