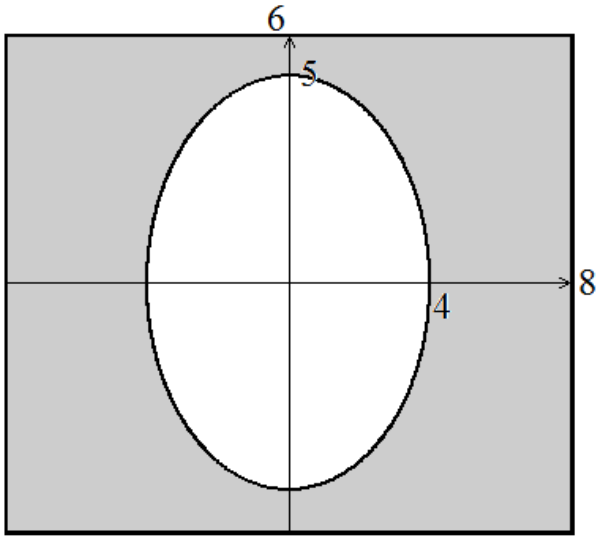
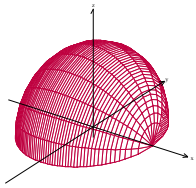


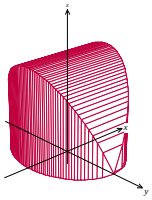
An architect is working on a design for a building. In the sketch shown above, the building foundation is bounded by an ellipse centered at the origin. The building will be surrounded by a green space bounded in the sketch by $x = 8$, $x = -8$, $y = 6$, $y = -6$. Write three different definite integrals that will determine the area of the green space (at least one integral with respect to *x* and at least one integral with respect to *y*).

The architect considers four possible designs for his building. Determine volume of each.

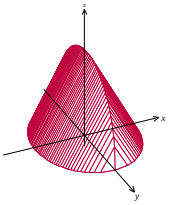
a) semi-circular cross sections perpendicular to the *x*-axis



b) square cross sections perpendicular to the *y*-axis



c) equilateral triangle cross-sections perpendicular to *y*-axis



d) right triangular cross sections, perpendicular to *x*-axis, with leg in the base