

Spring 2008 Math 152

Week in Review 2

courtesy: Amy Austin

(covering sections 7.3 - 7.4)

Section 7.3

1. Find the volume of the solid obtained by rotating the region bounded by the given curve(s) about the specified axis.

a.) $y = \frac{1}{x^2}$, $x = 2$, $x = 4$, $y = 0$ about the y axis.

b.) $y = x^2$, $y = 16$, $x = 0$ about the x -axis.

c.) $y = x^2$, $y = 3x$. Rotate around the x -axis. Now rotate around the y axis.

d.) $y = x^3$, $y = 0$, $x = 1$, $x = 2$. Rotate around the line $x = -1$.

e.) $y = \sqrt{x}$, $x = 0$, $x = 4$, $y = 0$. Rotate around the line $y = 3$.

f.) $y = \cos x$, $y = 0$, $x = 0$, $x = \frac{\pi}{2}$. Rotate around the line $y = 1$. Now rotate around the line $x = \frac{\pi}{2}$. Do not evaluate either integral.

g.) $y = \ln x$, $y = 0$, $x = 4$ about the y axis. Do not evaluate the integral.

h.) $y = \sqrt{x}$, $y = 2 - x$, $y = 0$, around the x -axis. Find the volume using two different techniques of your choosing.

Section 7.4

2. How much work is done in lifting a 30 lb barbell from the floor to a height of 4 feet?

3. When a particle is at a distance x meters from the origin, a force of $f(x) = 3x^2 + 2$ Newtons acts on it. How much work is done in moving the object from $x = 2$ to $x = 4$?

4. A spring has a natural length of 6 inches. If a 5-lb force is required to maintain it to a length of 18 inches, how much work is required to stretch it from 1 foot to 3 feet?

5. A heavy rope, 50 feet long, weighs 0.5 pounds per foot and hangs over the edge of a building 120 feet

high. There is a 85 pound weight attached to the end of the rope. How much work is done in pulling the rope to the top of the building?

6. An aquarium 10 m long, 2 m wide and 1 m deep is full of water. Find the work required to pump half the water to the top of the aquarium.

7. A tank contains water and has the shape of a trough 6 feet long. The end of the trough is an isosceles triangle with height 3 feet and base length 4 feet. The vertex of the triangle is at the bottom. The water is pumped from a spout at the top of the tank that is 1 foot high. Find the work required to pump all of the water through the spout.

8. A trough is in the shape of a half drum (half a cylinder lying on its side). The length of the tank is 8 m and the radius is 1 m. Assuming it is full of water, find the work done in pumping the water to the top of the tank.