

ARCH 331. Assignment #2

Date: 6/3/14, due 6/5/14

Pass-fail work

Problems: supplemental problems (2A, etc.) and from Onouye, Chapters 2, 3 & 4.

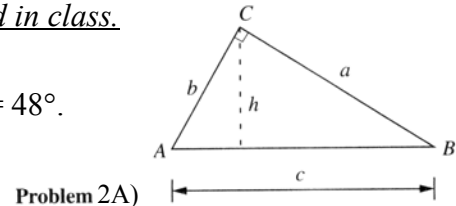
*Notes: Problems marked with a * have been altered with respect to the problem stated in the text.*

*The "Find, Given, Solution" format **is required** unless noted.*

Selected problems not required to be worked will be announced in class.

- (5%) 2A) In the right triangle ABC shown, $c = 25$ ft and angle $A = 48^\circ$. Determine a) side a , b) side b , and c) height h . (math)

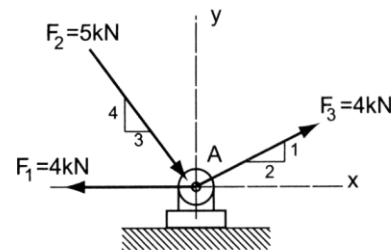
Partial answer to check with: $h = 12.43$ ft



Problem 2A)

- (12%) *2.3.5 Determine the resultant using the sequence F_1 to F_2 to F_3 . Scale: $10 \text{ mm} = 1 \text{ kN}$ (force component method)

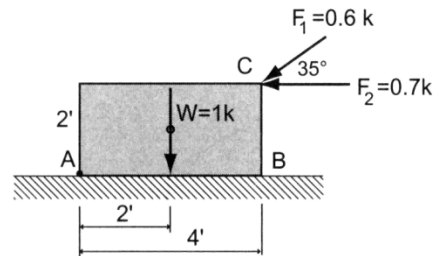
*Partial answers to check with: $R = 3.4 \text{ kN}$,
 $\theta = -40.6^\circ$ (below $+x$)*



Problem 2.3.5

- (13%) 2.4.2 A 1000-lb. crate is subjected to two applied forces at C. Determine the moment about points A and B due to forces F_1 , F_2 , and the weight W . (moment of a force and of force components)

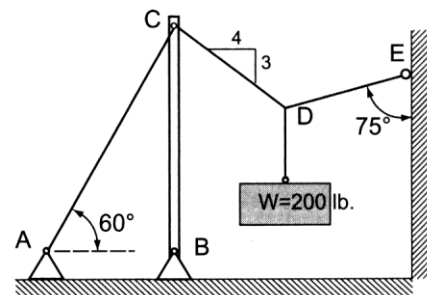
*Partial answers to check with: $M_A = -1.0 \text{ k}\cdot\text{ft}$
 $M_B = +4.4 \text{ k}\cdot\text{ft}$.*



Problem 2.4.2

- (26%) 3.1.8 A 200-lb. weight is supported by cables DC, AC, and DE and by the vertical pole BC. Determine all cable forces and the force in the pole BC. (equilibrium of a particle)

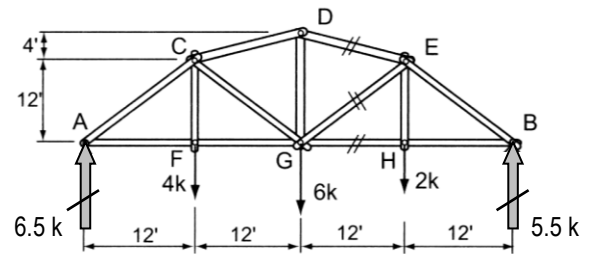
*Partial answers to check with: $DE = 203 \text{ lb}$,
 $DC = 246 \text{ lb}$, $AC = 393 \text{ lb}$, $BC = 488 \text{ lb (C)}$*



Problem 3.1.8

- (35%) *4.1.15 A bowstring or crescent truss is loaded as shown. Determine all member forces in DE , EG , and GH using the method of joints, and knowing there is a vertical support force of 6.5 k up at A, and 5.5 k up at B.
(method of joints)

Partial answers to check with: $AC = -9.2 k$,
 $CF = 4 k$, $CG = 0.4 k$, $HG = 5.5 k$,
 $ED = -7.12 k$, $EG = 1.77 k$, $EB = -7.78 k$.



Problem 4.1.15

- (9%) 2B) For the truss of problem *4.1.15, use Multiframe software to find all member forces to verify your work from method of joints. You will be assigned a standard wide-flange (W) steel section to use posted in My Grades on eCampus. Model the force at A using a pin support (triangle) and the force at B using a roller support (triangle with wheels) as shown in the figure. Submit the data file (.mfd) on eCampus (under Assignments: Assignment 2) and provide a print of the axial forces diagram (P).

Note: The "Find, Given, Solution" format is not required.

