

Calculus Worksheet #5 Unit 11

Solids of Revolution

Use the indicated method to find the volume generated by rotating the given region about the given line. For each problem, you must

- sketch the generating region, showing a typical generating rectangle,
- write an expression for the volume generated by this rectangle,
- express the exact volume of the solid as a definite integral, and
- evaluate the integral. Express your final answers rounded to 3 significant digits.

Show all of your work, including your answer, neatly organized on the graph paper provided.

- The region in the first quadrant bounded by $x^2 + y = 9$ and the coordinate axes is rotated about the y-axis. (Use disks.)**
- The region bounded by the x-axis, the curve $y = x^2$, and the line $x = 2$ is rotated about the line $x = 3$. (Use washers.)**
- The region bounded by the curve $y = 4 - x^2$ and the line $y = 3$ is rotated about the line $x = 2$. (Use shells.)**

Known Cross Section

- In this problem a solid is described. You must
 - sketch the base of the solid, showing a typical cross sectional slice,
 - write an expression for the volume of this cross sectional slice,
 - express the exact volume of the solid as a definite integral, and
 - evaluate the integral. Express your final answers rounded to 3 significant digits.

Show all of your work, including your answer, neatly organized on the graph paper provided.

The base of a solid is the ellipse $x^2 + 9y^2 = 36$. Each cross section by a plane perpendicular to the x-axis is an isosceles right triangle with its hypotenuse in the base of the solid.