Name: _____
Group members: _____ _____ _____

TAM 210/211 - Worksheet 5

Objectives:

- Evaluate moments in 2D and 3D problems
- Obtain resultant forces and moments for equivalent systems.

1) Draw the forces and resulting moment that acts on a wrench when unfastening a nut.

2) Sketch a diagram of the forces and moments acting on a bottle opener.

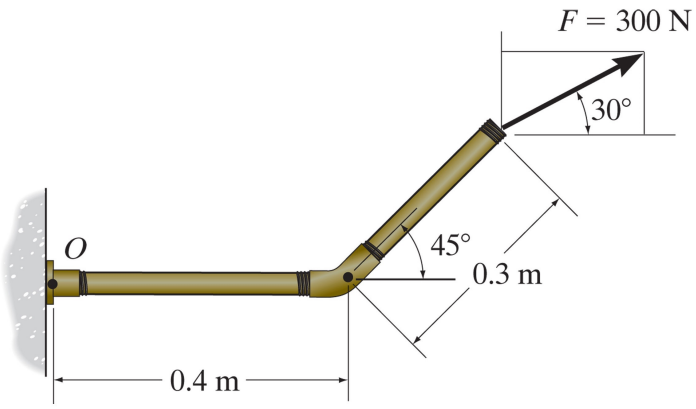


Figure 1

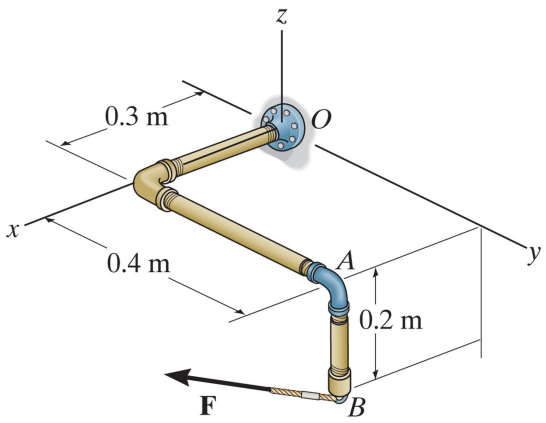
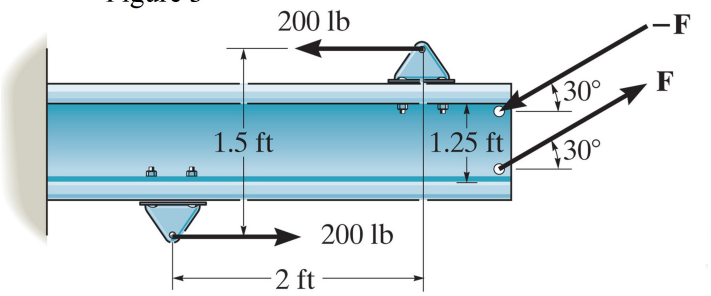


Figure 2

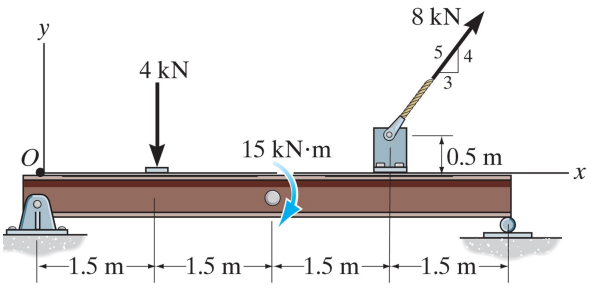
3) Use Figure 1 to determine the moment of the force about point O using the scalar formulation.

4) Use Figure 2 and the force $\mathbf{F} = 300\mathbf{i} - 200\mathbf{j} + 150\mathbf{k}$ to determine: (a) the moment of the force about point O using the vector formulation, and (b) the moment of the same force about the x-axis.

Figure 3



5) Using Figure 3, determine the magnitude of F so that the resultant couple moment is 600 lb.ft counterclockwise. Where on the beam does the resultant couple moment act?



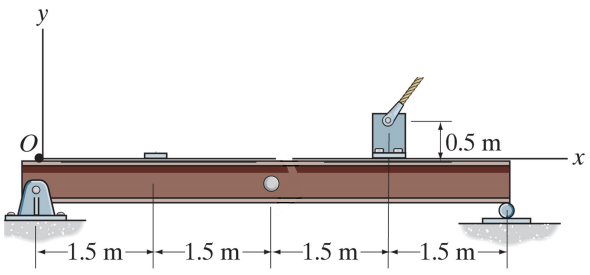


Figure 4

6) Replace the force system acting on the beam in Figure 4 by: (a) an equivalent force and couple moment at point O, and (b) an equivalent force distance x to the right of O. Sketch your equivalent system on the right side of Figure 4.