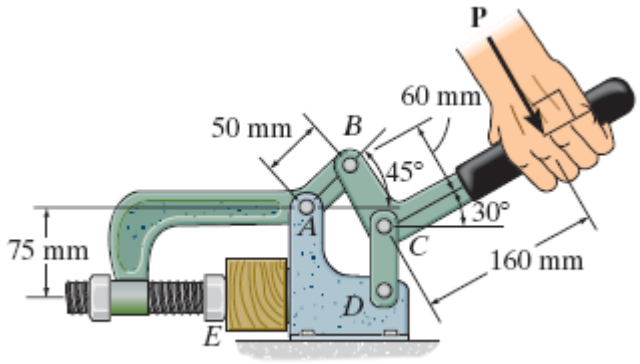
PEER ASSISTED STUDY SESSIONS – Mock Exam (Workshop 12)

Facil: Ross Cruikshank Course: ECOR 1101 Date: April 4-8, 2011

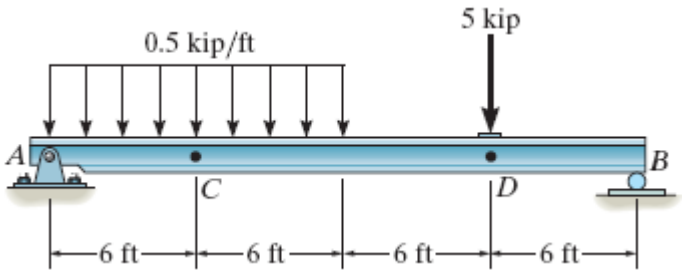
Office Hour: Tuesdays 11:00 – 12:00, TB 302(SASC) Email Address: pass@carleton.ca

Please **print out** this mock exam and come to one of my workshops after **attempting the questions at home**. The exam should take you about 3 hours. The solutions will **not** be posted online. The problems will be taken up during my PASS workshops, but come prepared with specific questions and be ready to **participate** because there may not be time to write full solutions on the blackboard. My job is to give you the tools to solve problems on your own, not to solve problems for you.

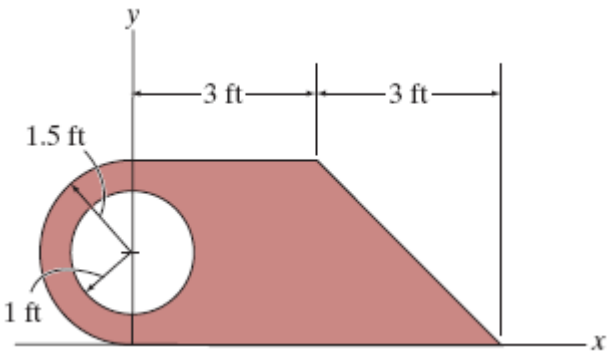
1. If a force of P = 100 N is applied to the handle of the toggle clamp, determine the horizontal clamping force N_E that the clamp exerts on the smooth wooden block at E.



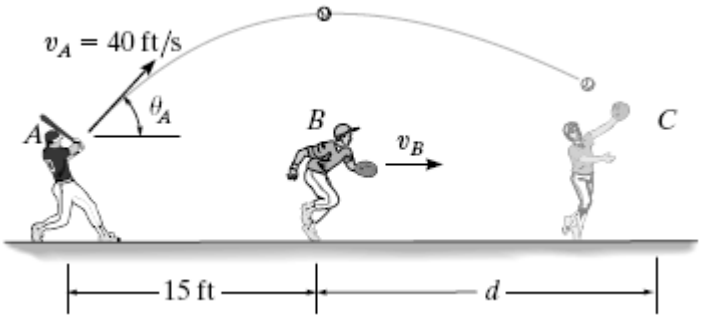
2. Determine the internal normal force, shear force, and moment in the beam at point D.



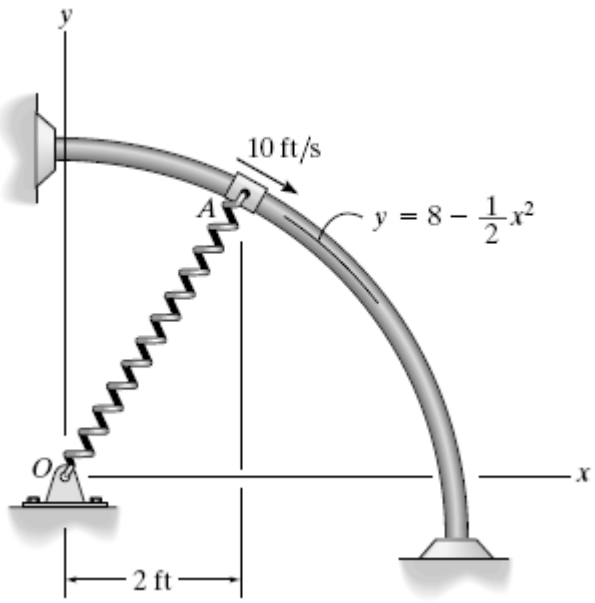
3. Locate the centroid of the composite area.



4. The baseball player A hits the baseball with $v_A = 40$ ft/s and $\theta_A = 60^0$. When the ball is directly above player B he begins to run under it. Determine the constant speed v_B and the distance d at which B must run in order to make the catch at the same elevation at which the ball was hit.



5. The 5-lb collar slides on the smooth rod, so that when it is at A it has a speed of 10 ft/s. If the spring to which it is attached has an unstretched length of 3 ft and a stiffness of k = 10 lb/ft, determine the normal force on the collar and the acceleration of the collar at this instant.



6. The roller-coaster car has a mass of 800 kg and starts from the top of the hill A with a speed v_A = 3 m/s. Determine the minimum height h of the hill so that the car travels around both inside loops without leaving the track. What is the normal reaction on the car when the mass is at B and C. Determine the height h2 of the incline D to which the roller coaster will reach.