

ARCH 331. Assignment #2

Date: 6/4/13, due 6/6/13

Pass-fail work

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

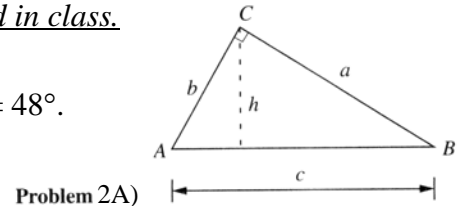
Notes: Problems marked with a * have been altered with respect to the problem stated in the text.

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)

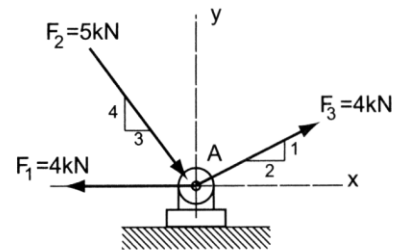
Partial answer to check with: $h = 12.43$ ft



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)

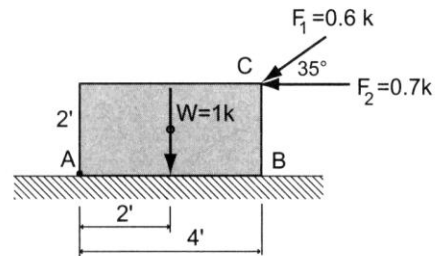
Partial answers to check with: $R = 3.4 \text{ kN}$,
 $\theta = -40.6^\circ$ (below $+x$)



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)

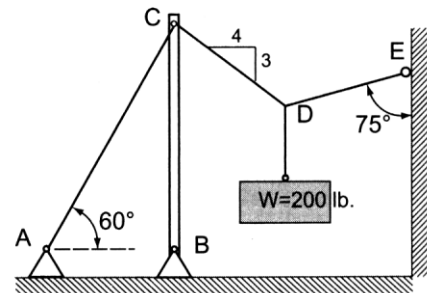
Partial answers to check with: $M_A = -1.0 \text{ k-ft}$
 $M_B = +4.4 \text{ k-ft}$



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)

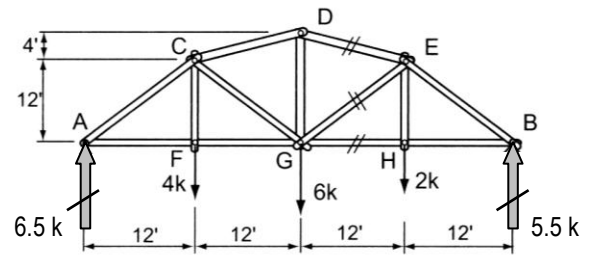
Partial answers to check with: $DE = 203 \text{ lb}$,
 $DC = 246 \text{ lb}$, $AC = 393 \text{ lb}$, $BC = 488 \text{ lb (C)}$



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.

