

Honors Calc. I. Homework Set #14 Name: _____
Self-Edification

1. §6.1, p.352, #16: Sketch the region enclosed by $y = x^3 - x$ and $y = 3x$, Decide whether to integrate with respect to x or y , draw a typical approximation rectangle and label its height and width, then find the area of the region.
2. §6.2, p. 362, #16 Find the volume of the solid obtained by rotating the region bounded by $y = x$, $y = \sqrt{x}$ about $x = 2$.
3. §6.3, p.368, #14: Use cylindrical shells to find the volume of the solid obtained by rotating the region bounded by $x + y = 3$, $x = 4 - (y - 1)^2$ about the x -axis . Sketch the region and a typical shell.
4. §6.3, p.368, #20: Use cylindrical shells to find the volume of the solid region obtained by rotating the region bounded by $y = x^2$, $x = y^2$ about $y = -1$. Sketch the region and a typical shell.
5. §6.4, p.374 #18: A 10-ft chain weights 25 lb and hangs from a ceiling. Find the work done in lifting the lower end of the chain to the ceiling so that it's level with the upper end.
6. §6.5, p. 377,#22: The velocity, v , of blood in a blood vessel with radius R and length l at a distance r from the central axis is

$$v(r) = \frac{P}{4\eta l}(R^2 - r^2),$$

where P is the pressure difference between the ends of the vessel and η is the viscosity of the blood. Find the average velocity (with respect to r) over the interval $0 \leq r \leq R$. Compare the average velocity with the maximum velocity.