Calculus   Worksheet #4   Unit 11   _____

Known Cross Section

In each problem a solid is described. You must
   a) sketch the base of the solid, showing a typical cross sectional slice,
   b) write an expression for the volume of this cross sectional slice,
   c) express the exact volume of the solid as a definite integral, and
   d) evaluate the integral.
Show all of your work neatly organized on graph paper.

1. The base of a solid is the circle $x^2 + y^2 = 9$. Each cross section by a plane perpendicular to the x-axis is an isosceles right triangle with one leg in the base of the solid.

2. The base of a solid is the ellipse $x^2 + 4y^2 = 16$. Each cross section by a plane perpendicular to the x-axis is a square with one side in the base of the solid.

3. The base of a solid is the region bounded by the curves $y = 8 - 2x^2$ and $y = 4 - x^2$. Each cross section by a plane perpendicular to the x-axis is a circle with diameter in the base of the solid.

4. The base of a solid is the region bounded by the curve $y = x^2 + 1$ and the line $y = 5$. Each cross section by a plane perpendicular to the y-axis is an isosceles right triangle with its hypotenuse in the base of the solid.