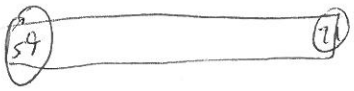
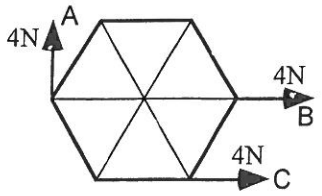
Post Activity Problems:

1. A 59-kg woman and a 71-kg man sit on a seesaw, 3.5 m long. Where is their center of mass?



$X_{com} = \frac{59}{130}(0) + \frac{71}{130}(3.5) =$ 1.91 m from woman

2. Three 4-Newton forces act on a plywood hexagon as shown in the diagram. The sides of the hexagon each have a length of 1 meter.



Rank, from greatest to least, the magnitude of the torque applied about the center of the hexagon by each force.

Greatest 1 A 2 C 3 B Least

3. A system consists of two spheres, of mass m and $2m$, connected by a rod of negligible mass, as shown above. The system is held at its center of mass with the rod horizontal and released from rest near Earth's surface at time $t = 0$.

Which of the following best explains why the system does not rotate around its center of mass as it falls?

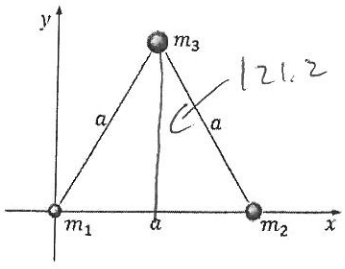
(A) The Earth exerts the same gravitational force on both spheres, causing them to accelerate at the same rate.

(B) The Earth exerts the same gravitational force on both spheres, generating torques that cancel out.

(C) The Earth exerts a larger gravitational force on the sphere of mass $2m$, but that sphere is closer to the center of mass and the torques cancel out.

(D) The Earth exerts a larger gravitational force on the sphere of mass $2m$, but that sphere has more inertia and the torques cancel out.

4. Three particles of respective masses $m_1 = 12$ kg, $m_2 = 25$ kg and $m_3 = 38$ kg form an equilateral triangle of side length $a = 140$ cm. If we locate m_1 at the origin on the xy-plane, and put m_2 to the right of m_1 on the x-axis, as shown in the above figure, what are the approximate coordinates of the center of mass of this system?



x) $\frac{12}{75}(0) + \frac{25}{75}(140) + \frac{38}{75}(70)$

$= 82.\overline{13}$ cm

y) $\frac{12}{75}(0) + \frac{25}{75}(0) + \frac{38}{75}(121.2) = 61.43$ cm

(82.13, 61.43)