**Eddie Price** 

## High score: 10; Non-0 Low score: 6; Average score: 7.47 (including 0's)

<u>Problem 1</u> (10 Points). Find the volume of the solid obtained by rotating the region bounded by the curves y = 5 - 2x, y = 0, x = 0 about the x-axis. (Round to 3 decimal places.)

Solution. First sketch a graph of the region and the solid:



Notice here that we have disks of radius y = 5 - 2x, and those disks vary from x = 0 to  $x = \frac{5}{2}$  (since  $0 = 5 - 2\left(\frac{5}{2}\right)$ ). Thus, the volume of the solid is

$$V = \pi \int_{0}^{5/2} (5 - 2x)^{2} dx$$
  
=  $\pi \int_{0}^{5/2} (25 - 20x + 4x^{2}) dx$   
=  $\pi \left( 25x - 10x^{2} + \frac{4}{3}x^{3} \right) |_{0}^{5/2}$   
=  $\pi \left[ \left( 25 \left( \frac{5}{2} \right) - 10 \left( \frac{5}{2} \right)^{2} + \frac{4}{3} \left( \frac{5}{2} \right)^{3} \right) - (0 - 0 + 0) \right]$   
 $\approx \overline{(65.450 \text{ units}^{2})}$ 

Common Mistakes

Many people forgot to square their radius.

Many people got the upper bound wrong, putting either 5 or  $\frac{2}{5}$ , when it should have been  $\frac{5}{2}$ . Several people forgot to integrate their function after squaring it.

Several people squared their radius incorrectly.

Many people made rounding errors.