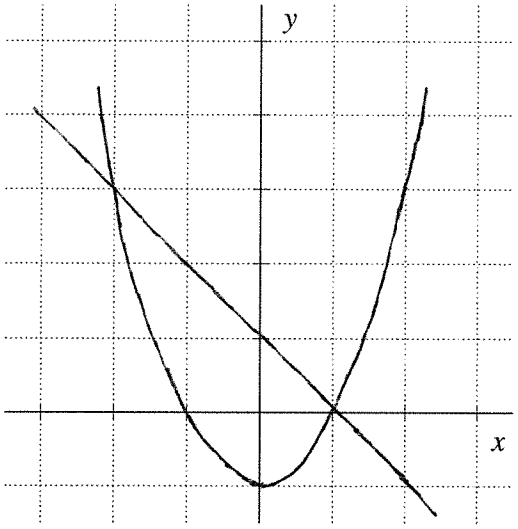
Math 172 | Quiz 2 | Name: _____

9 Sept 2016 | Show Appropriate Work | Point Values in boxes.

1. Consider the region bounded by the graphs of $y = x^2 - 1$ and $y = 1 - x$.

(a) [1] Carefully sketch the graphs on the coordinate system below.



(b) [3] Find the area of the bounded region.

[ProTip: In 172 'find the area' means compute an integral, not shade the area, draw an arrow to it, and exclaim "here it is!"]

$$\int_{-2}^{1} [(1-x) - (x^2-1)]\,dx = \int_{-2}^{1} (2 - x - x^2)\,dx$$

$$= 2x - \frac{x^2}{2} - \frac{x^3}{3}\Big|_{-2}^{1}$$

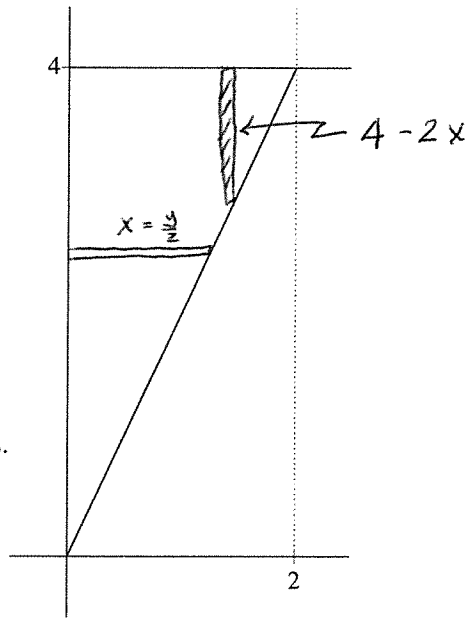
$$= 2 - \frac{1}{2} - \frac{1}{3} - \left(-4 - \frac{4}{2} + \frac{8}{3}\right)$$

$$= \frac{9}{2}$$

2. Consider a solid with base bounded by $y = 2x$ and $y = 4$ in the first quadrant, see the shaded region in the figure below. The solid has cross sections as specified. Express the volume of the solid as an integral. **Do not evaluate either of the integrals.**

(a) [3] Cross sections perpendicular to the y-axis are squares.

$$\int_0^4 \left(\frac{y}{2}\right)^2 dy$$



(b) [3] Cross sections perpendicular to the x-axis are semicircles.

$$\text{radius} = \frac{1}{2}(4 - 2x) = 2 - x$$

$$\int_0^2 \pi/2\,(2-x)^2\,dx$$