

Math 2

Homework 5

Due: February 15, 2010

Please show all work.

1. Find the volume of the region obtained by rotating the region formed by $x = y^2$ and $x = 1$ about the line $x = 1$.
2. Find the volume of the region obtained by rotating the region formed by $y = x$ and $y = \sqrt{x}$ about the line $x = 2$ using (a) the methods of section 6.2 (i.e. disks and washers) and (b) using the methods of section 6.3 (i.e. cylindrical shells).
3. Use the method of cylindrical shells to find the volume of the region generated by rotating the region bounded by the curves $y = \frac{1}{x}$, $y = 0$, $x = 1$ and $x = 2$ about the y-axis.
4. Use the method of cylindrical shells to find the volume of the region generated by rotating the region bounded by the curves $y = x^3$, $y = 8$ and $y = 0$ about the x-axis.
5. Find the work done if a constant force of 100 lbs. is used to pull a cart a distance of 200 feet.
6. If 6 J of work is needed to stretch a spring from 10 cm to 12 cm, and another 10 J is needed to stretch it from 12 cm to 14 cm, what is the natural length of the spring?