Problem 1. Determine the centroid of the plane region bounded by one arch of a sine curve.

Problem 2. Compute moments of inertia, $I_x$, $I_y$, and $I_z$, of right circular cone with radius $r$, height $h$, and constant density.
Problem 3. Compute the mass of the spherical shell composed of two materials of uniform densities $\delta_1$, $\delta_2$ respectively, as detailed in the figure. The internal radius is $\frac{1}{2}$, the external radius is $\frac{3}{2}$, and the density changes in the middle point ($\rho = 1$).