1. (5 points) Find the volume of the solid generated by revolving the region bounded by the line $y = 1$ and the curve $\frac{\pi}{4} y = \arctan x$ in the first quadrant about the $y$-axis.
2. (5 points) The region bounded by the parabola $y = x^2$ and the line $y = 2x$ in the first quadrant is revolved about the $y$-axis to generate a solid. Find the volume of the solid.
3. (5 points) Find the volume of the solid generated by revolving the region bounded by the line $x = 3$ and the curve $y = \frac{9\sqrt{x}}{\sqrt{x^2 + 9}}$ in the first quadrant about the y-axis.