

# MATH 162

# PRACTICE QUIZ 1C

1. Sketch the region in the first quadrant bounded by the x-axis, the y-axis, the line  $x = \sqrt{3}$  and the curve  $y = \sqrt{x^2 + 1}$ . This region is rotated about the y-axis. Using the *shell method*, write a definite integral that expresses the volume of this solid of revolution. You *need not* evaluate this integral.
2. The base of a certain solid is the disk  $x^2 + y^2 \leq 25$  in the xy-plane. Each cross-section of the solid cut out by a plane perpendicular to the x-axis is an isosceles right triangle with its hypotenuse on the base of the solid. Express the volume of the solid as a definite integral. *Do not evaluate.*
3. Consider the region in the xy-plane bounded by the parabola  $y = x^2$  and the line  $y = 36$ . Revolve the region about the line  $x = 11$ . Using the *washer method* express the *volume* as a definite integral. *Do not evaluate.* Be certain to sketch the region.

**Extra Credit:** A solid is generated by revolving about the x-axis the region bounded by the graph of the positive continuous function  $y = f(x)$ , the x-axis, and the fixed line  $x = a$  and the variable line  $x = b$  where  $b > a$ .

Its volume, for all  $b$ , is  $b^2 - ab$ . Find the function  $f(x)$ .