

Worksheet 24 – Solids Defined with Cross Sections

Period _____

Let R be the region completely enclosed by the graphs of $y = x^2$ and $y = \sqrt{x}$. All vertical cross sections **perpendicular** to the x -axis are the shapes listed below. Write, but do not evaluate an integral expression representing the volume of the solid formed.

1. Squares:
2. Rectangles with height 4:
3. Equilateral triangles:
4. Right Isosceles Triangles:
5. Semicircles:

Now, using region R , consider that all vertical cross sections **parallel** to the x -axis are the shapes listed below. Write, but do not evaluate an integral expression representing the volume of the solid formed.

6. Squares:
7. Rectangles with height three times the base:
8. Equilateral triangles:
9. Right Isosceles Triangles:
10. Semicircles:

11. A solid has as its base the region bounded by the lines $x + y = 4$, $x = 0$ and $y = 0$ and the cross section is perpendicular to the x -axis are equilateral triangles. Find its volume.
12. The base of a solid is the region bounded by the graphs of $f(x) = x^2$ and $g(x) = 8 - x^2$. Find the volume of the solid if all cross sections perpendicular to the x -axis are squares.
13. A solid has as its base the region bounded by the lines $x + 2y = 6$, $x = 0$, and $y = 0$, and the cross sections perpendicular to the y -axis are semi-circles. Find the volume of the solid.
14. Find the volume of the solid whose base is bounded by the graphs of $y = x + 1$ and $y = x^2 - 1$, with the cross sections perpendicular to the x -axis being rectangles with constant height 2. Find the volume of the solid.
15. The base of a solid is enclosed by the lines $y = x^3$, $y = 0$, and $x = 1$. Find the volume of the solid with the cross sections parallel to the x -axis being right isosceles triangles with the hypotenuse in the base.