MATE 3032 assignment 1: sections 6.2, 6.5

1. The linear density in a rod 6 m long is $\sqrt{x+1}$ kg/m, where x is measured in metres from one end of the rod. Find the average density of the rod.

2. Exercise 15 p. 463 of the text, where you replace the given $f(x)$ by $g(x) = f(x) + 2$.

3. If f is continuous and $\int_{-1}^{3} f(x)\,dx = 8$, show that f takes on the value 2 at least once in the interval $[-1,3]$.

For the remaining exercises, plot the figure. For exercises 4-5, follow the instructions for exercises 1–18 of §6.2, p. 446. For exercises 7-8, find the volume of the described solid S.

4. Region bounded by $x = 2 - y^2, x = |y|$; about the y-axis.

5. Region bounded by $y = \cos x,\ y = \sin x,\ 0 \le x \le \pi/4$; about the line $y = -1/2$.

6. Any three of exercises 19–30 pp. 446-447.

7. S has base the inside of the ellipse $9x^2 + 4y^2 = 36$. Cross-sections perpendicular to the y-axis are squares.

8. S has base the region bounded by the parabola $x = 2 - y^2$ and the y-axis. Cross-sections perpendicular to the y-axis are equilateral triangles.