Find the volume of the solid generated by revolving the region bounded by the given lines and curves about the x-axis. Show the work that leads to your answer. Set-up the integral and then use your calculator to find the volume.

1) \( y = \frac{1}{x}, \ y = 0, \ x = 1, \ x = 8 \)

Find the volume of the solid generated by revolving the region bounded by the given lines and curves about the x-axis. Show the work that leads to your answer.

2) \( y = x^2, \ y = 25, \ x = 0 \)

For problems 3 and 4; **Find the volume of the solid generated by revolving the region about the y-axis. Show the work that leads to your answer**

3) The region enclosed by \( x = \frac{y^2}{3}, \ x = 0, \ y = 0, \ y = 3 \)

4) The region in the first quadrant bounded on the left by \( y = x^3, \) on the right by the line \( x = 4, \) and below by the x-axis. **Set-up the integral and then use your calculator to find the volume.**
5. Let $R$ be the shaded region bounded by the graph of $f(x) = xe^x$, the line $g(x) = -2x$, and the vertical line $x = 1$, as shown in the figure above. (R is the shaded region in both quadrant 1 and 4)

a) Write, but do not evaluate an integral expression for the area of $R$.

b) Write, but do not evaluate, an integral expression that gives the volume of the solid generated when $R$ is rotated about the horizontal line $y = -2$.

c) For this solid with base $R$, the cross sections are perpendicular to the x-axis are squares. Write, but do not evaluate, an integral expression for the volume of the solid.

d) Write, but do not evaluate, an expression involving one or more integrals that gives the perimeter of $R$. 