

1. Find the area of the region between  $y = x^2$  and  $y = x + 2$  from  $x = 0$  to  $x = 1$ .
2. Find the area of the region bounded by the line  $y = x$  and the parabola  $y = 6 - x^2$ .
3. Find the area of the region bounded by  $y = x^3$  and  $y = x$ .
4. Find the area of the region between  $x = y^2$  and  $x = 32 - y^2$  from  $y = -2$  to  $y = 2$ .
5. Find the area of the region between lines  $x = -2y + 5$ ,  $x = y - 1$  and  $y = 0$ .
6. Find the area of the region between  $x = -y^2$  and  $x = y - 2$ .
7. The base of a certain solid is a circle with diameter  $AB$  of length  $2a$ . Find the volume of the solid if each cross section perpendicular to  $AB$  is a square.
8. The base of a certain solid is the region in the  $xy$ -plane bounded by the parabolas  $y = x^2$  and  $x = y^2$ . Find the volume of this solid if every cross section perpendicular to the  $x$ -axis is a square with base in the  $xy$ -plane.
9. Find the volume of a frustum of a pyramid with square base of side  $b$ , square top of side  $a$  and height  $h$ .
10. Find the volume of the solid which is generated by rotating the region bounded by  $y = \sin x$  on  $[0, \pi]$  and  $y = 0$  about the  $x$ -axis.
11. Verify the formula  $V = \frac{1}{3}\pi r^2 h$  for the volume of the circular cone with base radius  $r$  and height  $h$ .
12. Find the volume of the solid generated by rotating the region bounded by  $y = 1 - x^2$ , lines  $x = -1$  and  $x = 1$  about the line  $y = 2$ .
13. Determine the volume of the solid obtained by rotating the region bounded by  $x = 5 - x^2$  and  $x = 1$  about the  $y$ -axis.