1. The profile of a football resembles the ellipse $\frac{4x^2}{121} + \frac{y^2}{12} = 1$, where $x$ and $y$ are measured in inches. Find the football’s volume to the nearest cubic inch.
2. Find the volume of the solid generated by revolving the region bounded by \( y = \sqrt{x} \) and the lines \( y = 2 \) and \( x = 0 \) about the line \( x = 4 \).
3. Use the shell method to find the volume of the solid generated by revolving the region bounded by the curves $x = 2y - y^2$ and $x = 0$ about the $x$-axis.
4. Find the length of the parametric curve $x = 1 - t$, $y = 2 + 3t$, from $-2/3 \leq t \leq 1$. 
5. Find the center of mass of a thin plate covering the region bounded below by the parabola \( y = x^2 \) and above by the line \( y = x \) if the plate’s density at the point \((x, y)\) is \( \delta(x) = 12x \).
6. Find the area of the surface generated by revolving the curve \( x = \sqrt{2y-1} \), \( \frac{3}{8} \leq y \leq 1 \), about the \( y \)-axis.
7. A mountain climber is about to haul up a 50 m length of hanging rope. How much work will it take if the rope weighs 0.624 N/m?
8. A rectangular milk carton measures 3.75 in. × 3.75 in. at the base and is 7.75 in. tall. Find the force of the milk on one side when the carton is full. Assume milk has the weight density of 64.5 lb/ft³.
9. Find the length of the curve \( y = x^{1/2} - \frac{1}{3} x^{3/2} \) from \( x = 1 \) to \( x = 4 \).
10. Find the volume of the region bounded by $y = -x + 4$, $y = -\frac{2}{3}x + 4$, and $x = 3$ rotated about the $y$-axis.