PHYS 211 Center of Mass

 $x\_{cm}=\frac{m\_{1}x\_{1}+m\_{2}x\_{2}+m\_{3}x\_{3}+…}{m\_{1}+m\_{2}+m\_{3}+…}$ $ y\_{cm}=\frac{m\_{1}y\_{1}+m\_{2}y\_{2}+m\_{3}y\_{3}+…}{m\_{1}+m\_{2}+m\_{3}+…}$

4. In Fig. [9-37](http://edugen.wiley.com/edugen/courses/crs4957/halliday9118/halliday9118c09/halliday9118/halliday9118c09/halliday9118c09xlinks.xform?id=halliday9118c09-fig-0037), three uniform thin rods, each of length *L* = 22 cm, form an inverted U. The vertical rods each have a mass of 14 g; the horizontal rod has a mass of 42 g. What are (a) the *x* coordinate and (b) the *y* coordinate of the system's center of mass?



7. In the ammonia (NH3) molecule of Fig. [9-40](http://edugen.wiley.com/edugen/courses/crs4957/halliday9118/halliday9118c09/halliday9118/halliday9118c09/halliday9118c09xlinks.xform?id=halliday9118c09-fig-0040), three hydrogen (H) atoms form an equilateral triangle, with the center of the triangle at distance *d* = 9.40 × 10-11 m from each hydrogen atom. The nitrogen (N) atom is at the apex of a pyramid, with the three hydrogen atoms forming the base. The nitrogen-to-hydrogen atomic mass ratio is 13.9, and the nitrogen-to-hydrogen distance is *L* = 10.14 × 10-11 m. What are the (a) *x* and (b) *y* coordinates of the molecule's center of mass?

