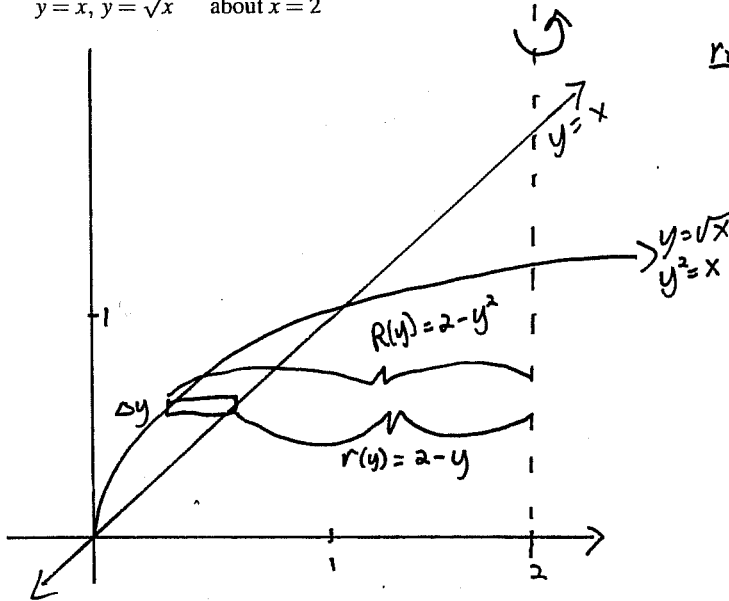


Quiz 9

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 #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 $x = 2$



intersection of two curves: $x = \sqrt{x}$
 $x^2 = x$

rep. element: $\Delta V = \pi [(R(y))^2 - (r(y))^2] \Delta y$
 $x(x-1) = 0$
 $= \pi [(2-y^2)^2 - (2-y)^2] \Delta y$
 $x=0 \quad x=1$

$$V = \int_0^1 \pi [(2-y^2)^2 - (2-y)^2] dy$$

$$= \int_0^1 \pi [4 - 4y^2 + y^4 - 4 + 2y - y^2] dy$$

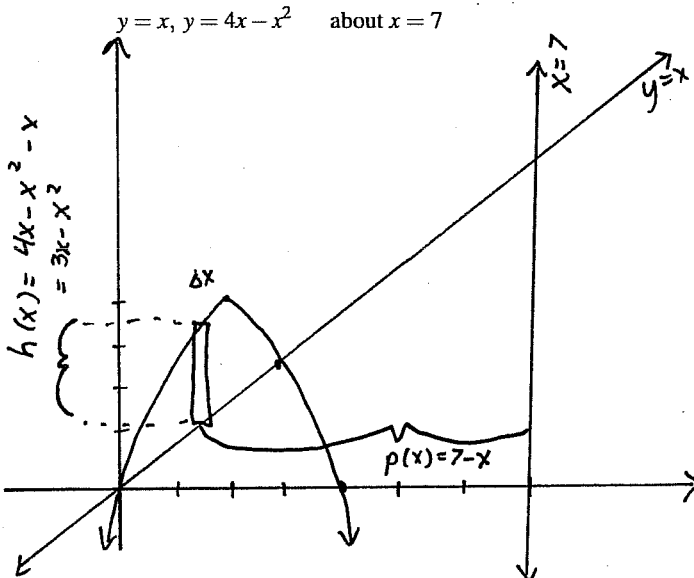
$$= \int_0^1 \pi [2y - 5y^2 + y^4] dy$$

$$= \pi \left[2y^2 - \frac{5}{3}y^3 + \frac{y^5}{5} \right]_0^1$$

$$= \pi \left(2 - \frac{5}{3} + \frac{1}{5} \right) = \frac{\pi 8}{15}$$

Question 2. (5 marks) §7.3 #22 Set up but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the given curves about the specified axis

$y = x, y = 4x - x^2$ about $x = 7$



x-int $0 = 4x - x^2$
 $0 = x(4-x)$
 $x=0 \quad x=4$

vertex $y = -x^2 + 4x$
 $= -(x^2 - 4x)$
 $= -(x^2 - 4x + 4 - 4)$
 $= -[(x-2)^2 - 4]$
 $= -(x-2)^2 + 4$

rep. element.

$$\Delta V = 2\pi p(x) h(x) \Delta x$$

$$= 2\pi (7-x)(3x-x^2) \Delta x$$

intersection of two curves:

$$x = 4x - x^2$$

$$0 = 3x - x^2$$

$$0 = x(3-x)$$

$$x=0 \quad x=3$$

y-int: (0,0)

$$V = \int_0^3 2\pi (7-x)(3x-x^2) dx$$