MATH 1920 Chapter 6 Practice

1. Find the area of the region bounded by the graphs of the equations $x = y^2$ and $x + y = 1$.

2. Find the area of the region between the graphs of the equations $y = \cos\left(\frac{1}{2}x\right)$ and $y = \sin x$ from $x = \frac{\pi}{2}$ to $x = \pi$.

Sketch the region bounded by the graphs of the equations, and find the volume of the solid generated by revolving the region about the indicated axis.

3. $4x - y^2 = -1$, $y = 0$, $x = 0$, $x = 2$, $x -$ axis

4. $x^3 - y = -1$, $y = 2$, $x = 0$, $y -$ axis

5. Find the volume of the solid generated by revolving the region bounded by the graphs of $y = 4x^2$ and $4x + y = 8$ about a) the x-axis b) the line y = 16

6. Find the volume of the solid generated by revolving the region bounded by $x = y^2$ and x = 4 about the line x = 6.

7. Find the arc length of the graph of from $(x + 3)^2 = 8(y - 1)^3$ from $\left(-2, \frac{3}{2}\right)$ to $(5, 3)$.

8. Sketch the region bounded by the graphs of the equations, and find m, M_x, M_y and the centroid.

   $y = 4 - x^2$, $x - y = -2$

9. a) Find the average value of the function of the given interval,

   b) Find c such that $f_{ave} = f(c)$ $f(x) = 3\sqrt{x + 1}$, on $[-1, 8]$

10. A 20-ft chain weighing 5 pounds per foot is lying coiled on the ground. How much work is required to raise one end of the chain to a height of 20 ft so that it is fully extended?

11. A 15-ft chain is hanging from a winch 15 feet above ground level. Find the work done by the winch in winding up the chain, if the chain weighs 3 pounds per foot.

12. A force of 5 pounds compress3s a 15-inch spring a total of 4 inches. How much work is done in compressing the spring 7 inches?

13. A force of 750 pounds compresses a spring 3 inches from its natural length of 15 inches. Find the work done in compressing the spring an additional 3 inches.

Answers: 1. 1.8634 2. $\frac{1}{2}$ 3. 10π 4. $\frac{3\pi}{5}$ 5. a) $\frac{1152\pi}{5}$ b) $\frac{1728\pi}{5}$

6. $\frac{384\pi}{5}$ 7. 7.16 8. $m = \frac{9}{2}$, $M_y = -\frac{9}{4}$, $M_x = \frac{54}{5}$, centroid $= \left(-\frac{1}{2}, \frac{12}{5}\right)$ 9. a) 6 b) 3

10. 1000 ft-lb 11. 337.5 ft-lb 12. 30.625 in-lb = 2.55 ft-lb 13. 3375 in-lb = 281.25 ft-lb