

1. Let R_1 be the region bounded by the curve $x^2/3 + y^2 = 1$ and R_2 be the region bounded by the curve $x^2 + y^2/3 = 1$. Let R be the intersection of R_1 and R_2 . Find the area of R .

2. Consider a cylindrical oil tank with a diameter of 5 feet, mounted so that the axis of the cylinder is horizontal. Thus, the x -cross-sections are circles. Suppose that the depth of the oil in the tank is 3 feet. Find out what percent of the tank is filled in two ways:
 - (a) Use only geometry.
 - (b) Use an integral and trigonometric substitution.