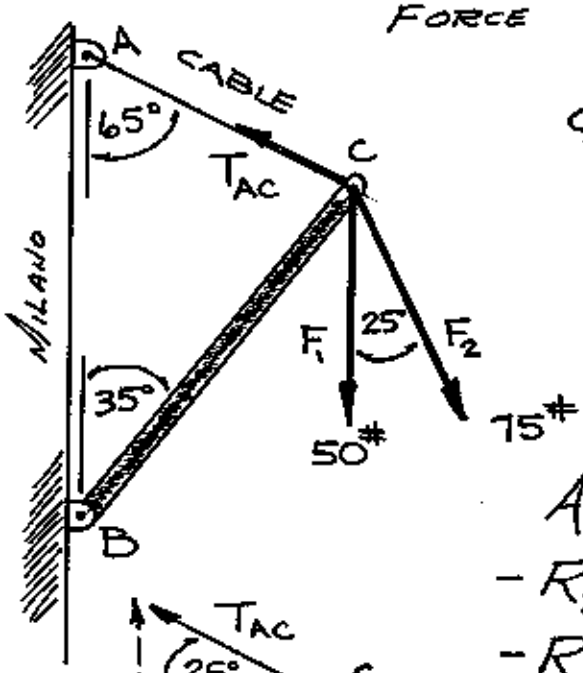
MECH 234 + 235
FORCE SYSTEM

PROB. 2.41
P. 35

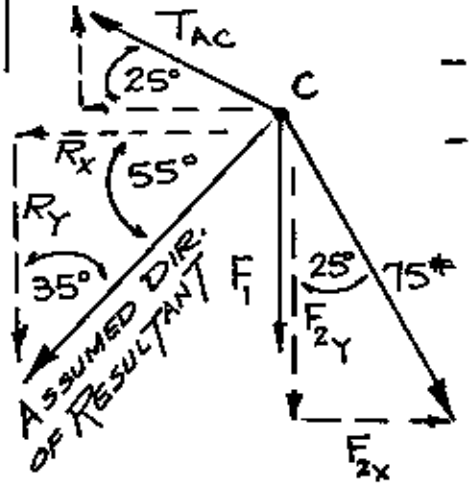


GIVEN: $\vec{R} = \vec{T}_{AC} + \vec{F}_1 + \vec{F}_2$

$\vec{R}$ along $\overline{BC}$

FIND: a) TENSION IN CABLE, $\vec{T}_{AC}$

b) magnitude of RESULTANT



ASSUME $\vec{R}$ pulling at C

$-R_x = -T_{AC_x} + F_{2x}$

$-R \sin 35° = -T_{AC} \sin 65° + 75^{\#} \sin 25°$

$-0.574\,R = -0.906\,T_{AC} + 31.696$ (1.)

$-R_y = +T_{AC_y} - F_1 - F_{2y}$

$-R \cos 35° = T_{AC} \cos 65° - 50^{\#} - 75^{\#} \cos 25°$

$-0.819\,R = 0.423\,T_{AC} - 50 - 67.973$ (2.)

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2 EQ., 2 UNKNOWNS, SOLVE SIMULTANEOUSLY

(1) ÷ 0.906 $\quad -0.634\,R = -T_{AC} + 34.985$ } ADD

(2) ÷ 0.423 $\quad -1.936\,R = +T_{AC} - 278.896$ }

$-2.57\,R = -243.911$

$R = 94.907$ $\quad \boxed{R = 94.91^{\#}}$

BACK SUBSTITUTE TO SOLVE FOR T_{AC}

$-0.634(94.91^{\#}) - 34.985 = -T_{AC}$ $\quad \therefore \boxed{T_{AC} = 95.16^{\#}}$

NOTE: Answers in the back of the book

a) $T_{AC} = 95.1^{lb}$ $\quad$ b) $R = 95.0^{lb}$. ✓