

In Exercises 1–12, find the volume of the solid obtained by revolving each of the following regions about the  $y$  axis and sketch the region.

1. The region under the graph of  $\sin x$  on  $[0, \pi]$ .
2. The region under the graph of  $\cos 2x$  on  $[0, \pi/4]$ .
3. The region under the graph of  $2 - (x - 1)^2$  on  $[0, 2]$ .
4. The region under the graph of  $\sqrt{4 - 4x^2}$  on  $[0, 1]$ .
5. The region between the graphs of  $\sqrt{3 - x^2}$  and  $5 + x$  on  $[0, 1]$ .
6. The region between the graphs of  $\sin x$  and  $x$  on  $[0, \pi/2]$ .
7. The circular region with center  $(a, 0)$  and radius  $r$  ( $0 < r < a$ ).
8. The circular region with radius 2 and center  $(6, 0)$ .