Supplementary Problems on Center of Mass

Set up triple integrals for the center of mass for each of the following solids. Evaluate using Maple.

1. The solid lies in the first octant, bounded above by $2x + 3y + z = 12$. The density is $\rho(x, y, z) = x + 1$.
   
   Answer: $(2.04, 0.88, 2.64)$

2. The solid lies above $z = x^2 + y^2$ and below $z = 4$. The density is $\rho(x, y, z) = 1$.
   
   Answer: $(0, 0, \frac{8}{3})$

3. The solid lies above $z = y^2$, below $z = 1$, and between the planes $x = 0$ and $x = 3$. The density is $\rho(x, y, z) = xy^2$.
   
   Answer: $(2, 0, \frac{5}{7})$