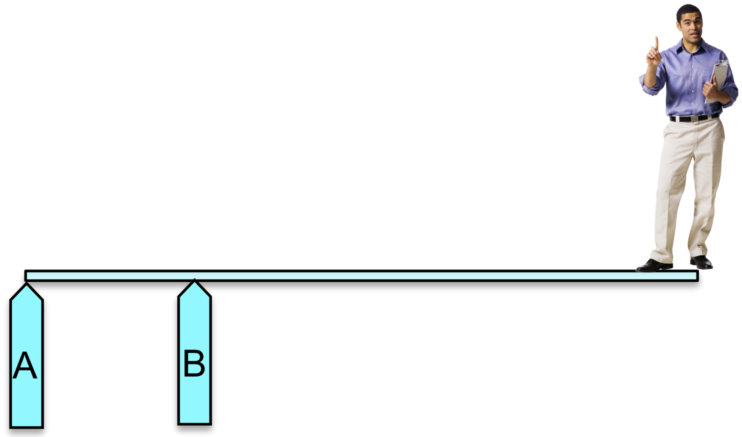
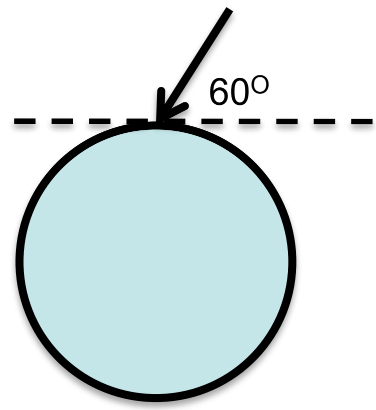
#3 An 80 kg man stands at the end of a 10 m diving board as shown. The pilons are 3 m apart. Please find the reactive forces at pts A and B if:

a) the board is massless
b) the board has a mass of 100 kg.



#4 A child's carousel has a mass of 100 kg and a diameter of 3 meters. Assume that the mass is uniformly distributed over the circular area and is at rest. One kid, a 40 kg point mass, runs as fast as she can (5 m/s), jumps onto and grabs the edge of the carousel as shown. Please find the following:

a) What is the final angular velocity?
b) If the carousel instead of being at rest, was rotating into the paper (clockwise), would the collision increase, decrease, or not affect the rotation rate? How do you know?
c) was kinetic energy conserved in this process? How do you know?
d) If collision was in outer space, how would this change the result?



#5 Remember the flywheel from the first problem in PS #7?, now it has a hub on either side, rolling down two rails inclined at 30° as shown at right. The flywheel is a 3 kg flat disk of uniform thickness and has a radius of 30 cm. The hub is of radius = 10 cm.
The flywheel starts from rest and rolls without slipping along 4 m of rail.

a) What is the loss of potential energy?
b) * (more difficult problem) Find the final velocity and rotational velocity. *hint: you have two unknowns and only one equation! Poop! Ah, but there is a relationship between the speed of the disk and how fast it is spinning. Is this a helpful relationship?*
c) * Use the above to find the average velocity, the time taken, and the angular and linear acceleration.
d) * Use the above to find the torque on the wheel, and therefore find the frictional force that must have been applied by the rails.
e) * Now that you know the frictional force on the wheel, and the force of gravity, can you find the acceleration the wheel should have and see if it matches your value for (c) above?