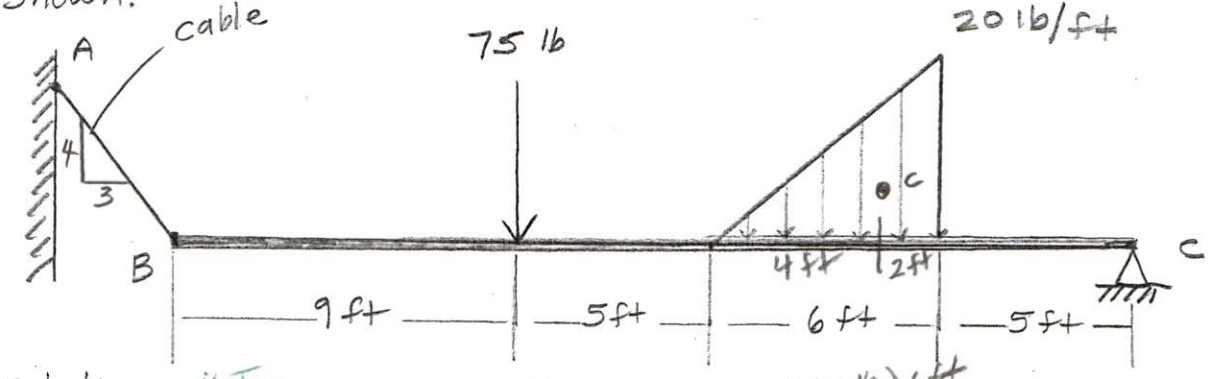
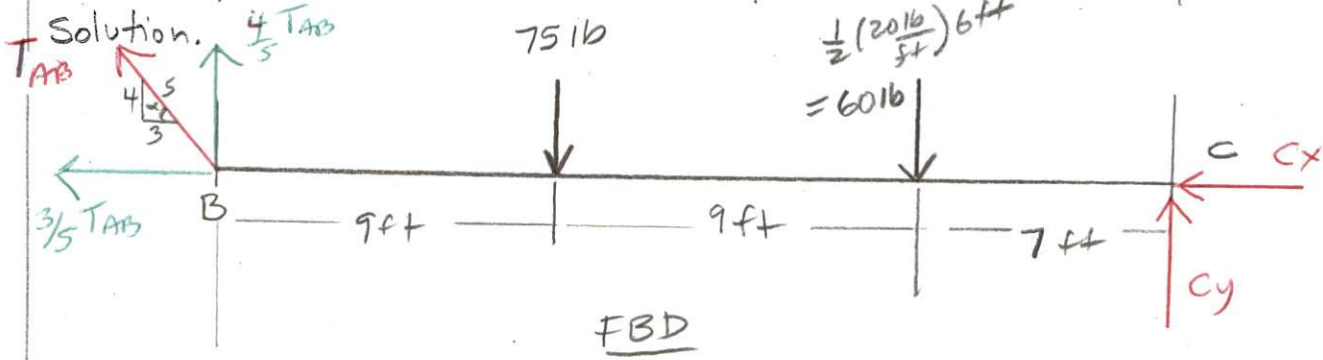
CMGT 340 | QUIZ #7 | F 2019

Show all work for full credit. All vector answers are to be positive scalar, true direction.

Name Solution

Determine the reactions at the supports for the beam shown.





FBD

Equilibrium Equations

ccw +M ↺ cw −M ↻

$[\Sigma M_B = 0]$ $-75\,lb(9ft) - 60lb(18ft) + C_y(25ft) = 0$

$$C_y = \frac{1755\ lb\cdot ft}{25ft} = 70.2\ lb\ \uparrow$$

$[\Sigma F_y = 0]$ $\frac{4}{5}T_{AB} - 75\,lb - 60\,lb + C_y = 0$

$$\frac{4}{5}T_{AB} = 135\,lb - 70.2\,lb = 64.8\,lb$$

$\alpha = \tan^{-1}\frac{4}{3} = 53°$

$\theta = 180° - 53° = 127°$

$T_{AB} = 81\,lb \angle 127°$

$[\Sigma F_x = 0]$ $-\frac{3}{5}T_{AB} - C_x = 0$

$$C_x = -\frac{3}{5}(81\,lb) = -48.6\,lb \leftarrow$$

and $C_x = 48.6\,lb \rightarrow$

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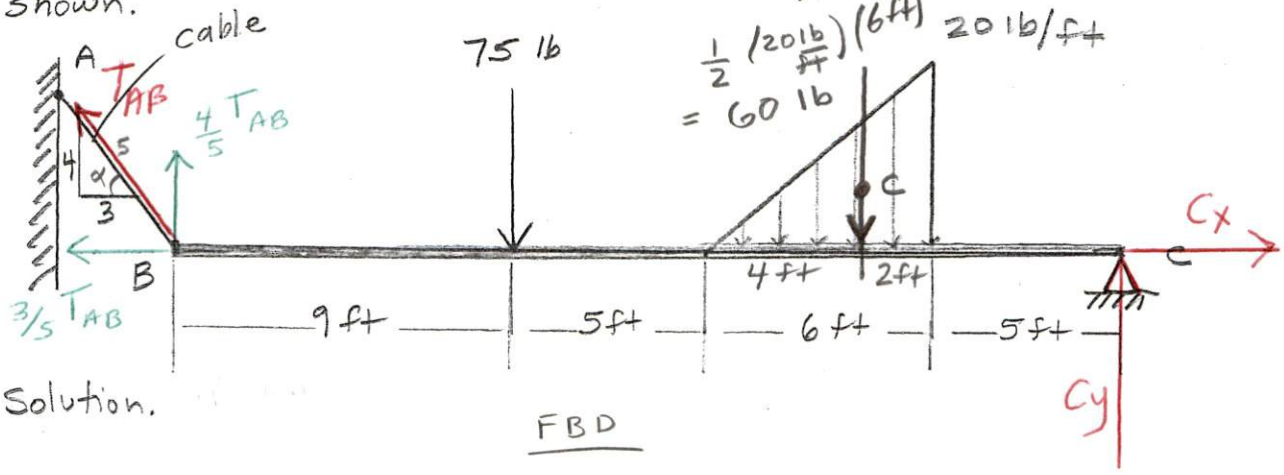
Name Solution

Determine the reactions at the supports for the beam shown.



Solution.

FBD

Equilibrium Equations

ccw +M ↺
cw −M ↻

$[\Sigma M_A = 0]$ $-75\,lb(9ft) - 60lb(18ft) + C_y(25ft) = 0$

$$C_y = \frac{1755\ lb\cdot ft}{25\ ft} = \underline{70.2\ lb} \uparrow$$

$[\Sigma F_y = 0]$ $\frac{4}{5}T_{AB} - 75lb - 60lb + C_y = 0$

$$\frac{4}{5}T_{AB} = 135\,lb - 70.2\,lb$$

$\alpha = \tan^{-1}\frac{4}{3} = 53°$

$180° - 53° = 127°$

$$T_{AB} = \frac{5}{4}(64.8\,lb) = 81\,lb \text{ at } 127°$$

$[\Sigma F_x = 0]$ $-\frac{3}{5}T_{AB} + C_x = 0$

$$C_x = \frac{3}{5}(81\,lb) = \underline{48.6\ lb} \rightarrow$$