TAM 210/211 - Worksheet 7

Objectives:

- Investigate 2D and 3D rigid bodies in equilibrium.

<u>Ice breaker:</u> What are your teammates' favorite places to eat?

1) The frame in equilibrium shown below is loaded with a force of 600 N in the negative y-direction on pin C. The frame is also supported by a roller at B. Assume the weight of the frame and its components are negligible.

(A) What support reactions (force component(s) and/or couple moment) for the frame are possible at
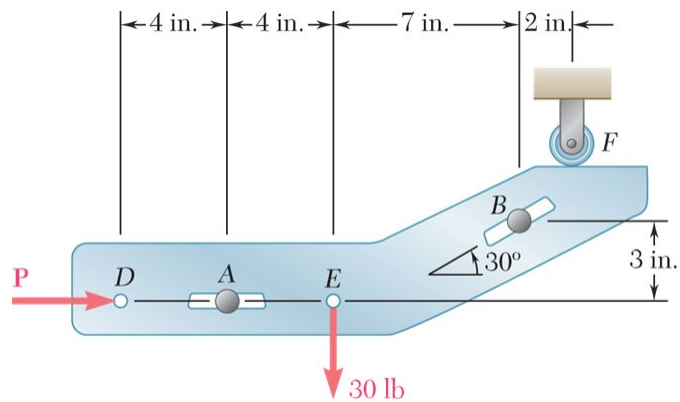(i) Pin support A?

(ii) Roller support B?
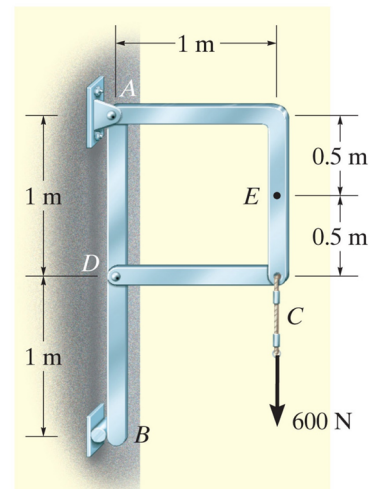
(B) Draw a free-body diagram for the whole frame.

(C) Write the equations of equilibrium for the frame and solve for the support reactions at A and B.

2) Two slots have been cut in plate DEF, and the plate has been placed so that the slots fit two fixed, frictionless pins A and B. Knowing that $P = 15$ lb.

(A) Draw a free-body diagram for the plate.

(B) Write the equations of equilibrium for the plate and determine the support reaction from the roller at F.

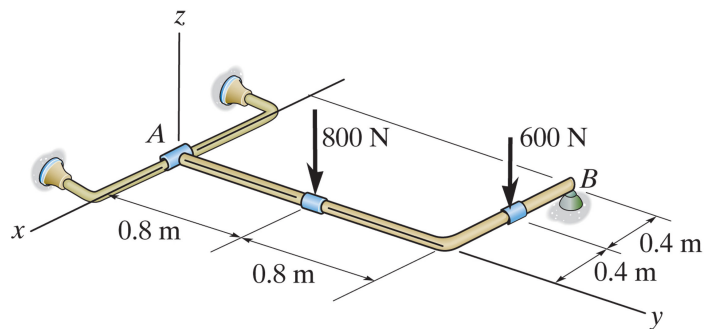3) The bent rod AB has 2 force loadings supported at A and B as shown below.

Figure: 05_P071

(A) What support reactions (force component(s) and/or couple moment) for the rod are possible at
(i) Fixed connect collar A?

(ii) Roller B?

(B) Does AB have redundant constraints? Why or why not?

(B) Draw a free-body diagram for rod AB.

(C) Determine the support reaction at B.