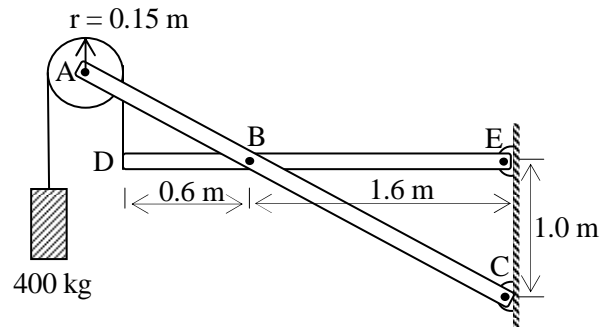**CIV100F - MECHANICS – GROUP G (107)**
Problem Set 7
Due: 5:00 pm on Monday October 29, 2012
In Dropbox #2 in GB422 (Computer Lab)

1. A pin-connected pulley-rod-and-cable system carries a crate as shown. Determine:

   i.) Support reactions at C and E,
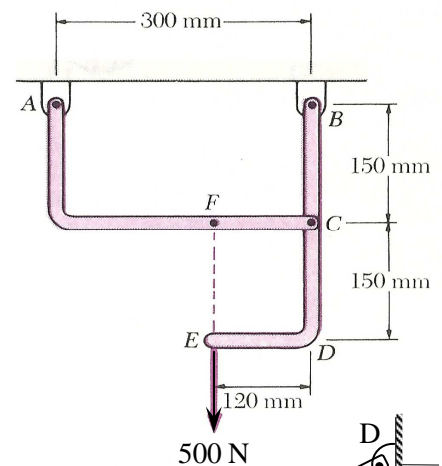   **ii.)** All force components acting on member ABC

   Show all results on a new free body diagram.

2. Determine the components of the reactions at A and B,

   i.) if the load is applied as shown.
   ii.) if the load is moved along its line of action and is applied at F.
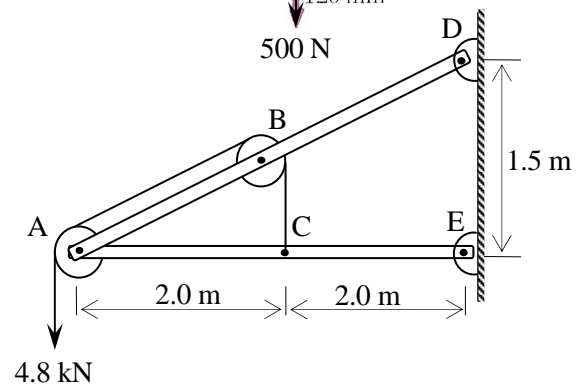
   Show all results on a new free body diagram.

3. A pin-connected pulley-and-rod system carries a force as shown. Knowing that each pulley has a radius of 250 mm, determine
   i.) Support reactions at D and E,
   ii.) The force components that pins A and B exert on member ABD.

   Show all results on a new free body diagram.

4. The truss in Question 2 of Problem Set 6 is to be manufactured from structural steel with a yield stress of 350 MPa and a modulus of elasticity of 200000 MPa.

   i.) If the force in member AE is 105 kN tension, determine a square cross section for a load factor of 1.9. Determine the actual axial stress, axial deformation and axial strain in the selected section. Assume that square steel bar sizes are available in increments of 5 mm.

   ii.) If the force in member BF is 100 kN compression and the cross section used is L75x75x10, determine the load factor used in the design of this member. Consider both material yielding and elastic buckling. Comment on the structural adequacy of the section.