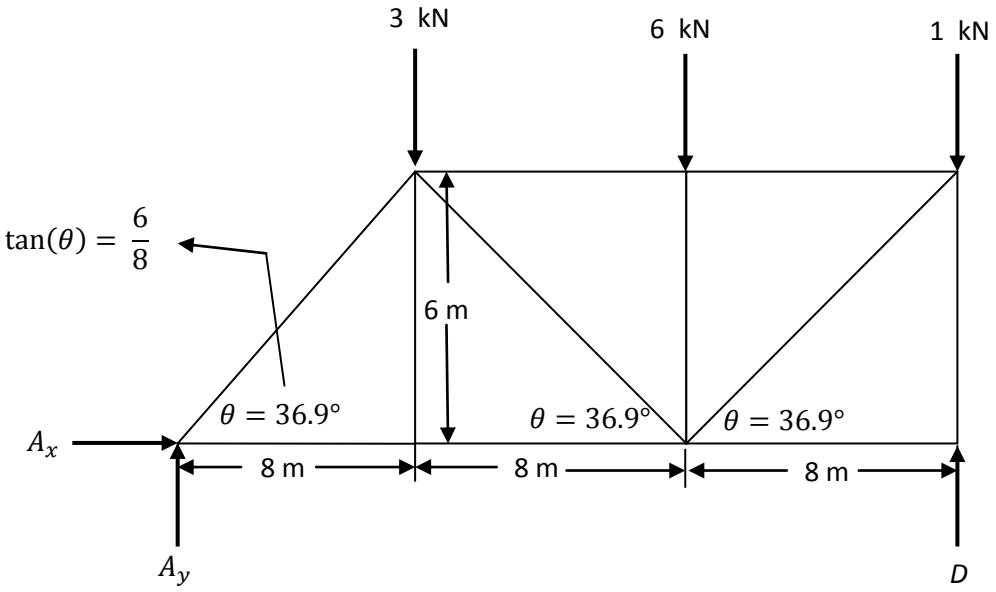
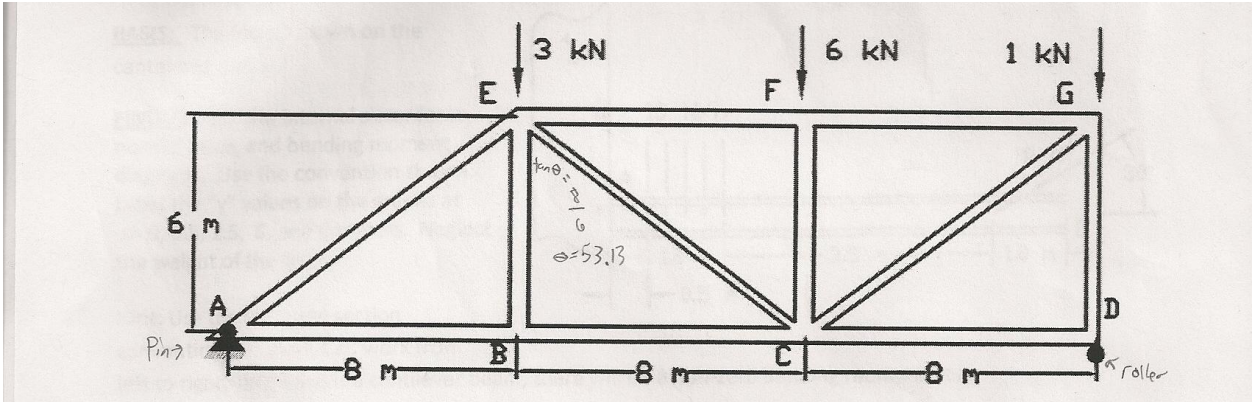


Use the method of joints to determine the forces in each member of the truss. Determine which members are in tension and which are in compression. Identify any zero force members. Draw the FBD s for each joint.



begin by analyzing the truss as a whole:

$$\sum M_A = 0$$

$$(D)(24) - (1)(24) - (6)(16) - (3)(8) = 0$$

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

$$\sum F_y = 0$$

$$D + A_y = 3 + 6 + 1$$

$$6 + A_y = 10$$

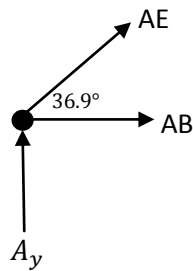
$$A_y = 4 \text{ kN}$$

$$\sum F_x = 0$$

$$A_x = 0$$

Next analyze each joint individually:

Joint A:



$$\sum F_y = 0$$

$$A_y + AE \sin(36.9) = 0$$

$$4 = AE \sin(36.9)$$

$$AE = -6.6 \text{ kN}$$

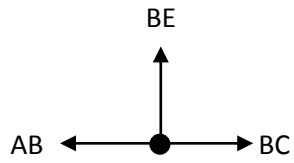
$$\sum F_x = 0$$

$$AE \cos(36.9) + AB = 0$$

$$-6.6 \cos(36.9) + AB = 0$$

$$AB = 5.28 \text{ kN}$$

Joint B:



$$\sum F_y = 0$$

$$BE = 0$$

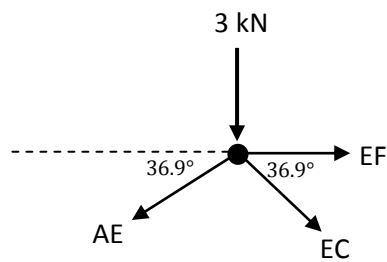
$$\sum F_x = 0$$

$$BC - AB = 0$$

$$BC = AB$$

$$BC = 5.28 \text{ kN}$$

Joint E:



$$\sum F_y = 0$$

$$-3 - AE \sin(36.9) - EC \sin(36.9) = 0$$

$$-3 + 6.6 \sin(36.9) - EC \sin(36.9) = 0$$

$$EC = 1.6 \text{ kN}$$

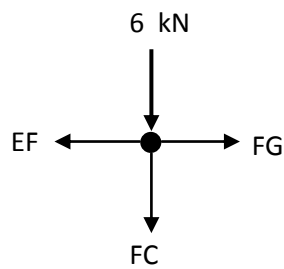
$$\sum F_x = 0$$

$$EF + EC \cos(36.9) - AE \cos(36.9) = 0$$

$$EF + 1.6 \cos(36.9) + 6.6 \cos(36.9) = 0$$

$$EF = -6.6 \text{ kN}$$

Joint F:



$$\sum F_y = 0$$

$$-6 - FC = 0$$

$$FC = -6 \text{ kN}$$

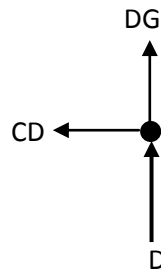
$$\sum F_x = 0$$

$$FG - EF = 0$$

$$FG = EF$$

$$FG = -6.6 \text{ kN}$$

Joint D:



$$\sum F_y = 0$$

$$D + DG = 0$$

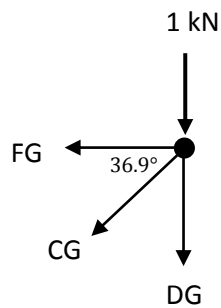
$$6 + DG = 0$$

$$DG = -6 \text{ kN}$$

$$\sum F_x = 0$$

$$CD = 0$$

Joint G:



$$\sum F_x = 0$$

$$-FG - CG \cos(36.9) = 0$$

$$6.6 - CG \cos(36.9) = 0$$

$$CG = 8.25 \text{ kN}$$

the members with a negative value are in compression and ones with a positive force are in tension