

ARCH 331. Assignment #2

Date: 1/23/18, due 2/1/18

Pass-fail work

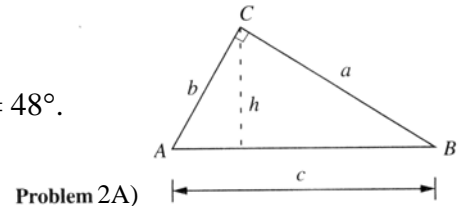
Problems: supplemental problems (2A, etc.) and from Onouye & Kane, Chapters 2, 3 & 4

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.

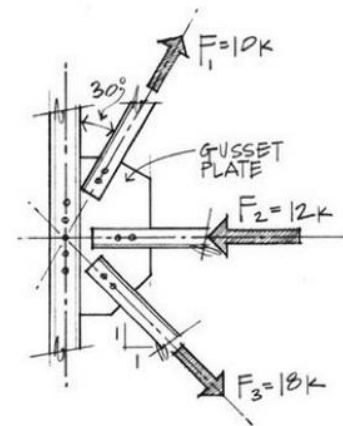
- (5%) 2A) In the right triangle ABC shown, $c = 25$ ft and angle $A = 48^\circ$. Determine a) side a , b) side b , and c) height h . (math)

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



- (12%) 2.9 Three members of a truss frame into a steel gusset plate as shown. All forces are concurrent at point O. Determine the resultant of the three forces that must be carried by the gusset plate. (force component method)

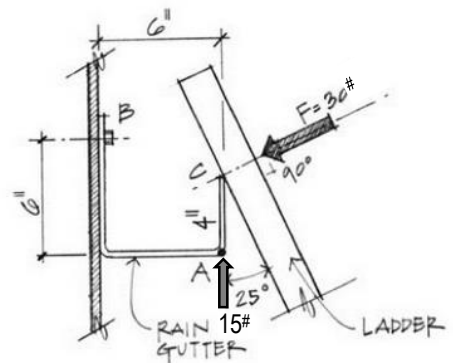
Partial answers to check with: $R = 7.03$ k,
 $\theta = -35.4^\circ$ (below +x)



- (13%) *2.21 A rain gutter is subjected to a 30# force at C as shown. Determine the moment developed about A and B. There is also a vertical force of 15 lb at A.

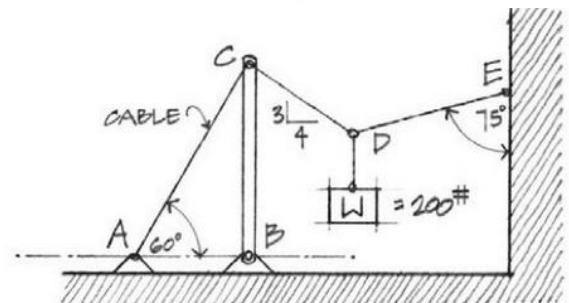
(moment of a force and of force component)

Partial answers to check with: $M_A = +108.8$ lb-in
 $M_B = -40.5$ lb-in



- (26%) 2.33 A weight $W = 200\#$ is supported by a cable system as shown. Determine all cable forces and the force in the vertical boom BC. (equilibrium of a particle)

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

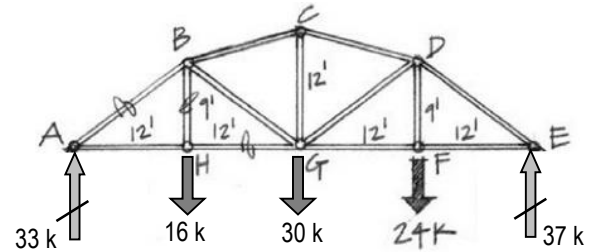


MORE NEXT PAGE

all member forces

- (35%) * 3.21 Solve for AB , BH , and HG . Use only one section cut using the method of joints, and knowing there is a vertical support force of 33 k up at A, and 37 k up at E with additional loads of 16 k at H and 30 k at G as shown (method of joints)

Partial answers to check with: $AB = -55$ k,
 $BH = 16$ k, $BG = 7.5$ k, $GF = 49.33$ k,
 $CD = -51.54$ k, $GD = 0.83$ k, $DE = -61.67$ k.



- (9%) 2B) For the truss of problem *3.21, 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 E 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, but the data file submitted to e-Campus and the print-out attached to the submission are.

