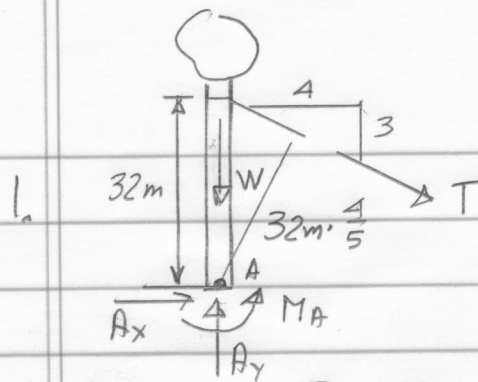


ME 35a Midterm
Solution

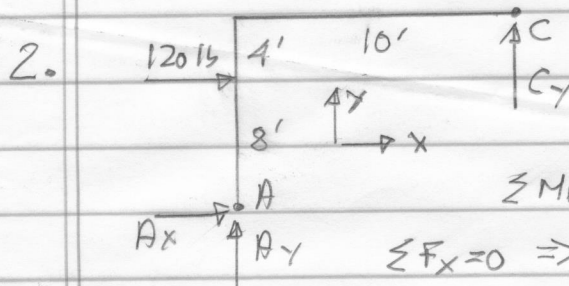


$$M_A = 640 \text{ kN-m}$$

$$\sum M_A = M_A - T \cdot 32\text{m} \cdot \frac{4}{5} = 0$$

$$T = M_A / (32\text{m} \cdot \frac{4}{5}) = 25 \text{ kN}$$

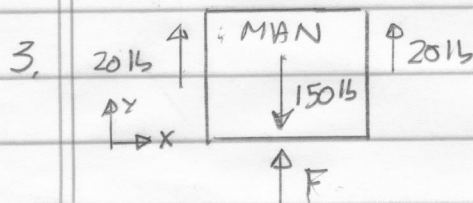
Buy rope with at least 25 kN tensile strength.



Triangular load is equivalent to 120 lb force 8' from A.

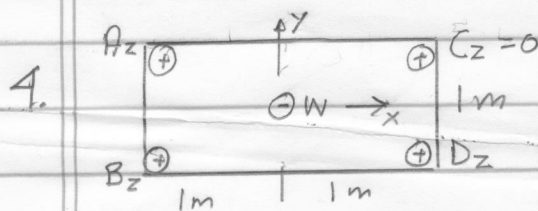
$$\sum M_A = C_y \cdot 10' - 120 \text{ lb} \cdot 8' = 0 \Rightarrow C_y = 96 \text{ lb}$$

$$\sum F_x = 0 \Rightarrow A_x = -120 \text{ lb}, \quad \sum F_y = 0 \Rightarrow A_y = -96 \text{ lb}$$



$$\sum F_y = 2015 + 2015 + F - 150 \text{ lb} = 0$$

$$\Rightarrow F = 110 \text{ lbs}$$

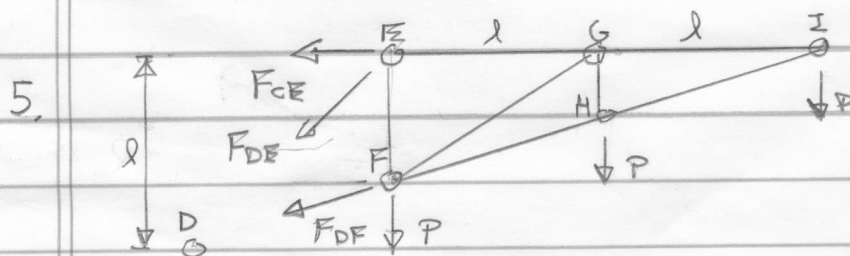


$$W = 400 \text{ N}$$

$$\sum M_{AB} = W \cdot 1\text{m} - D_z \cdot 2\text{m} = 0 \Rightarrow D_z = \frac{W}{2} = 200 \text{ N}$$

$$\sum M_{BD} = -W \cdot 1\text{m} + A_z \cdot 2\text{m} = 0 \Rightarrow A_z = \frac{W}{2} = 200 \text{ N}$$

$$\sum F_z = -W + A_z + B_z + D_z \Rightarrow B_z = 0$$



$$\sum M_D = +F_{CE} \cdot l - Pl - P2l - P3l \Rightarrow F_{CE} = 6P \text{ (Tension)}$$