University of Wisconsin – Madison; ME 306; Section 2
Prelim #1; Spring 2006

- Please be organized and write legibly
- State your units

Problem 1 (5 points): Three bars, two of material A and one of material B transmit a force P as shown. The cross-sectional area of B is 50% larger than either of the two bars (individually). The modulus of Elasticity of A is twice as that of B. What is the ratio of the stress in either of the two bars A to that of the stress in B?

Solution:
Problem 2 (5 points): A rigid triangular frame is pivoted at C and held by identical horizontal wires at points A and B as shown. Each wire has axial rigidity $EA = 120,000lb$ and coefficients of thermal expansion $\alpha = 12.5*10^{-6}/^\circ F$. A vertical load $P = 500lb$ acts at D. Then the temperature of the two cables is steadily raised. What increase in temperature will cause the wire attached to B to lose slack, i.e., lose all its tension?

Solution: