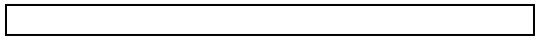
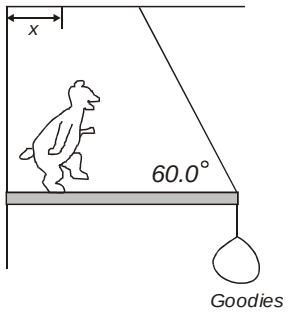
AP Physics
Circular, Gravitation, Torque

Name:_____
Period: 2-3A 3B-4 5-6A 6B-7

A hungry 700.0 N bear walks out on a uniform beam in an attempt to retrieve some goodies hanging in a bag off the end. The beam weighs 200.0 N and is 6.00 m long. The beam is supported at one end by a 5m long wire and at the other end by a hinge on the wall; the goodies weigh 80.0 N.

a) Draw a free body diagram for the beam.





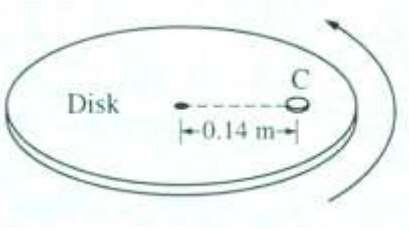
b) When the bear is at x = 2 m, find the tension in the wire.

c) Find the x and y components of the force from the hinge when the bear is 2 m from the wall.

x

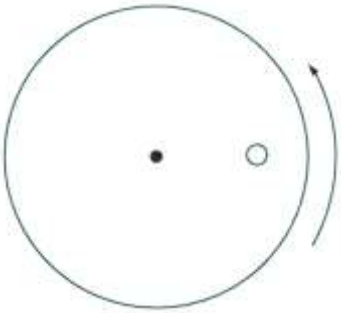
y

d) The wire breaks where it is attached to the beam, and the bear grabs the wire so that his center of mass is located at the bottom of the wire. What will be the period of bear swinging on the wire?



A coin of mass 0.0050 kg is placed on a horizontal disk at a distance of 0.14 m from the center, as shown above. The disk rotated at a constant rate in a counterclockwise direction as seen from above. The coin does not slip, and the time it takes for the coin to make a complete revolution is 1.5 seconds.

a) The figure to the right shows the disk and coin as viewed from above. Draw and label vectors on the figure below to show the acceleration and linear velocity vectors for the coin when it is at the position shown,



b) Determine the linear speed of the coin.

c) The rate of rotation of the disk is gradually increased. The coefficient of static-friction between the coin and the disk is 0.50. Determine the linear speed of the coin when it just begins to slip.

d) If the experiment in part c) were repeated with a second, identical coin glued to the top of the first coin, how would this affect the answer to part c)? Explain your reasoning.

_____increase _____decrease _____stay the same