February 25th 2014

Important equations:

Center of Mass=(m1x1+m2x2)/(m1+m2)

Torque=(Lever arm)(Force)

\*Also remember: The Lever arm is the perpendicular distance from the pivot point to the line along the force.

1. Find the center of mass of the following 2-dimensional body:

The mass of A is 27.4 kg

The mass of B is 31 kg

The mass of C is 70 kg

Assume A and B are equivalent in size.

C

B

A

Y=5

X=10

X=6

Y=4

1. A force of 5N is applied to a door at a 30 degree angle with respect to the door in the direction of the hinge. If the torque on the door is 4.5N\*m. What is the length of the lever arm and the length of the door to the hinge?
2. A force of 16N is applied 80 cm from the pivot point of a door. The torque it produces is 8 N\*m. What is the direction the force is applied?
3. A 20N force is exerted at the end of a fan blade to start the fan in motion. The force is exerted at a direction of 80 degrees with respect to the blade in the direction of the pivot point. The length of the fan blade is 0.7 m. What is the torque on the fan?
4. A wooden plank is laying on a table with a portion of the plank hanging off the table. A metal block is placed at the end of the plank, causing a torque of 7.8 N\*m. What is the mass of the block if only 65cm of the wooden plank are off of the table?