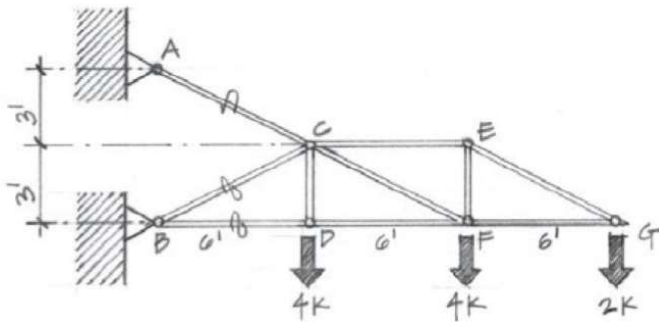
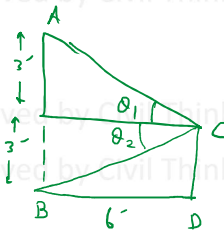
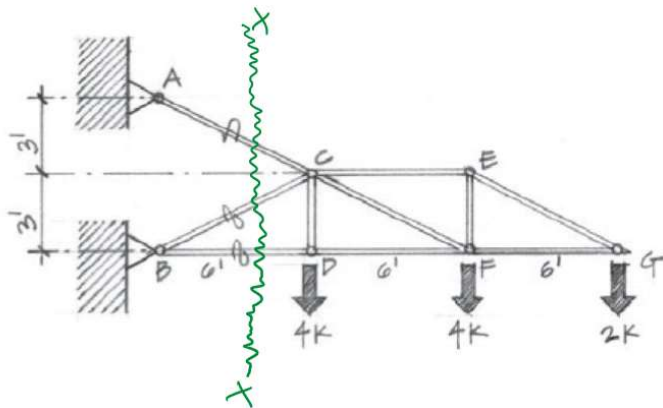


Find Truss Member Forces using Ritter's Method

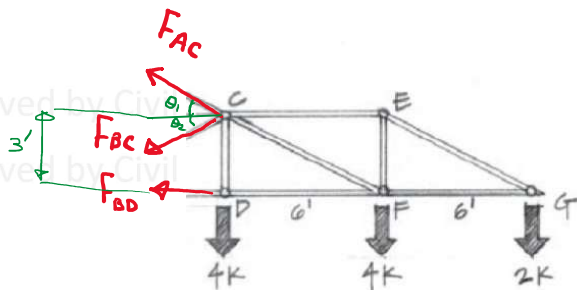
4. Solve for AC, BC, and BD using only one section cut (Ritter method).



Solution:



$$\theta_1 = \theta_2 = \tan^{-1} \frac{3}{6} = 26.565^\circ$$



$$\sum M_C = 0:$$

$$2K \times (6+6) + (4K \times 6) + (F_{BD} \times 3) = 0$$

$$\Rightarrow F_{BD} = -16K \Rightarrow F_{BD} = 16K (C)$$

$$\sum F_x = 0:$$

$$-F_{BD} - F_{BC} \cos \theta_2 - F_{AC} \cos \theta_1 = 0$$

$$16K - F_{BC} \cos 26.565^\circ - F_{AC} \cos 26.565^\circ = 0$$

$$F_{AC} \cos 26.565^\circ + F_{BC} \cos 26.565^\circ = 16K \quad \text{--- (1)}$$

$$F_{AC} \cos 26.565^\circ + F_{BC} \cos 26.565^\circ = 10 \text{ K} \quad (1)$$

$$+\sum F_y = 0:$$

$$F_{AC} \sin \theta_1 - F_{BC} \sin \theta_2 - 4 \text{ K} - 4 \text{ K} - 2 \text{ K} = 0$$

$$F_{AC} \sin 26.565^\circ - F_{BC} \sin 26.565^\circ = 10 \text{ K} \quad (2)$$

Solving equation ① and ②, we get:

$$F_{AC} = 20.125 \text{ K}, \quad F_{BC} = -2.2361 \text{ K}$$

$$\Rightarrow F_{AC} = 20.125 \text{ K (T)}, \quad F_{BC} = 2.2361 \text{ K (C)}$$

This problem was solved by Civil Thinking (<https://civilthinking.com>)

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