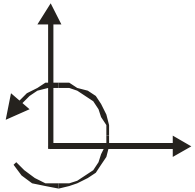
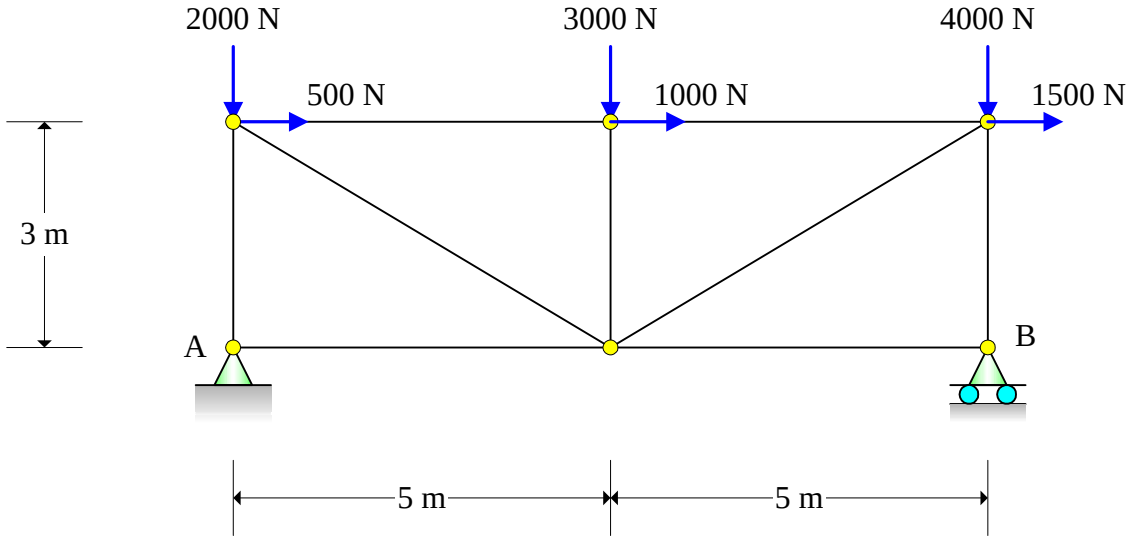
Example 3.8

J. Frye

Example 3.8:

For the truss shown, determine the reactions at supports A and B.

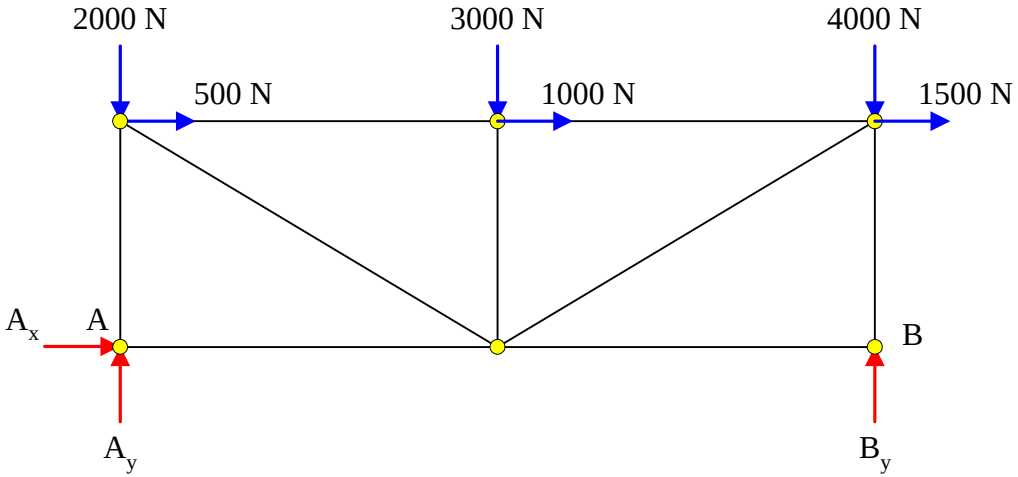




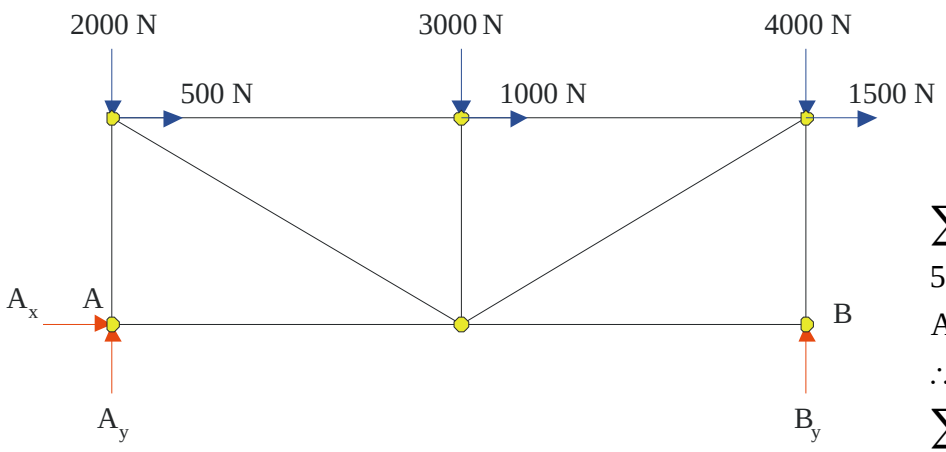
FBD:

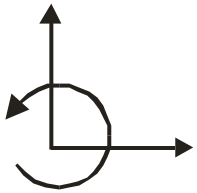
Pin support at A

Roller Support at B



We apply the equations of equilibrium to the FBD





$$\sum F_x = 0 \rightarrow$$

$$500 + 1000 + 1500 + A_x = 0 \quad (1)$$

$$A_x = -3000\text{N}$$

$$\therefore \mathbf{A_x} = 3000\text{N} \leftarrow$$

$$\sum F_y = 0 \uparrow$$

$$A_y - 2000 - 3000 - 4000 + B_y = 0 \quad (2)$$

$$A_y + B_y = 9000$$

$$\sum M_A = 0$$

$$-500(3) - 3000(5) - 1000(3) - 4000(10) - 1500(3) + B_y(10) = 0 \quad (3)$$

$$B_y = \frac{64000}{10} = +6400\text{N}$$

$$\therefore \mathbf{B_y} = 6400\text{N} \uparrow$$

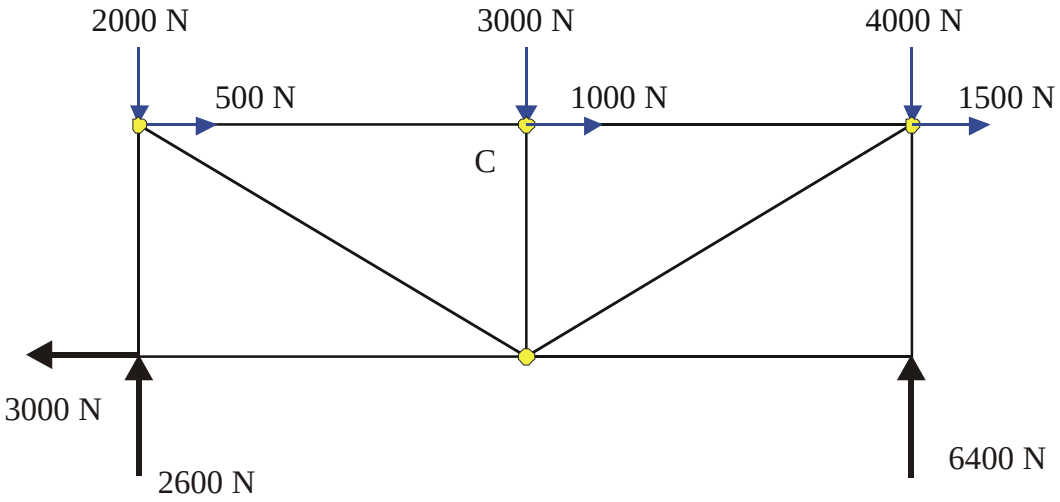
Substitute in (2)

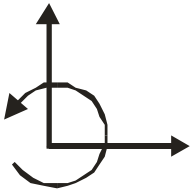
$$A_y + 6400 = 9000$$

$$A_y = +2600\text{N}$$

$$\therefore \mathbf{A_y} = 2600\text{N} \uparrow$$

As a check, we take moments about a different point in the FBD: (let us choose Point C)





$$\sum M_C = 0$$

$$-2600(5) - 3000(3) + 2000(5) - 4000(5) + 6400(5) = 0$$

$$0 = 0 \quad \text{Checks!!!!!}$$