

ARCH 614. Assignment #1

Date: 1/21/14, due 1/28/14

Pass-fail work

Problems: all but 1A & 1B from Ambrose & Tripeny, Chapter 1 & 2, pgs 18, 20, 25, and 85.

(2.5%) 1A) Determine the weight in newtons (N) of a car whose mass is 1550 kg. Convert the mass of the car to kN and then determine its weight in pounds and kips. (No figure.) (*conversions*)

Partial answer to check with: 15,205.5 N

(2.5%) 1B) You are given two measurements off a non-dimensional ruler of $A = 8.69$ and $B = 1.427$ marked in 100^{ths} (0.01). Knowing the accuracy of the data you are given, determine the quantities of $A+B$, $A-B$, $A \times B$ and A/B with reasonable precision. (*math & precision*)

Partial answers to check with: $A+B = 10.1$, $A \times B = 12.4$ (by significant digits)

(20%) **Problem 1.3.B,D,F.** By constructing the parallelogram of forces, determine the resultants for the pairs of forces shown in Figures 1.5 *b, d & f*. (*graphical addition*)

Partial answers to check with:
 $R_b = 121 \text{ lb}$, $\theta_d = 22^\circ \text{ below } +x$,
 $R_f = 57 \text{ lb}$

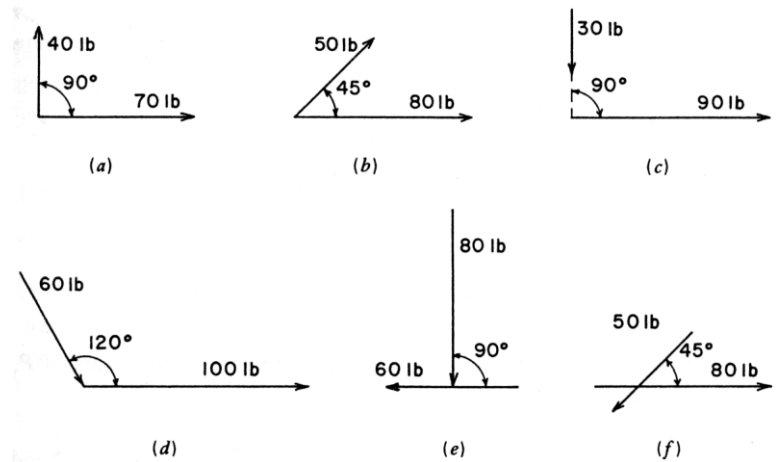


Figure 1.5 Reference for Problem 1.3, part 1.

(15%) **Problem 1.3.I.** Using graphical methods, find the resultant of the system of concurrent forces show in Figure 1.7 *(i)*. (*graphical addition*)

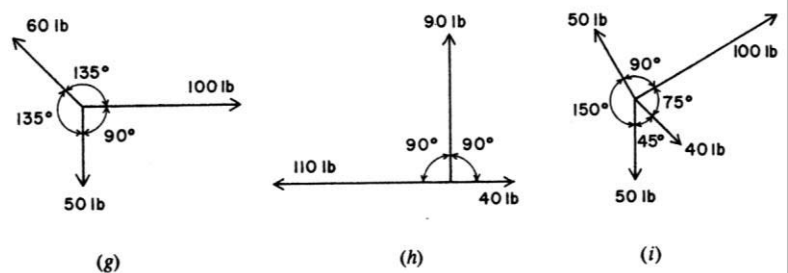


Figure 1.7 Reference for Problem 1.3, part 2.

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(10%) **Problem 1.4.C.** Find the sense (tension or compression) and magnitude of the internal force in the member indicated in Figure 1.12 (c) using graphical methods. (*graphical addition to zero*)

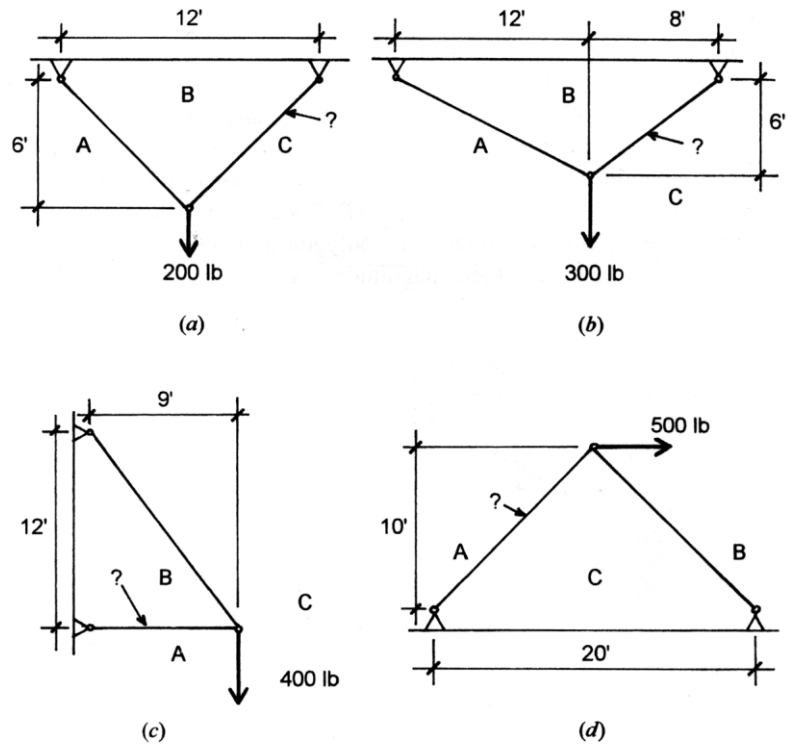


Figure 1.12 Reference for Problem 1.4.

(50%) **Problem 2.6.A.** Using the algebraic method of joints, find the internal forces in the truss in Figure 2.9 (a). (*method of joints*)

Partial answers to check with:
 $BH = 2401 \text{ lb (C)}$, $CI = 2000 \text{ lb (C)}$,
 $IJ = 812.5 \text{ lb (T)}$, $JG = 1250 \text{ lb (T)}$

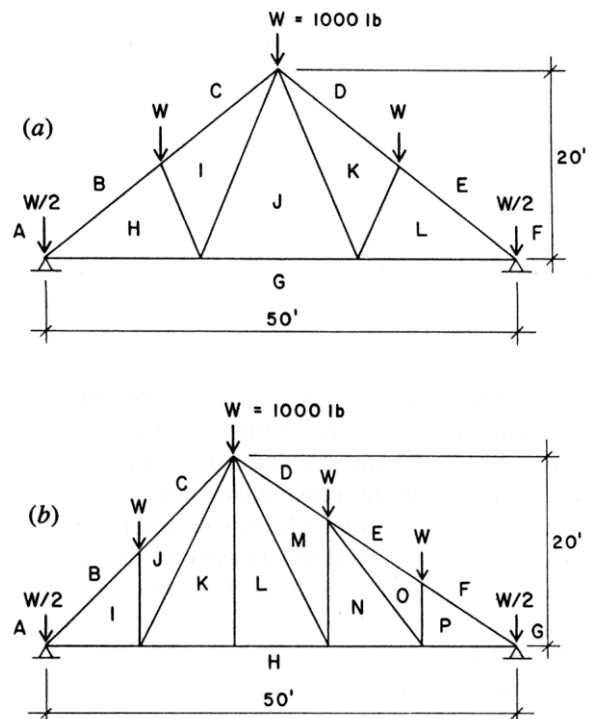


Figure 2.9 Reference for Problems 2.5 and 2.6