1. §6.4: Problems 1*, 3*, 5*, 19*. For each problem:
   (a) Sketch a graph of the curve.
   (b) Choose an axis of integration and write down your choice.
   (c) Draw a typical slice of surface area and label its dimensions.
   (d) Compute the area of that slice. Write your answer in terms of the integration variable.
   (e) Express the total surface area as an integral. (Use a numerical approximation to check your answer.)

2. §6.4: Problem 1*. Assume the units on the $x$- and $y$-axes are centimeters and that the surface is made of thin metal whose density varies by $x$-coordinate: $\rho = x + 1$ g/cm$^2$ (grams per square centimeter).
   (a) Sketch a graph of the curve.
   (b) Choose an axis of integration and write down your choice.
   (c) Draw a typical slice of surface area and label its dimensions.
   (d) Compute the mass of that slice. Write it in terms of your integration variable.
   (e) Express the total mass as an integral. (Use a numerical approximation to check your answer.)

3. §6.4: Problem 3*. Assume the units on the $x$- and $y$-axes are centimeters and the surface is made of metal that has variable density: $\rho = y^2 + 1$ g/cm$^2$. Complete the usual steps to find the total mass of the surface. (You can leave your answer as an integral.)

4. §6.4: Problem 5*. Assume the units on the $x$- and $y$-axes are centimeters and the surface is made of metal whose density depends on the $x$-coordinate: $\rho = x$ g/cm$^2$. Complete the usual steps to find the total mass of the surface.

5. §6.4: Problem 19*. Assume the units on the $x$- and $y$-axes are centimeters and the surface is made of material whose density varies by $y$-coordinate: $\rho = 2y + 3$ g/cm$^2$. Complete the usual steps to find the total mass of the surface.

6. §6.4: Problem 19*. Assume the units on the $x$- and $y$-axes are centimeters and the surface is made of material whose density is a function of radius: $\rho = r^2$ g/cm$^2$. Complete the usual steps to find the total mass of the surface.

Hints and Answers

2) 5.99 g; 3) 15.5 g; 4) 127 g; 5) 521 g; 6) 761 g;