AEE 361 – Fall 2009 Section: ___ Name: _____
Homework
Due: Wednesday October 14, 2009

COVER SHEET

- HW is to be turned in with the cover sheet filled out and signed.
- HW is due before class one week after it is handed out.
- Use the systematic solution technique presented in class.

I have completed this assignment on my own. I did not *copy* the solutions from anyone or any other source.

☐ I collaborated on this assignment with:

_____ _____

_____ _____

_____ _____

☐ I looked at the solutions from other sources after I worked on the problem and made the necessary corrections.

Signature: _____

No member of this class shall take unfair advantage of any other member in this class.

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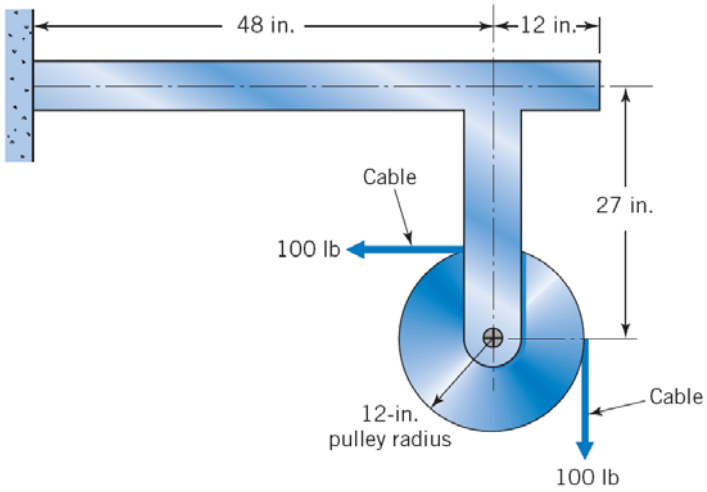
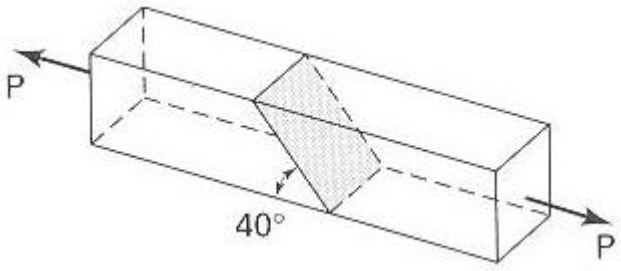
1. (a) Draw a free-body diagram of the structure supporting the pulley.
(b) Draw shear and bending moment diagrams for both the vertical and horizontal portions of the structure.



2. Two prismatic bars of 50 mm by 75 mm rectangular cross-section are glued as shown. The allowable normal and shearing stresses for the glued joints are 700 and 560 kPa, respectively. Assuming that the strength of the joint controls the design, what is the largest axial load P that may be applied.



References: Juvinall (2006); Ugural and Fenster (2003)

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Some future problems you can play around with if you have the time (do not turn them in).

1. Complete the Mohr's circle exercise on the web:
http://www.engin.umich.edu/students/ELRC/me211/me211/flash3/coach_stress_03.swf
Play the game and ***print out the certificate*** to attach it to your HW.

2. A round steel bar having $S_y = 800$ MPa is subjected to loads producing calculated stresses of $P/A = 70$ MPa, $Tc/J = 200$ MPa, $Mc/I = 300$ MPa, and $4V/3A = 170$ MPa.

   (a) Sketch Mohr circles showing the relative locations of maximum normal stress and maximum shear stress.

   (b) Determine the safety factor with respect to initial yielding according to the maximum-shear-stress theory and according to the maximum-distortion-energy theory.