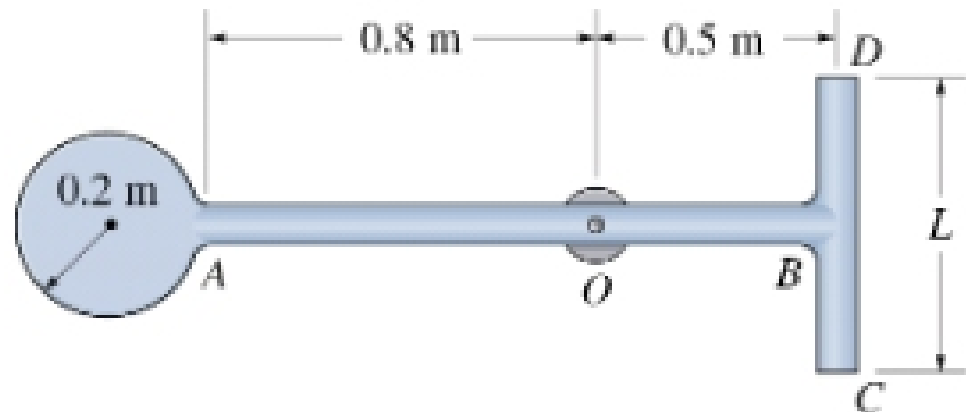


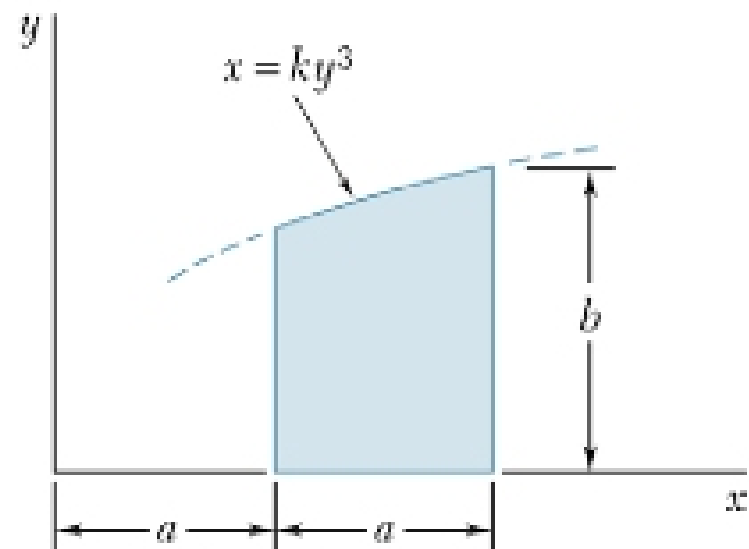
EM 201 Sample Test 2 Fall 2006

These are problems that are representative of the material we covered in Chapter 4 and Chapter 5, Sections 5-1 – 5-4. There are more problems given here than are likely to be given on your test.

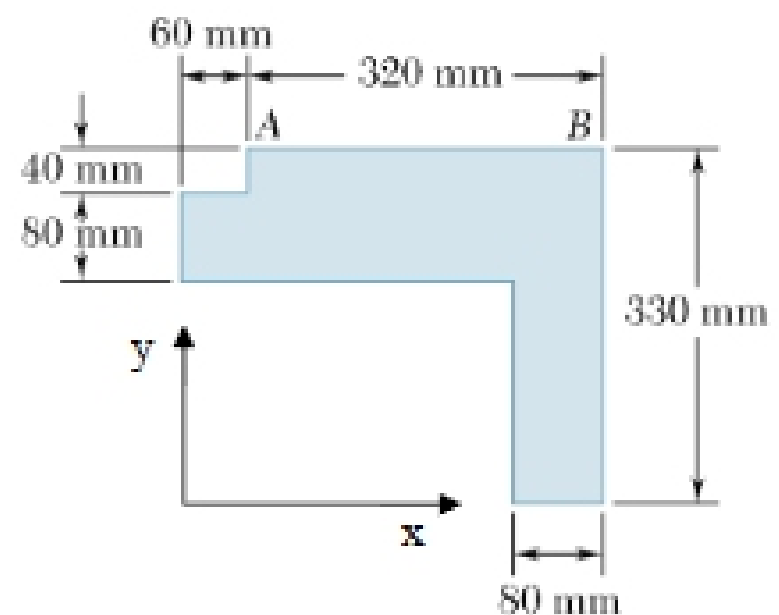
- The assembly consists of two uniform thin rods, each having a mass per unit length of 2 kg/m , and a thin circular plate having a mass of 6 kg . The three parts are welded together and supported at a pin at "O". Let the length "L" be 0.4 m . Neglect the small fillets where the pieces are welded together. (a) Find the center of gravity of the assembly. (b) Find the mass moment of inertia about an axis perpendicular to the paper through the support at point "O". (c) Find the mass moment of inertia about an axis perpendicular to the paper through the center of gravity you found in part (a).



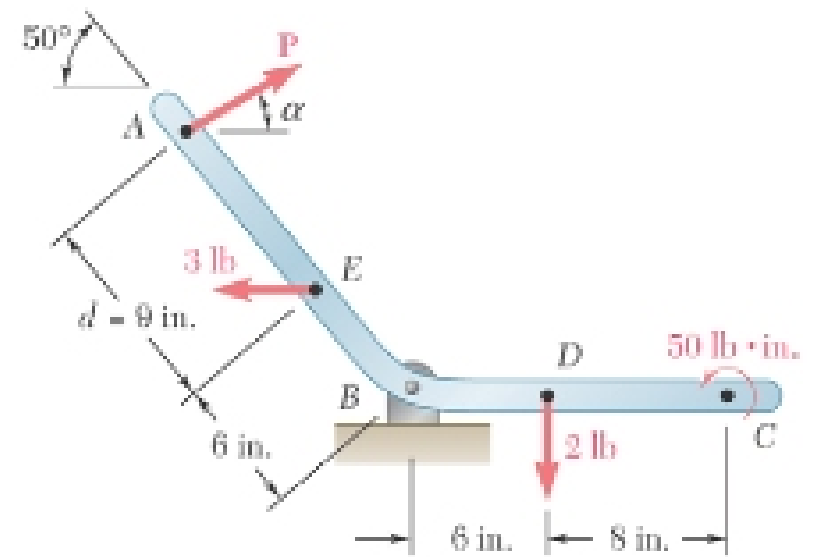
- First find the constant k in terms of a and b . Then: (a) Find the distance from the y -axis to the centroid of the shaded area. (b) Find the moment of inertia of the shaded area about the y -axis. (c) Find moment of inertia of the shaded area about the centroidal y -axis.



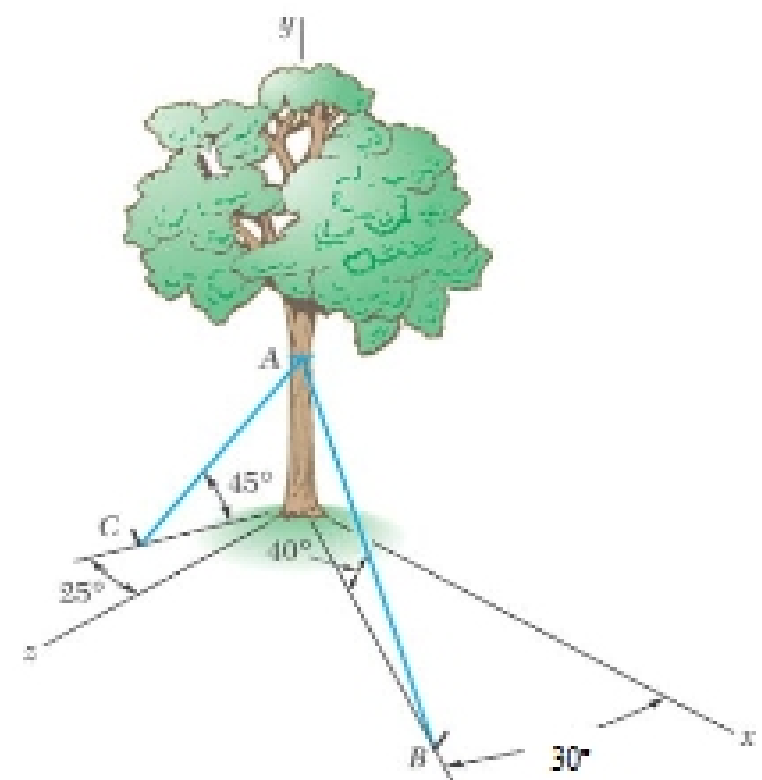
- (a) Find the centroid of the area. (b) Find the moment of inertia about the horizontal axis through the bottom edge of the area. (c) Find the moment of inertia about the horizontal axis through the centroid.



4. (25 pts) If P is 4 lb and α is 40° (i.e. P is perpendicular to AB), find the force-couple system located at point E that is statically equivalent to the applied loads (the three forces and the couple at C) not including any reactions at B .

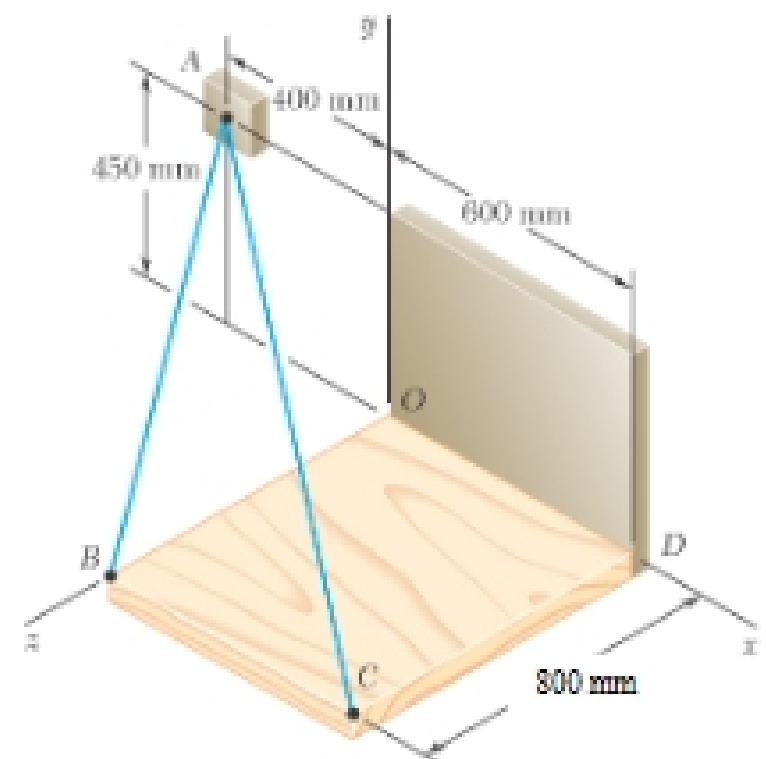


5. The cable AB pulls on the tree with a force of 1500 lb. The tree trunk is exactly vertical (y -direction). Find the components of the cable force applied to the tree in the x, y, z directions.



6. Knowing the tension in cable AC is 1200 N and point A is in the x - y plane as shown:

- Find the force vector from the cable AC acting on the horizontal panel $OBCD$ at point C .
- Find the moment of that cable force at C about point D .
- Find the moment of that cable force at C about the line through BD .
- Find the perpendicular distance from cable AC to point D .



7. (a) Find the force-couple system at point "O" that is statically equivalent to the three applied forces and the two applied couples. This figure uses an arrow and a curved arrow to represent a couple vector. (b) What reaction force and couple would have to be supplied by the support at "O" for this body to be in equilibrium?

