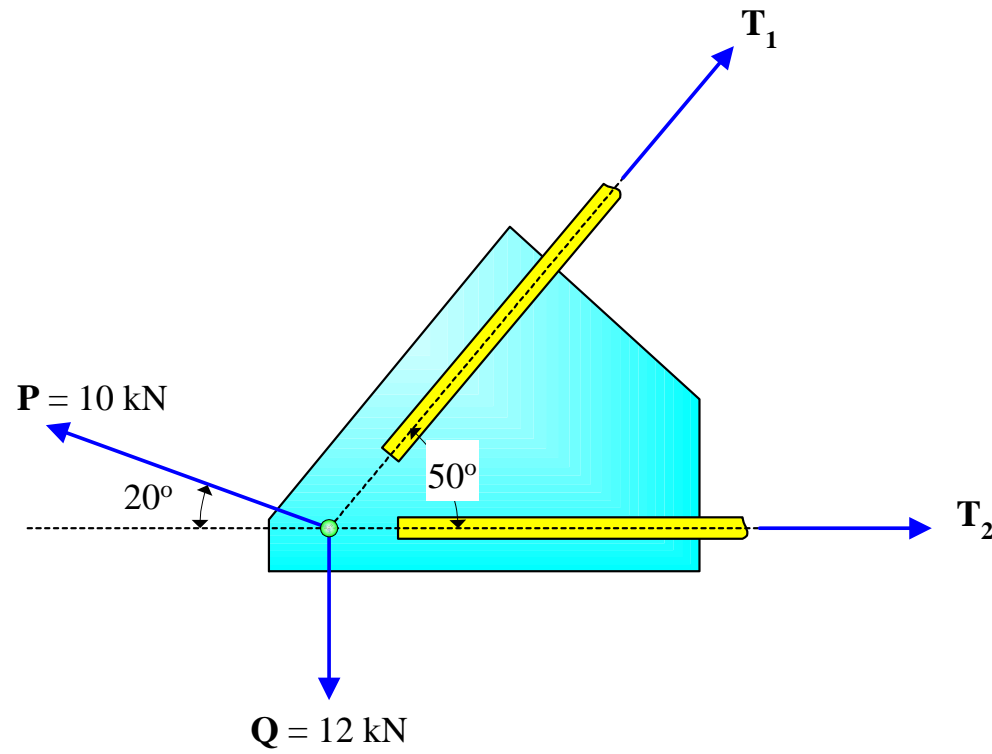
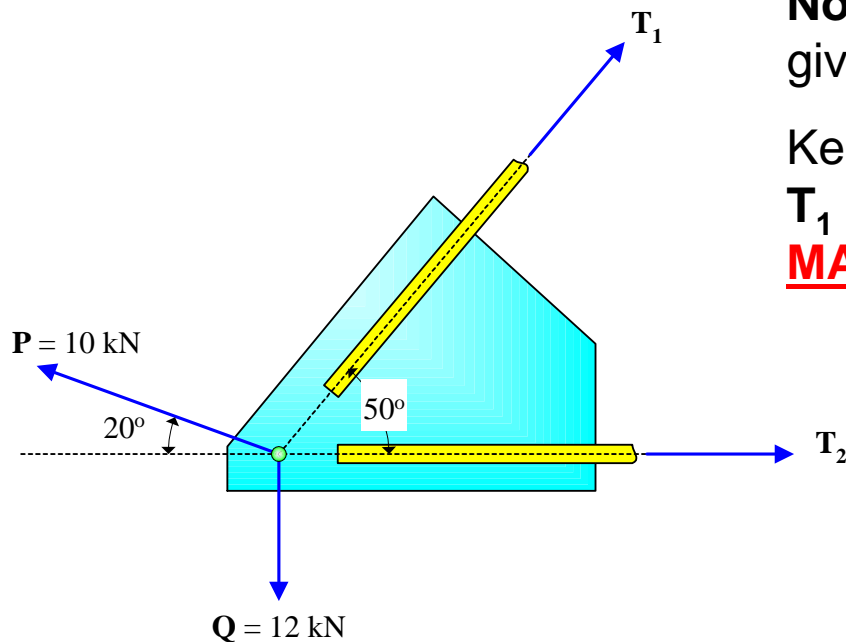


Example 2.8

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Two forces **P** and **Q** of magnitude 10 kN and 12 kN respectively are applied to the truss connection as shown. Knowing that the connection is in equilibrium and given the Free Body Diagram (FBD) as shown, determine the forces **T₁** and **T₂**.





Note: In this problem you are given a FBD to start.

Keep in mind that the senses of T_1 and T_2 are assumed. (They **MAY BE INCORRECT!!!!**)

$$\sum F_x = 0 \rightarrow$$

$$T_2 + T_1 \cos 50^\circ - 10 \cos 20^\circ = 0 \quad (1)$$

$$\sum F_y = 0 \uparrow$$

$$T_1 \sin 50^\circ + 10 \sin 20^\circ - 12 = 0 \quad (2)$$

$$0.766T_1 = 8.58$$

From (2)

$$T_1 = \frac{8.58}{0.766} = +11.2 \text{ kN} \quad \begin{array}{c} \nearrow 50^\circ \\ \hline \end{array}$$

\therefore Direction of T_1 in the FBD assumed correctly!

$$\therefore T_1 = 11.2 \text{ kN}$$

Substitute in (2):

$$T_2 + (+11.2) \cos 50^\circ = 9.397$$

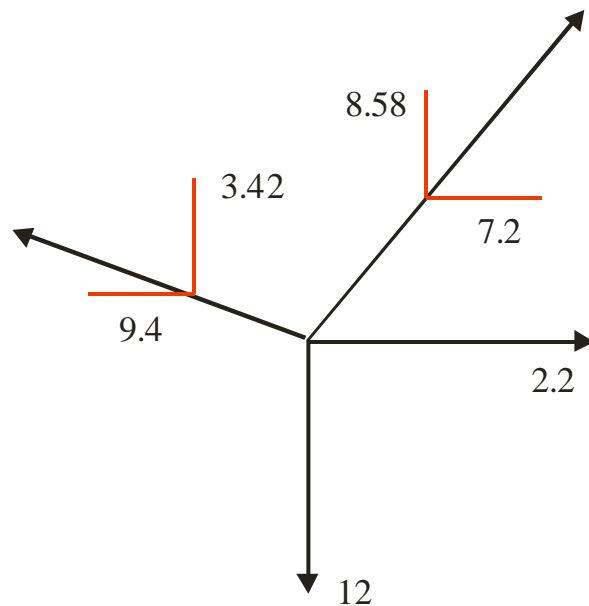
$$T_2 = +2.2 \text{ kN}$$

\therefore Direction of T_2 in the FBD assumed correctly!

$$\therefore T_2 = 2.2 \text{ kN} \rightarrow$$

A positive sign indicates your original assumption of the sense was **CORRECT!!!**

RECOMMENDED: Resolve all “sloping” forces into their horizontal and vertical components and check equilibrium.



$$\sum F_x = 0 \rightarrow$$

$$-9.4 + 7.2 + 2.2 = 0$$

$$0 = 0$$

$$\sum F_y = 0 \uparrow$$

$$3.42 + 8.58 - 12 = 0$$

$$0 = 0$$

WE ARE CORRECT!!!!!!!!!!