Problem 1 *Compute the definite integral. Show all work.*

$$\int_0^{1/2} \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$$

Problem 2 *The base of S is the region enclosed by the parabola $y = 1 - x^2$ and the x-axis. The cross-sections of S perpendicular to the y-axis are squares. Draw S and set up an integral to calculate its volume.*

Problem 3 *Consider the region R bounded by $y = \sin(x^2)$, $y = \cos(x^2)$, $x = \sqrt{\pi/4}$, $x = \sqrt{5\pi/4}$. Let S be the solid obtained by rotating R around the y-axis.*

(a) Draw R and S.

(b) Attempt to compute the area of R (set up the integral).

(c) Compute the volume of S.