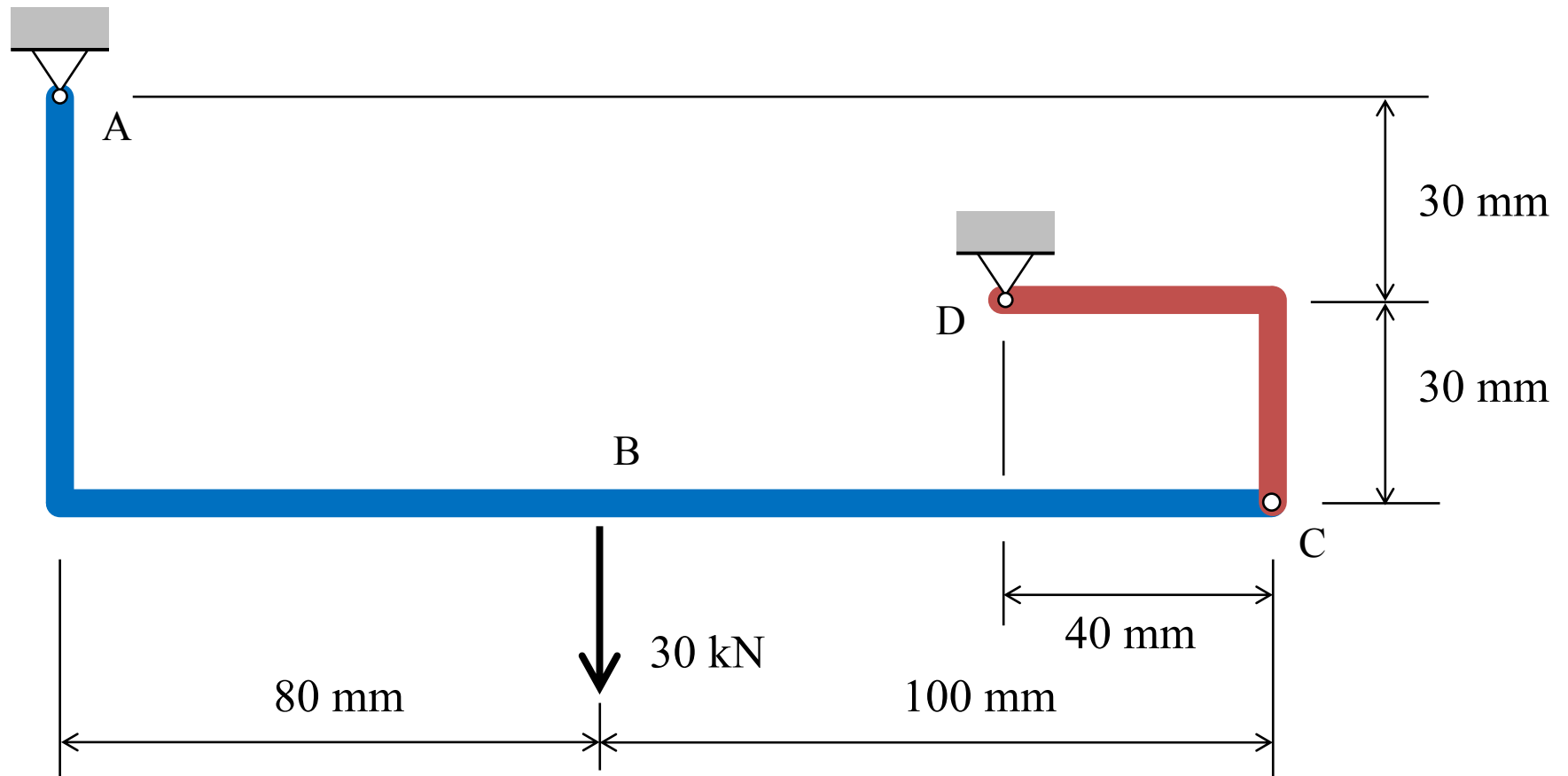


# Two-Force and Three-Force Member Example

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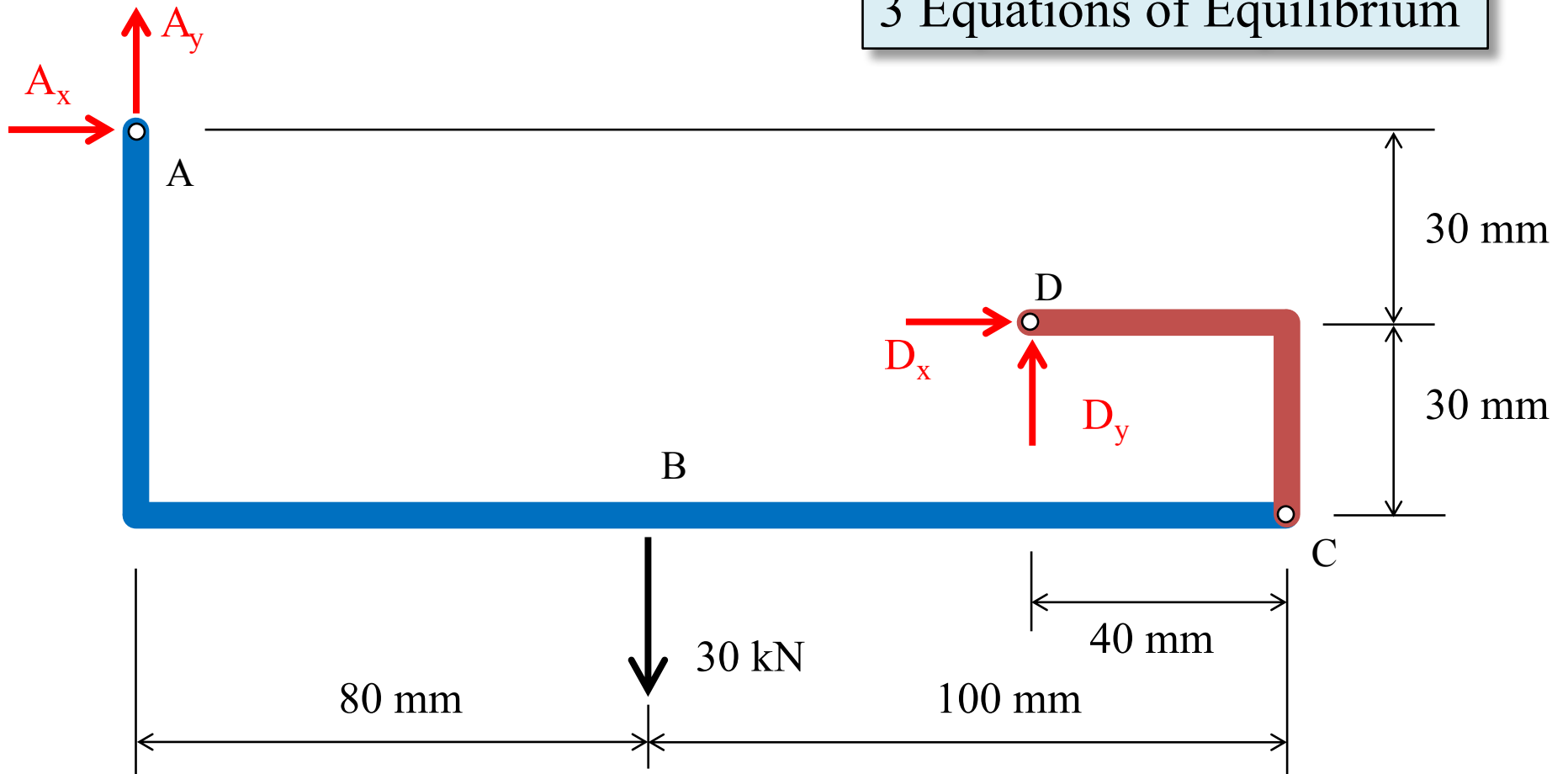
The structure shown is pin supported at points A and D. Members ABC and CD are connected by an internal hinge at point C. For the loading shown, find the reaction forces at the pin supports at points A and D. The weight of the members is negligible.



# FBD of Entire Structure

4 Unknowns

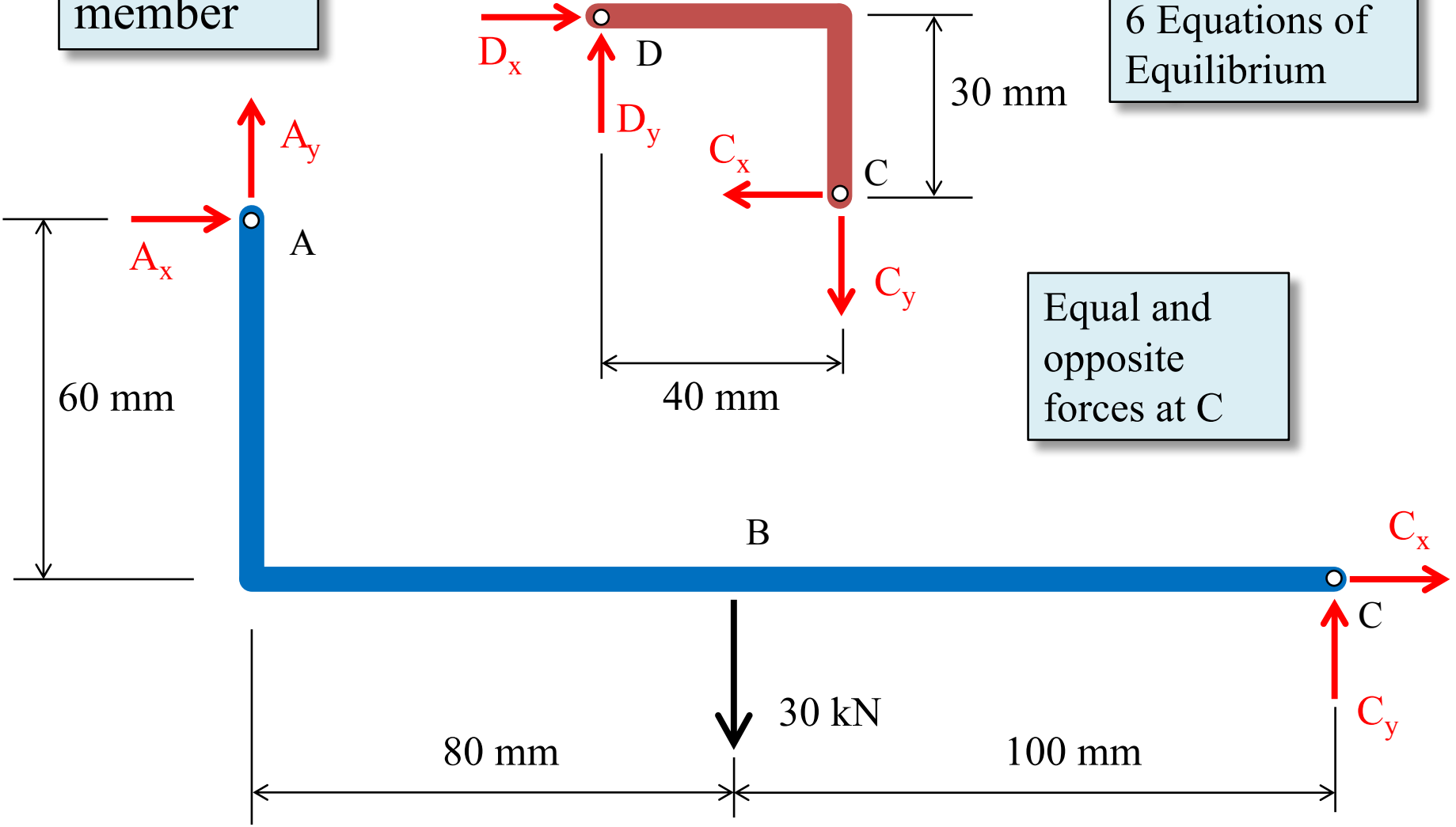
3 Equations of Equilibrium



# FBDs of ABC and CD

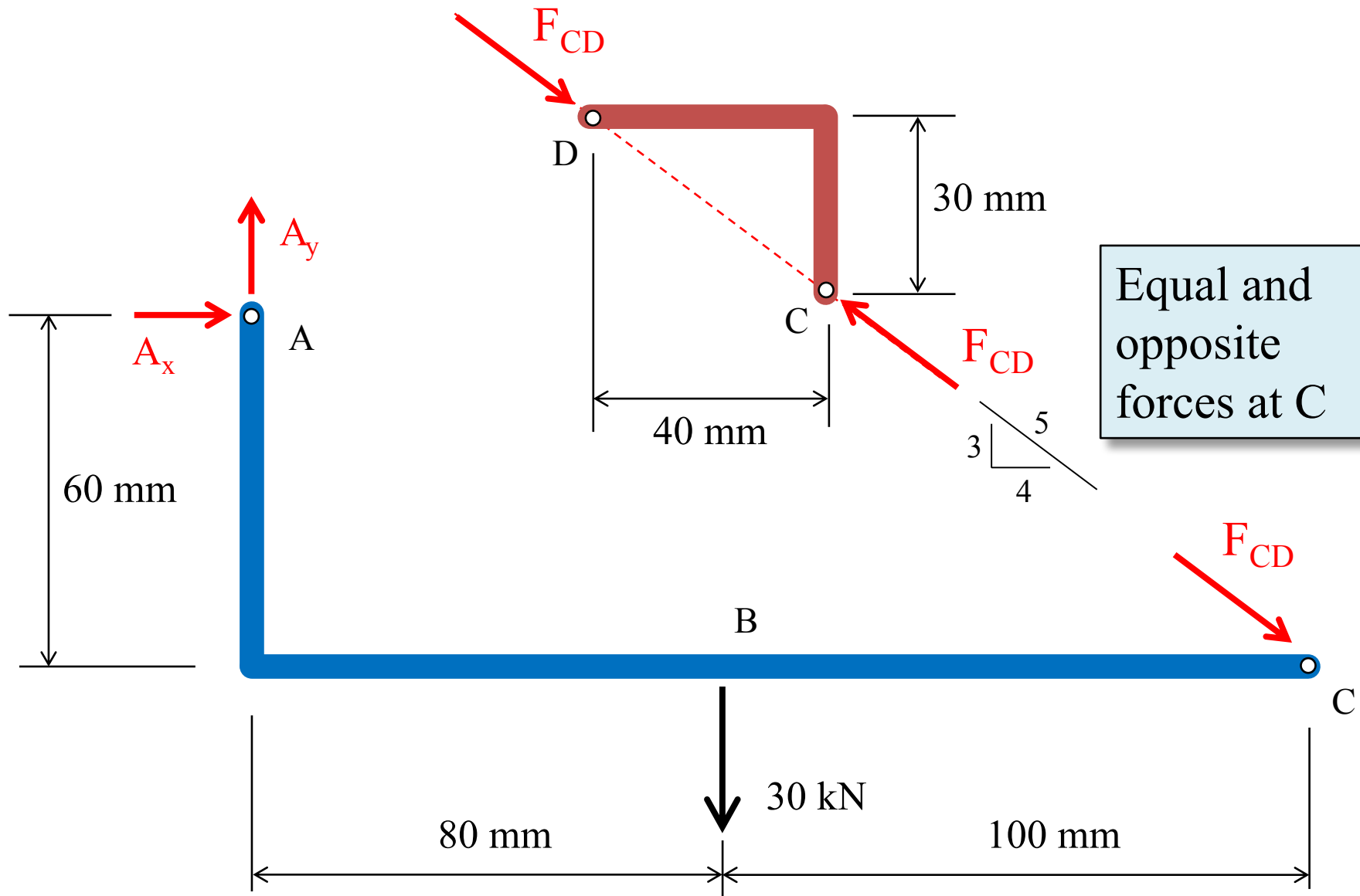
CD is a two-force member

6 Unknowns  
6 Equations of Equilibrium



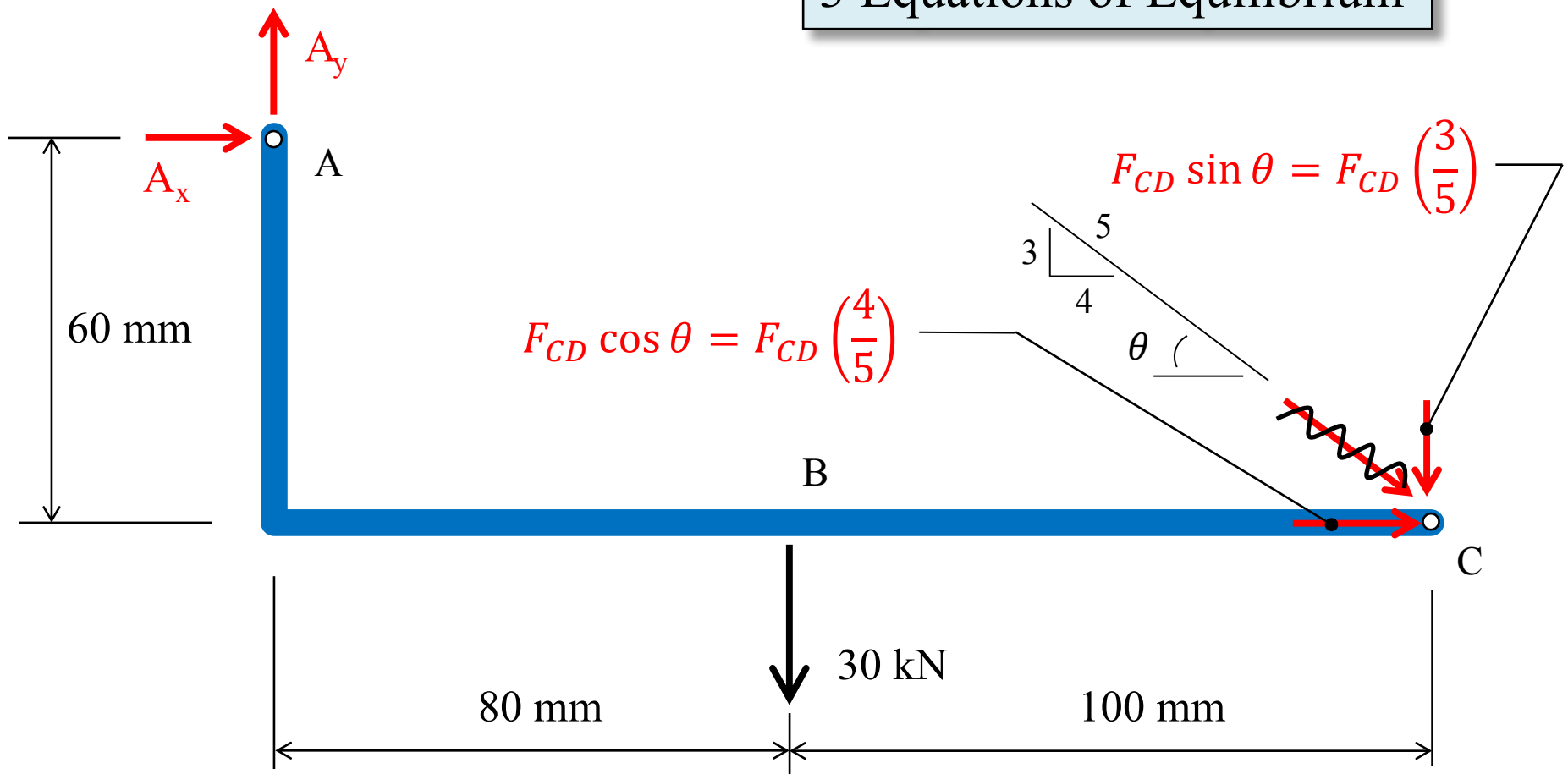
Equal and opposite forces at C

FBDs of ABC and CD recognizing that CD is a two-force member

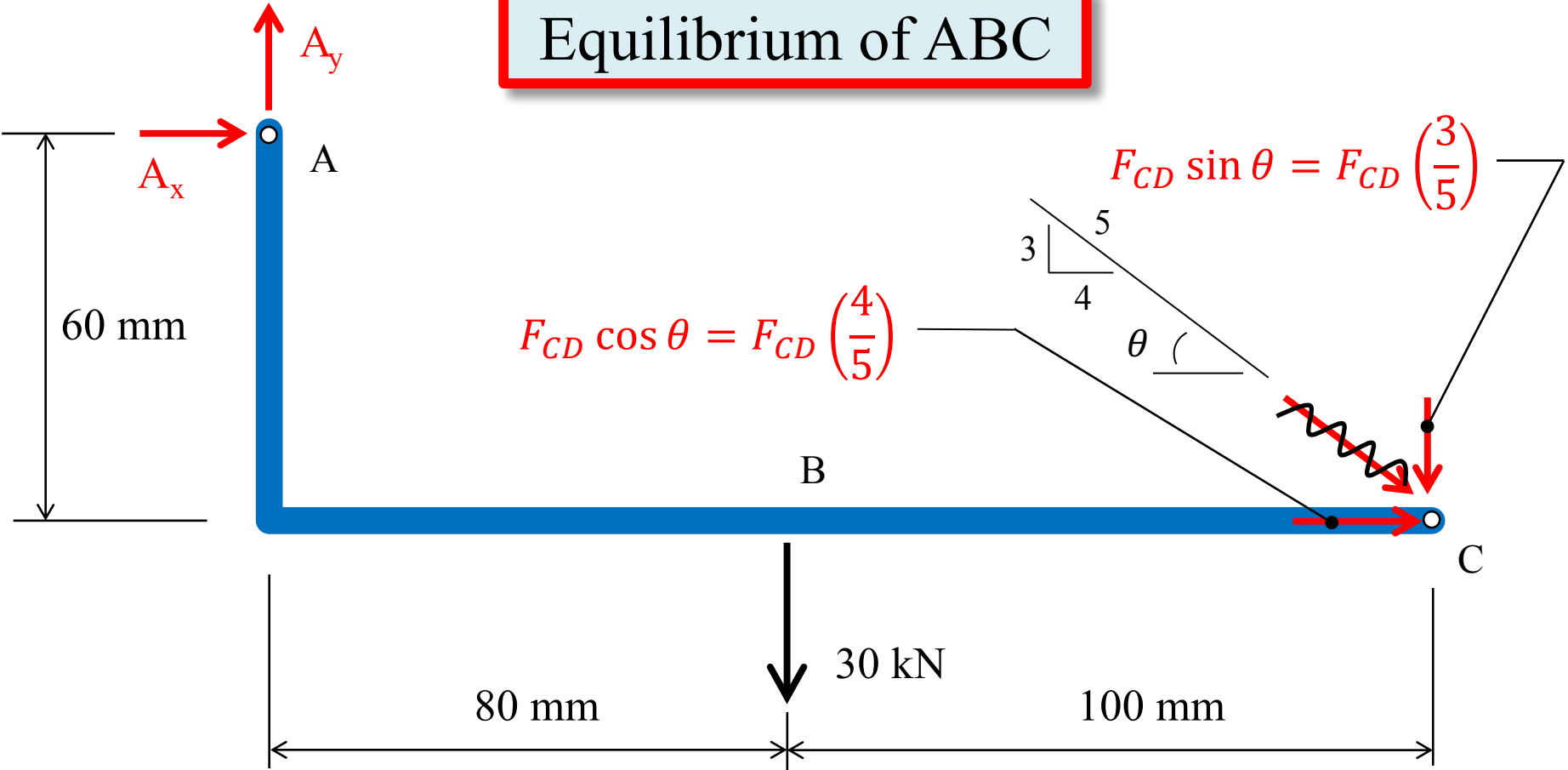


# FBD of ABC

3 Unknowns  
3 Equations of Equilibrium



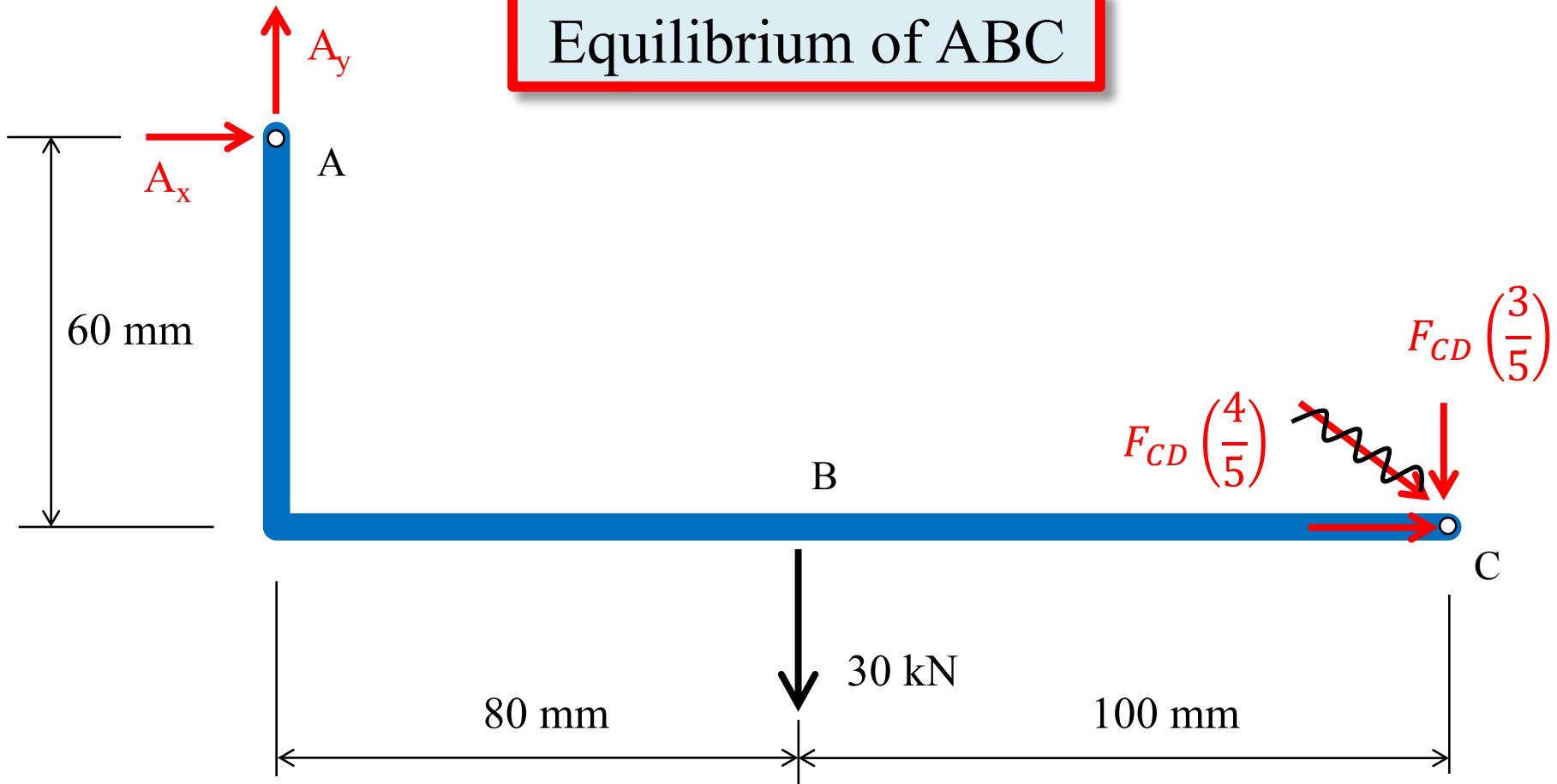
# Equilibrium of ABC



$$\oplus \sum M_A = 0$$

$$F_{CD} = -40 \text{ kN}$$

# Equilibrium of ABC

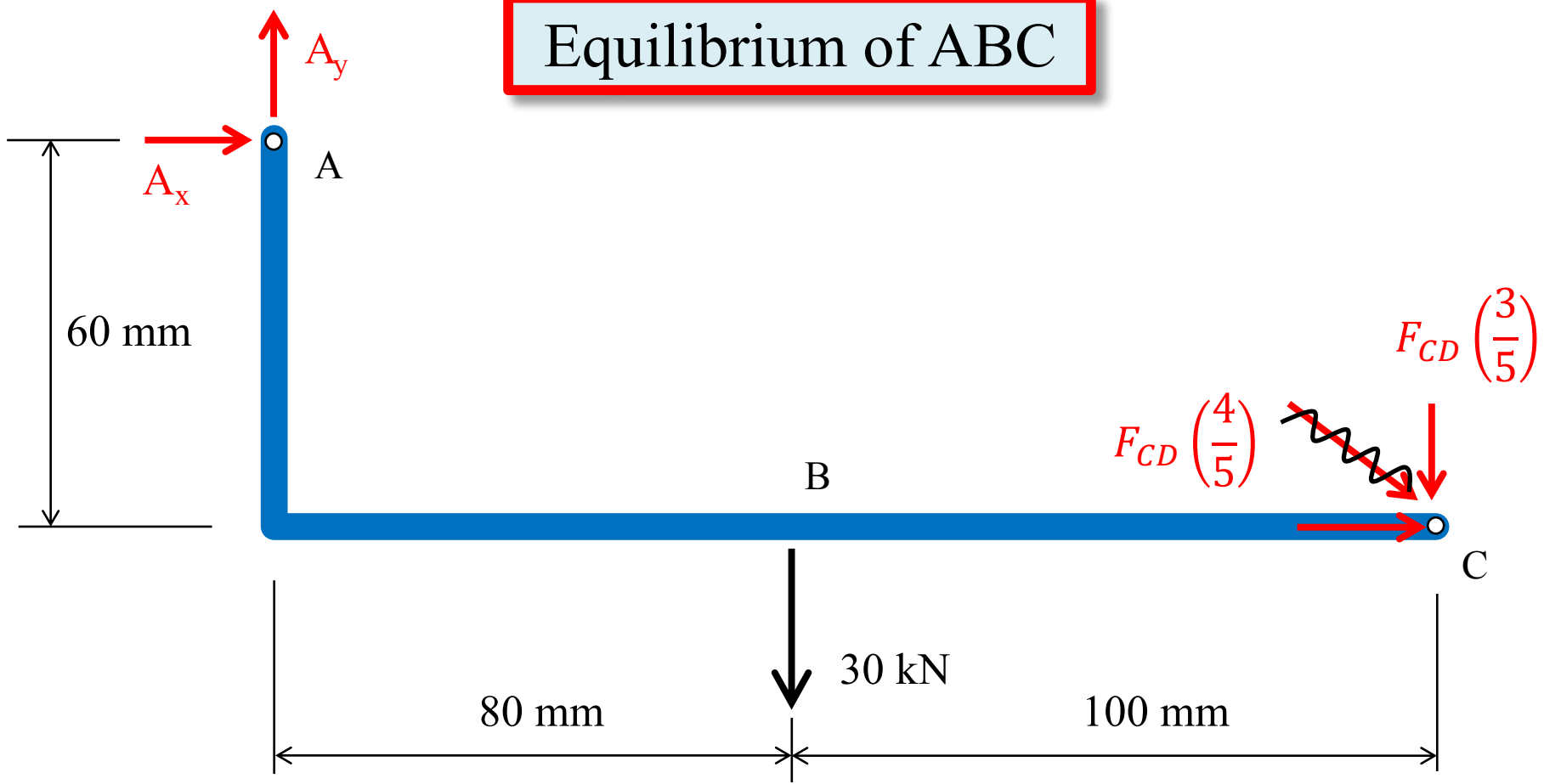


$$+\uparrow \sum F_y = 0$$

$$A_y = 6 \text{ kN}$$



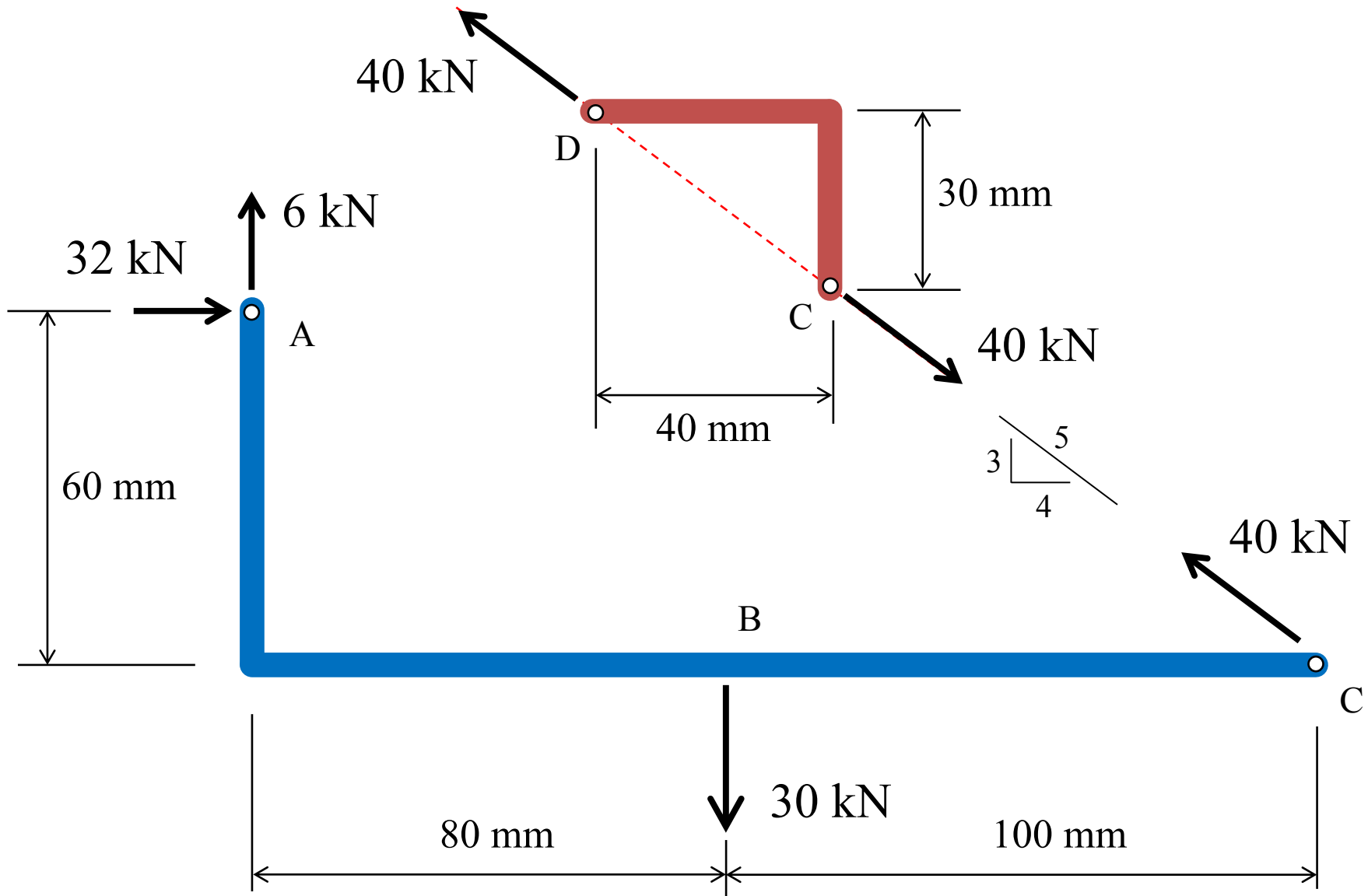
# Equilibrium of ABC



$$\overset{+}{\rightarrow} \sum F_x = 0$$

$$A_x = 32 \text{ kN}$$

# Show results on a FBDs of ABC and CD



# ABC is a Three-Force Member

For Equilibrium, the three forces acting on a Three-Force Member intersect at one point or are parallel.

