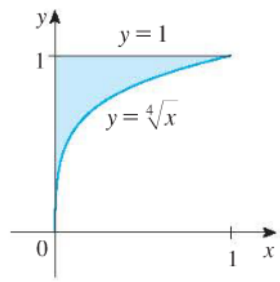
**Turn in the following problems:**

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 $y$.

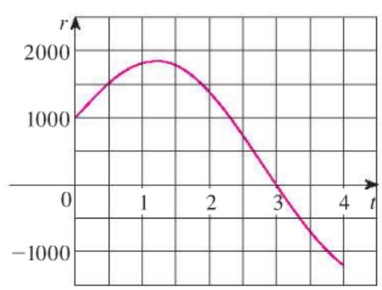



2. If $f(x)$ is the slope of a trail at a distance of $x$ miles from the start of the trail, what does $\int_3^5 f(x)\,dx$ represent?

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 $\int_2^5 h''(u)\, du$.