ENDS 231. Assignment #1

Date: 1/17/08, *due 1/24/08*   *Pass-fail work*

Problems: from Onouye, Chapter 2 *and* 1A & 1B

(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)*
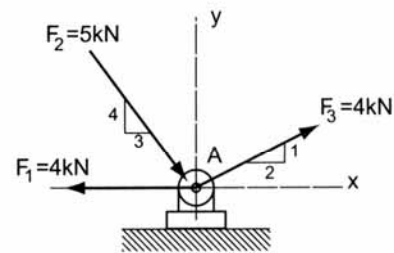
>   *Partial answer to check with: 15,205.5 N*

(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, AxB and A/B with reasonable precision. *(math & precision)*

>   *Partial answers to check with: A+B = 10.12, AxB = 12.4*

(25%) **2.3.5** Determine using the sequence F_1 to F_2 to F_3. Scale:
the resultant
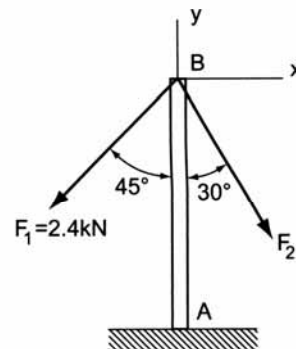10 mm = 1 kN (**graphical method**)

>   *Partial answers to check with: R = 3.5 kN,*
>   *θ = 40° below +x*

Problem 2.3.5

(25%) **2.3.7** The resultant of the two forces F_1 and F_2 is vertical, down the axis of the pole *AB*. Determine the magnitude of F_2. Scale: 1 mm = 40 N (**graphical method**)
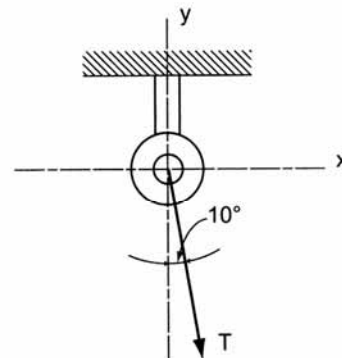
>   *Partial answers to check with: R ≈ 4.5 kN down*

Problem 2.3.7

(20%) **2.3.12** If a hook can sustain a maximum withdrawal force of 1 kN in the vertical direction, determine the maximum tension *T* that can be exerted. (*force components*)
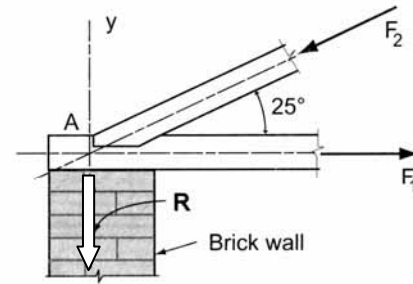
>   *Partial answers to check with: T = 1.02 kN*

MORE NEXT PAGE

Problem 2.3.12

(20%) **2.3.22** One end of a timber roof truss is supported on a brick wall but not securely fastened. The resultant of the wall is only vertical. Assuming that the maximum capacity of either the inclined or horizontal member is 600 lb., determine the maximum magnitudes of F_1 and F_2 such that their resultant is vertical through the brick wall. (*analytical vector addition*)

Problem 2.3.22

       Partial answers to check with:
           *Only **one set** from possible answers of:*
              {F_1 = 600 lb & F_2 = 662 lb}
              {F_1 = 544 lb & F_2 = 600 lb}