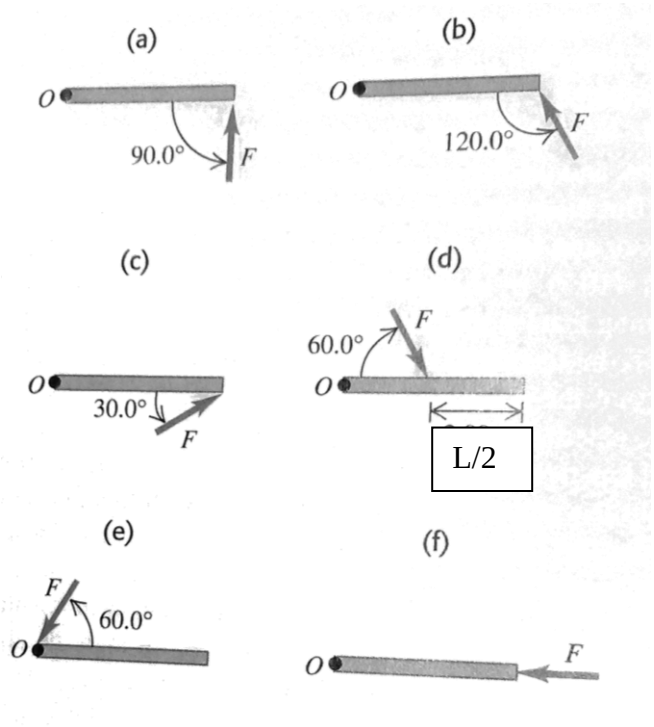
Problem 1

A rotating wheel requires 3 seconds to rotate through 37 revolutions. Its angular speed at the end of the 3 s interval is 98 rad/s. What is the constant angular acceleration of the wheel?

Problem 2

Calculate the torque (magnitude and direction) about point O due to force F. Give your answer in terms of F and L (the length of the rod). The force F and the rod both lie in the plane of the page.




Problem 3

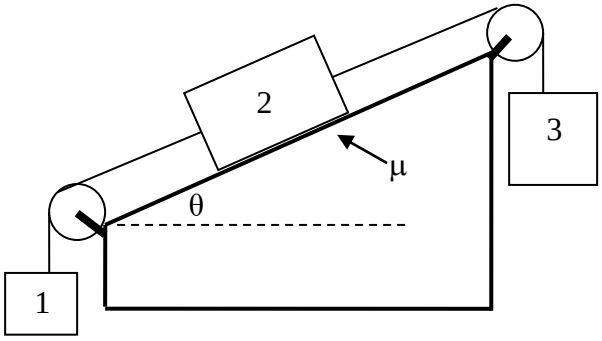
A point mass (2 kg) travels in a straight line at constant speed (1.5 m/s) along the line x = 10 m, in an x – y coordinate system.

a) What is its angular momentum (if any) about the origin when it is located at (10, -10)?

b) What is its angular momentum (if any) about the origin when it is located at (10, 10)?

## Problem 4

Write out the equations needed to solve for the acceleration of the blocks and the tensions in the strings in terms of the following known quantities: $m_1$, $m_2$, $m_3$, $m_{pulley}$, $R_{pulley}$, g, $\mu_s$, $\mu_k$, $\theta$. There is friction. Box 2 is moving to the right (block 1 goes up and block 3 goes down). The two pulleys are identical and are solid disks.




## Problem 5

A physical pendulum consists of a rod of mass $m_r$ and length L and is free to rotate about its top end. A block, $m_b$, slides down a frictionless incline and sticks to the end of the rod. Find the maximum angle the rod makes with the vertical after the collision. Assume the size of the block is small compared to the length of the rod.

Rod

$m_r$ = 0.7 kg

L = 1.1 m

Block

$m_b$ = 0.6 kg

h = 0.8 m