

2/19/22

HO 6.1

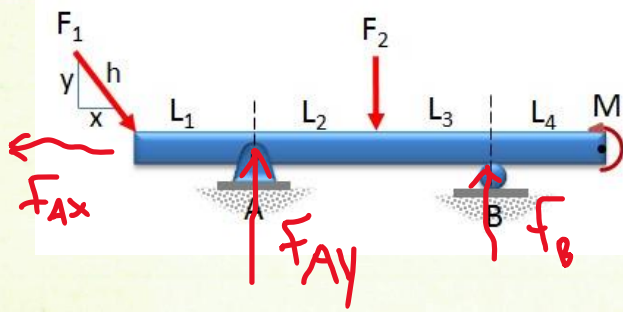
Sam Hanna

1. Given:

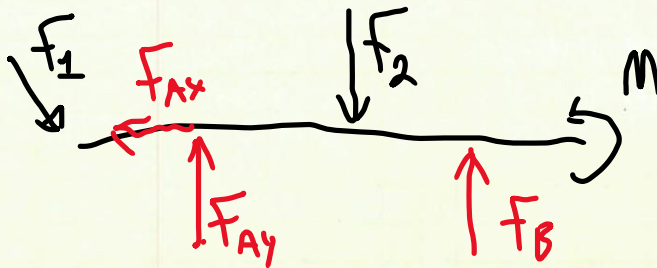
$$F_1 = 380 \text{ lbs} \quad F_2 = 370 \text{ lbs} \quad M = 625 \text{ lb}\cdot\text{ft}$$

$$L_1 = 1 \text{ ft} \quad L_2 = 2.5 \text{ ft} \quad L_3 = 2.8 \text{ ft} \quad L_4 = 1.5 \text{ ft}$$

$$x, y, h = 5, 12, 13$$

Find: F_{Ay} , F_{Ax} , F_B

Solution:



$$\sum F_y = 0 \quad \sum F_x = 0 \quad \sum M = 0$$

$$M_A = 0$$

$$F_{1y}(L_1) - F_2(L_2) - F_B(L_2 + L_3) + M = 0$$

$$\frac{380\left(\frac{12}{13}\right)(1) - 370(2.5) + 625 = 5/3 F_B}{5/3}$$

$$F_B = \underline{9.58 \text{ lbs}}$$

$$\sum F_y = 0$$

$$F_{Ay} + F_B - F_{1y} - F_2 = 0$$

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$$F_{Ay} = 380\left(\frac{12}{13}\right) + 370 - 9.58 = \underline{711.19 \text{ lbs}} \leftarrow F_{Ay}$$

$$\sum F_x = 0$$

$$F_{ix} - F_{Ax} = 0$$

$$F_{Ax} = 380\left(\frac{5}{13}\right) = \underline{146.15 \text{ lbs}} \leftarrow F_{Ax}$$

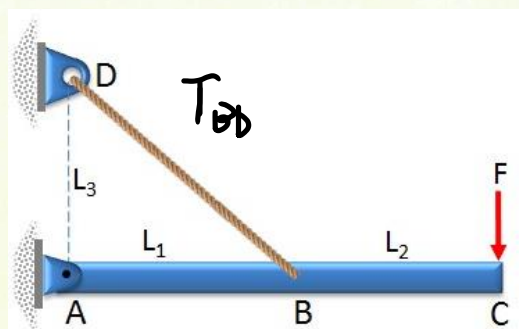
2. Given :

$$F = 55 \text{ N}$$

$$L_1 = 1 \text{ m}$$

$$L_2 = 1.9 \text{ m}$$

$$L_3 = 1.7 \text{ m}$$



Find:

$$F_{Ax}, F_{Ay}, T_{BD}$$

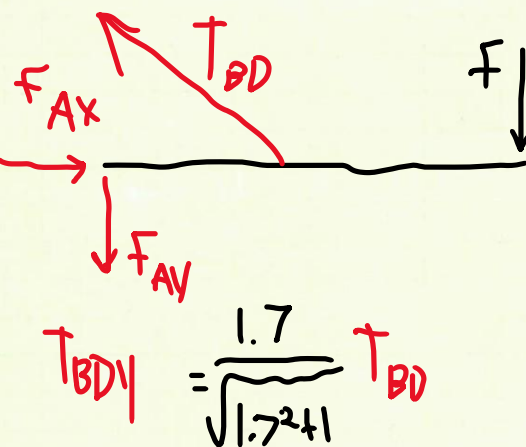
Solution:

$$\sum F_x = 0 \quad \sum F_y = 0 \quad \sum M = 0$$

$$\sum M = 0$$

$$-F(L_1 + L_2) + T_{BDy}(L_1) = 0$$

$$T_{BD} = 55(1 + 1.9) \left(\frac{\sqrt{1.7^2 + 1}}{1.7} \right) = \underline{185 \text{ N}} \leftarrow T_{BD}$$



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GPH HANNA

$$\sum F_y = 0$$

$$-F_{Ay} + T_{BDy} - F = 0$$

$$F_{Ay} = T_{BDy} - F = \frac{1.7}{\sqrt{1.7^2 + 1^2}} (185) - 55 = \underline{\underline{159.5 \text{ N}}} \leftarrow F_{Ay}$$

$$\sum F_x = 0$$

$$F_{Ax} - T_{BDx} = 0$$

$$F_{Ax} = T_{BDx} = \frac{1}{\sqrt{1.7^2 + 1^2}} (185) = \underline{\underline{93.8 \text{ N}}} \leftarrow F_{Ax}$$

3. Given:

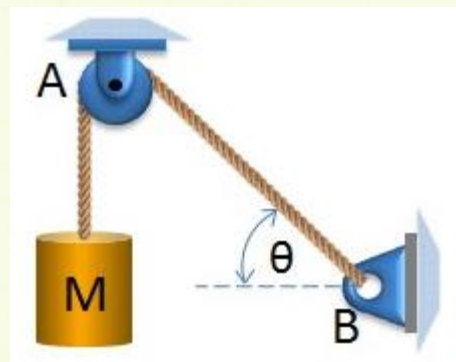
$$M = 85 \text{ kg}$$

$$\theta = 50^\circ$$

Find:

$$A_x, A_y, T$$

Solution:



$$T = Mg = 85(9.81) = \underline{\underline{833.85 \text{ N}}} \leftarrow T$$

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Gan Hana

$$\sum F_y = 0$$

$$-T \sin \theta + A_y = 0$$

$$A_y = 833.85 \sin 55 = \underline{\underline{638.78 \text{ N}}} \leftarrow A_y$$

$$\sum F_x = 0$$

$$T \cos \theta - A_x = 0$$

$$\underline{\underline{A_x = 833.85 \cos 55 = 536 \text{ N}}} \leftarrow A_x$$

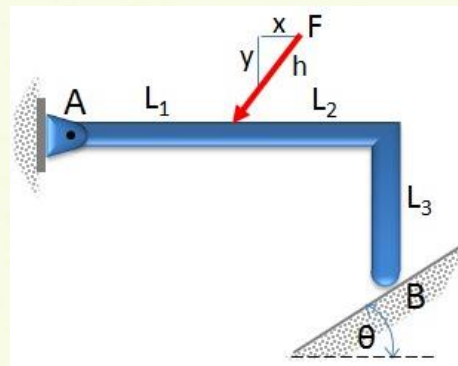
4. Given:

$$F = 250 \text{ lbs}$$

$$L_1 = 1 \text{ ft} \quad L_2 = 2.8 \text{ ft}$$

$$L_3 = 1.6 \text{ ft} \quad \theta = 26^\circ$$

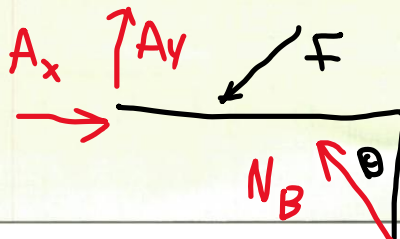
$$x, y, h = 3, 4, 5$$



Find:

$$A_x, A_y, N_B$$

Solution:



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GPH 1000

$$\Sigma M_A = 0$$

$$-F_y(L_1) + N_B \cos \theta (L_1 + L_2) - N_B \sin \theta (L_3) = 0$$

$$N_B \cdot 3.8 \cos(26) - N_B \cdot 1.6 \cos(26) = 250\left(\frac{4}{5}\right)(1)$$

$$N_B = \frac{250\left(\frac{4}{5}\right)}{3.8 \cos(26) - 1.6 \sin(26)} = \underline{\underline{73.7 \text{ lbs}}} \leftarrow N_B$$

$$\Sigma F_x = 0$$

$$-F_x - N_{Bx} + A_x = 0$$

$$A_x = 73.7 \sin(26) + 250\left(\frac{3}{5}\right) = \underline{\underline{182.3 \text{ lbs}}} \leftarrow A_x$$

$$\Sigma F_y = 0$$

$$-F_y + N_{By} + A_y = 0$$

$$A_y = 250\left(\frac{4}{5}\right) - 73.7 \cos(26) = \underline{\underline{133.8 \text{ lbs}}} \leftarrow A_y$$