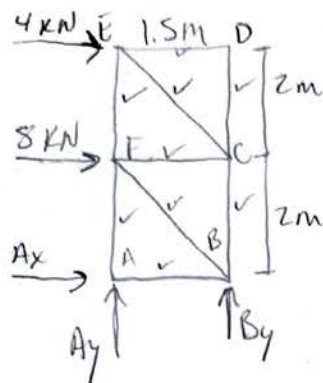


Test 2

Problem 1

Solution



FBD of Truss

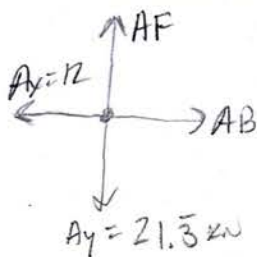
$$\sum F_x: 4 + 8 + A_x = 0 \quad 12 + A_x = 0 \quad A_x = -12 \text{ kN} \\ A_x = 12 \text{ kN} \leftarrow$$

$$\sum F_y: A_y + B_y = 0$$

$$\sum M_A: -8(2) - 4(4) + B_y(1.5) = 0 \\ -16 - 16 + B_y(1.5) = 0 \\ -32 + B_y(1.5) = 0 \\ B_y(1.5) = 32 \\ B_y = 21.\bar{3} \text{ kN} \uparrow$$

$$\sum F_y: A_y + 21.\bar{3} = 0 \\ A_y = -21.\bar{3} \text{ kN} \downarrow$$

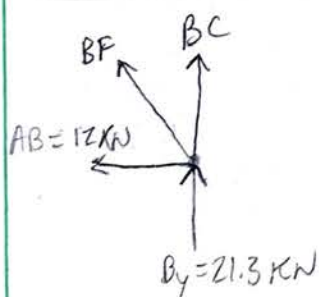
FBD of A



$$\sum F_x: AB - 12 = 0 \quad AB = 12.0 \text{ kN (T)}$$

$$\sum F_y: AF - 21.\bar{3} = 0 \quad AF = 21.3 \text{ kN (T)}$$

FBD of B



$$\sum F_x: -12 - \frac{1.5}{2.5} BF = 0 \\ -\frac{1.5}{2.5} BF = 12$$

$$BF = \frac{-2.5(12)}{1.5} = -20 \text{ kN}$$

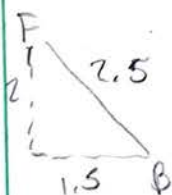
$$BF = 20.0 \text{ kN (C)}$$

$$\sum F_y: 21.\bar{3} + BC + \frac{2}{2.5}(20) = 0$$

$$53.\bar{3} + BC = 0$$

$$BC = -53.\bar{3} \text{ kN}$$

$$BC = 53.3 \text{ kN (C)}$$



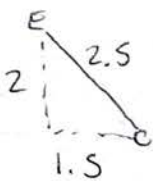
$$CF - 4 = 0 \quad CF = 4 \text{ kN (T)}$$

$$EF - 5.3 = 0 \quad EF = 5.3 \text{ KN}(\uparrow)$$

$$CE = \frac{-2.5(5.3)}{2} = -6.666666666 \text{ KN}$$

$$DE - .9999999969 = 0$$

$$DE = .9999999969 \text{ KN}$$



DE = 99... D

CD

$$\sum F_y: CD = 0$$

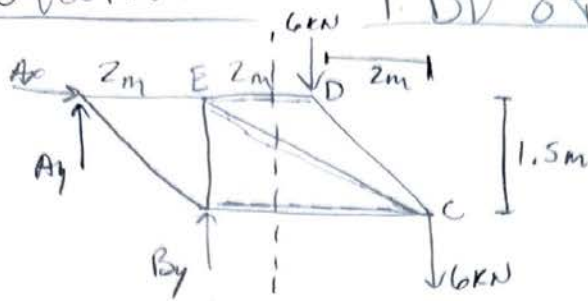
$$CD = 0.00 \text{ KN}$$

Problem 2

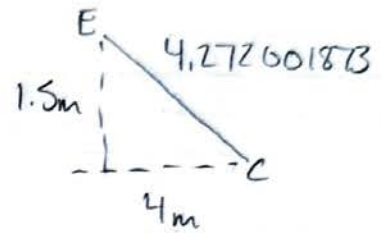
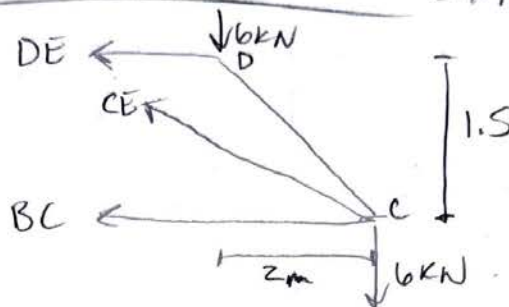
Solution

FBD of Truss

Special Case



Partial Truss FBD (Right side)



$$\sqrt{4^2 + 1.5^2} =$$

$$\sum F_x: -DE - BC - \frac{4}{4.27...} CE = 0$$

$$\sum F_y: \frac{1.5}{4.27...} CE - 6 - 6 = 0 \quad CE = \frac{12(4.27...)}{1.5} =$$

$$34.17601498 \text{ kN}$$

$$\sum M_c: DE(1.5) + 6(2m) = 0$$

$$DE(1.5) + 12 = 0$$

$$DE = -8 \text{ kN}$$

$$DE = -\frac{12}{1.5}$$

$$\sum F_x: -(-8) - BC - \frac{4}{4.27...}(34.17...) = 0$$

$$BC - 24 = 0$$

$$BC = 24 \text{ kN}$$

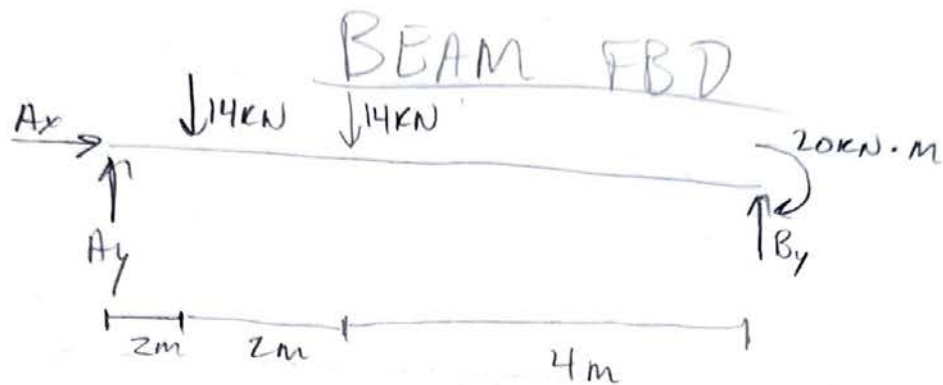
$$BC = 24.0 \text{ kN (T)}$$

$$CE = 34.2 \text{ kN (T)}$$

$$DE = 8.00 \text{ kN (C)}$$

Problem 3

Solution



$$\sum F_x: A_x = 0$$

$$\sum F_y: A_y + B_y - 14 - 14 = 0$$

$$\sum M_A: -14(2) - 14(4) + B_y(8) - 20 = 0$$

$$B_y(8) - 104 = 0$$

$$B_y = \frac{104}{8}$$

$$B_y = 13 \text{ kN}$$

$$\sum F_y: A_y + 13 - 14 - 14 = 0$$

$$A_y - 15 = 0 \quad A_y = 15 \text{ kN}$$

$$A_y = 15.0 \text{ kN } \uparrow$$

$$B_y = 13.0 \text{ kN } \uparrow$$

$$A_x = 0.00 \text{ kN}$$