1. Use the method of the cylindrical shells to find the volume generated by rotating the region bounded by the given curves

\[ y = \cos\left(\frac{\pi x}{2}\right), \quad y = 0, \quad 0 \leq x \leq 1, \quad \text{about the y-axis} \]
2. Evaluate the integral
\[ \int \frac{x^2}{\sqrt{6x - x^2}} \, dx \]