Instructions: Give concise answers, but clearly indicate your reasoning.

I. Consider the solid in the first octant bounded by the three coordinate planes and the plane $3x+2y+z=6$.
(6)

(a) What are the x and y-intercepts of the plane?

(b) The base of the solid is a triangle in the xy-plane. In an xy-plane, draw a picture of the base, and give equations for its sides.

(c) Write a double integral to find the volume of the solid. Supply specfic limits of integration, but *do not* carry out any further calculations or try to evaluate it.

II. A lamina occupies the unit square R, where $0 \le x \le 1$ and $0 \le y \le 1$. Its density at (x,y) is proportional
(6) to x^3. Write definite integrals to calculate each of the following, but *do not* carry out the evaluation of the integrals.

(a) The mass of the lamina.

(b) The moment of the lamina with respect to the x-axis.

(c) The x-coordinate of the center of mass of the lamina, where m is its mass.

III. Change the order of integration for the following integral, but *do not* carry out any further calculations or
(4) try to evaluate it: $\displaystyle\int_0^8 \int_{\sqrt[3]{y}}^2 e^{x^4}\,dx\,dy.$

IV. Using polar coordinates, evaluate the integral $\iint_D 2e^{-x^2-y^2}\,dA$, where D is the region bounded by $y = $
(4) $\sqrt{4-x^2}$ and the x-axis.