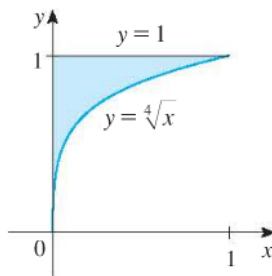
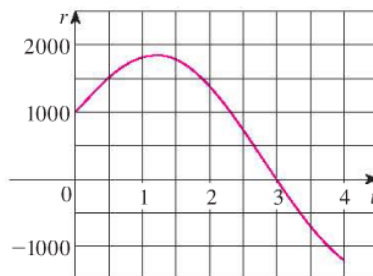


**Turn in the following problems:**

1. The boundaries of the shaded region are the  $y$ -axis, the line  $y = 1$ , and the curve  $y = \sqrt[4]{x}$ . Find the area of this region by writing  $x$  as a function of  $y$  and integrating with respect to  $y$ .



2. If  $f(x)$  is the slope of a trail at a distance of  $x$  miles from the start of the trail, what does  $\int_3^5 f(x) dx$  represent?
3. If the units for  $x$  are feet and the units for  $a(x)$  are pounds per foot, what are the units for  $da/dx$ ? What units does  $\int_2^8 a(x) dx$  have?
4. The linear density of a rod of length 4 m is given by  $\rho(x) = 9 + 2\sqrt{x}$  measured in kilograms per meter, where  $x$  is measured in meters from one end of the rod. Find the total mass of the rod.
5. Water flows into and out of a storage tank. A graph of the rate of change  $r(t)$  of the volume of water in the tank, in liters per day, is shown. If the amount of water in the tank at time  $t = 0$  is 25,000 L, use the Midpoint Rule to estimate the amount of water four days later.



6. Suppose  $h$  is a function such that  $h(2) = -4$ ,  $h'(2) = -7$ ,  $h''(2) = 6$ ,  $h(5) = 8$ ,  $h'(5) = 10$ , and  $h''(5) = 20$ , and  $h''$  is continuous everywhere. Evaluate  $\int_2^5 h''(u) du$ .