Given: Two cables loaded as shown

Find: a) tension in AC
b) tension in BC

Known: $W = 840$ N

Assumptions: equilibrium

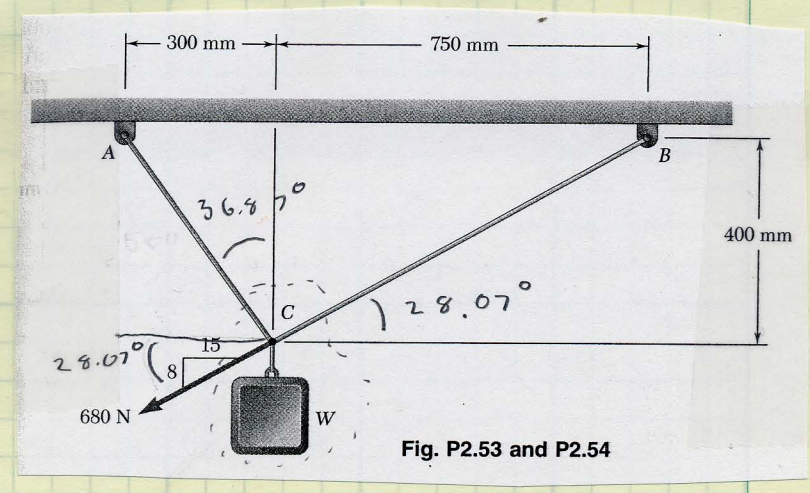
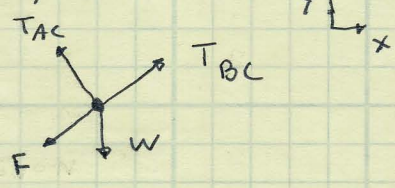


Fig. P2.53 and P2.54

System:



Principle: CoLM

$$x: -T_{AC_x} + T_{BC_x} - F_x = 0 \quad (1)$$

$$y: T_{AC_y} + T_{BC_y} - F_y - W = 0 \quad (2)$$

unk	eqs
T_{AC}	1
T_{BC}	2
T_{AC_x}	3
T_{BC_x}	4
F_x	5
T_{AC_y}	6
T_{BC_y}	7
F_y	8
W	9

Components:

$$T_{AC_x} = T_{AC} \sin 36.87^\circ \quad (3)$$

$$T_{AC_y} = T_{AC} \cos 36.87^\circ \quad (4)$$

$$T_{BC_x} = T_{BC} \cos 28.07^\circ \quad (5)$$

$$T_{BC_y} = T_{BC} \sin 28.07^\circ \quad (6)$$

$$F_x = 680 \cos 28.07^\circ \quad (7)$$

$$F_y = 680 \sin 28.07^\circ \quad (8)$$

$$W = 840 \quad (9)$$

Solving in Maple

$$T_{AC} = 750 \text{ N} \qquad T_{BC} = 1190 \text{ N}$$