I) If $R$ is the region bounded by the graphs of the equations shown below, set up (but do not evaluate) an integral expression for

- a) The area of $R$ (in terms of $x$).
- b) The area of $R$ (in terms of $y$).
- c) The volume of the solid generated by revolving $R$ around the $x$-axis.
- d) The volume of the solid generated by revolving $R$ around the $y$-axis.

1. $y = \frac{3}{x}$ and $x = 2y^2$
2. $y = 2x^2$ and $y = 6x$
3. $y = 2\sqrt{x}$, $y = 5 - 3x$, and $y = 0$
4. $y = e^{3x}$, $y = e^{2x}$, and $y = 5$

II) The side of a wine barrel is formed by rotating the parabola $x = 1.1 - 0.1y^2$ for $-1.5 \leq y \leq 1.5$ around the $y$-axis. Find the volume of the wine barrel, if length is measured in ft. (Round your answer off to 1 decimal place.)

A bowl has the shape of the bottom half of a sphere with a radius of 6 in. If the bowl contains soup which is 4 in deep, find the volume of the soup.

Let $R$ be the region bounded by the graphs of $y = x^2 - 4$ and $y = 5$.

a) Find the area of $R$.

b) Find the volume of the solid generated by revolving $R$ about the $y$-axis.