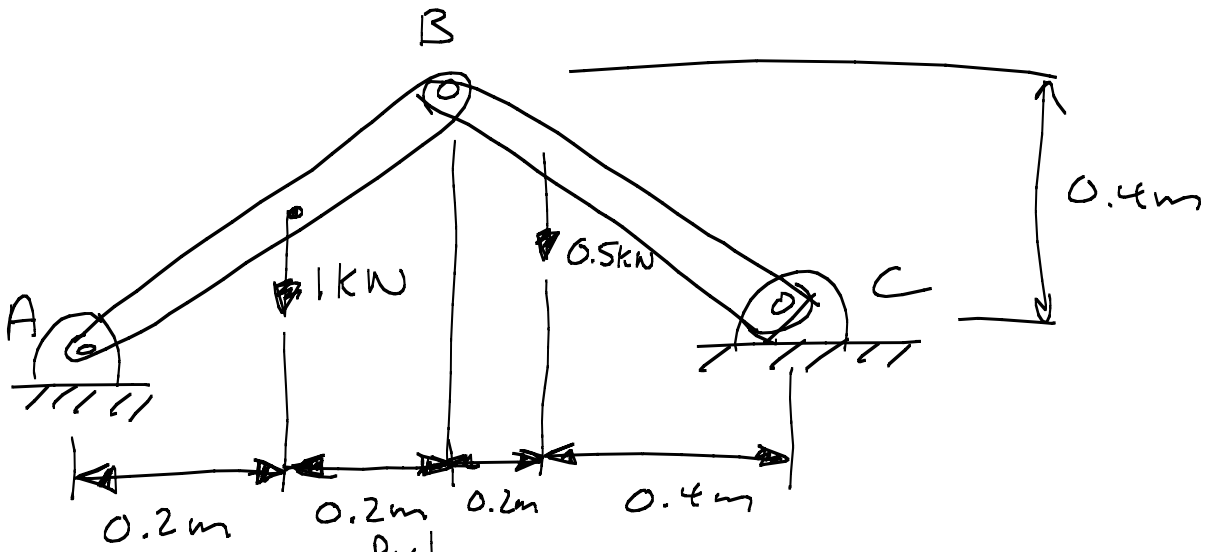
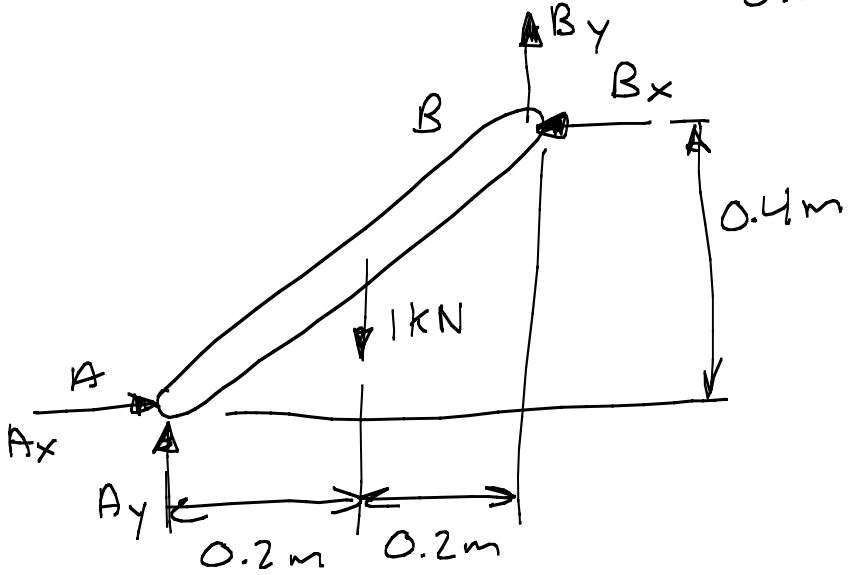
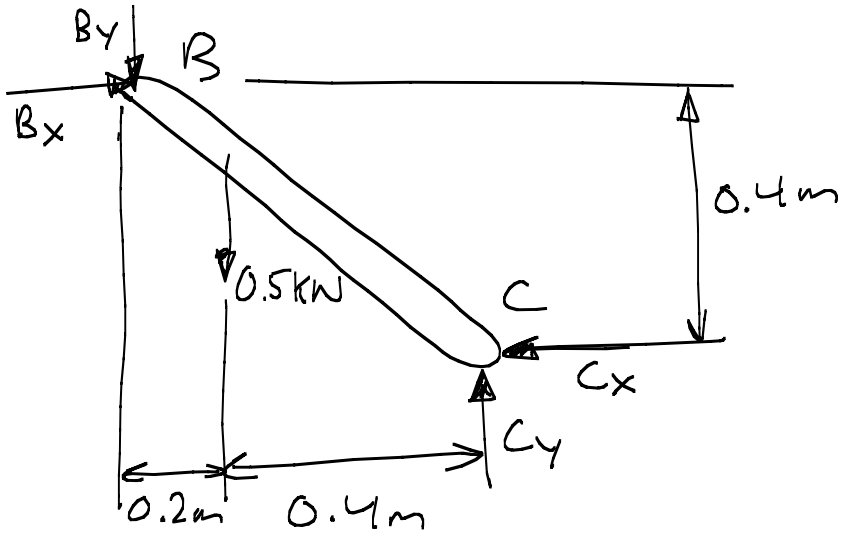
Example

Determine the support reactions





AB



BC

Unknowns: $A_x, A_y, B_x, B_y, C_x, C_y$ (6)

Equations: $(\Sigma F_x, \Sigma F_y, \Sigma M) \times 2$ (6)

AB $\pm \Sigma F_x = 0 \Rightarrow A_x - B_x = 0$

$+\uparrow \Sigma F_y = 0 \Rightarrow A_y + B_y - 1kN = 0$

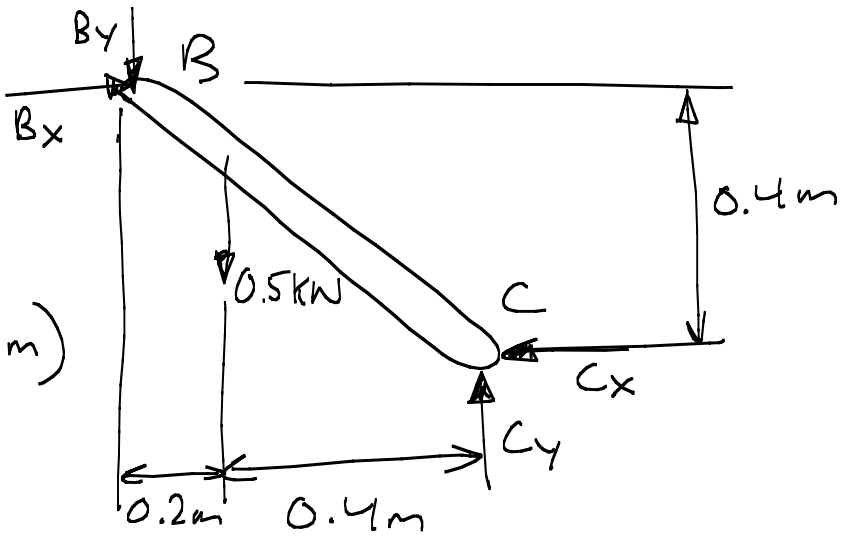
$+\circlearrowleft \Sigma M_A = 0 \Rightarrow -(1kN)(0.2m) + (B_x)(0.4m) + (B_y)(0.4m) = 0$

BC

$\pm \Sigma F_x = 0 \Rightarrow B_x - C_x = 0$

$+\uparrow \Sigma F_y = 0 \Rightarrow -B_y + C_y - 0.5kN = 0$

$+\circlearrowleft \Sigma M_C = 0 \Rightarrow +(0.5kN)(0.4m) - (B_x)(0.4m) + (B_y)(0.6m) = 0$



BC

6 Equations, 6 unknowns

$A_x = 0.5\ kN$

$A_y = 1\ kN$

$B_x = 0.5\ kN$

$B_y = 0$

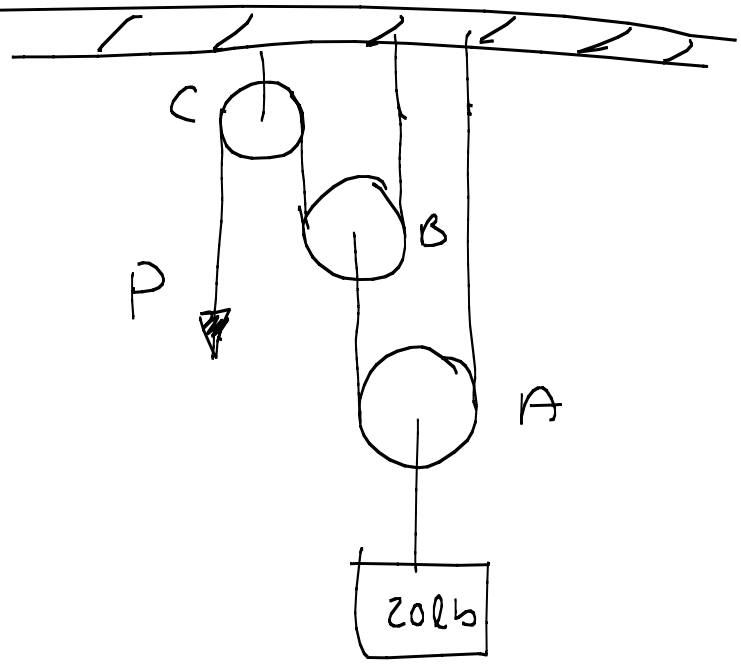
$C_x = 0.5\ kN$

$C_y = 0.5\ kN$

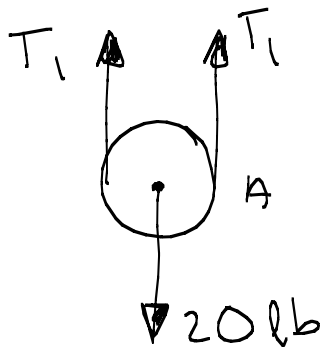
Machines (Pulleys)

Example (Neglect Friction)

Determine: P



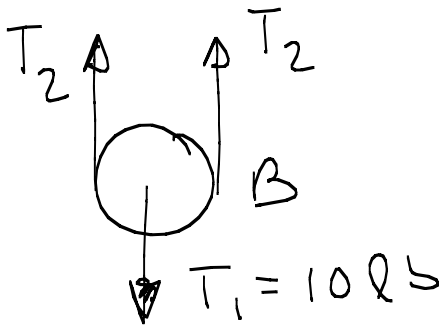
A



$+\uparrow \Sigma F_y = 0 \Rightarrow 2T_1 = 20\,lb$

$\boxed{T_1 = 10\,lb}$

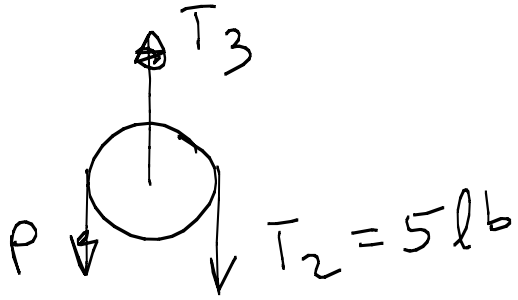
B



$+\uparrow \Sigma F_y = 0 \Rightarrow 2T_2 = 10\,lb$

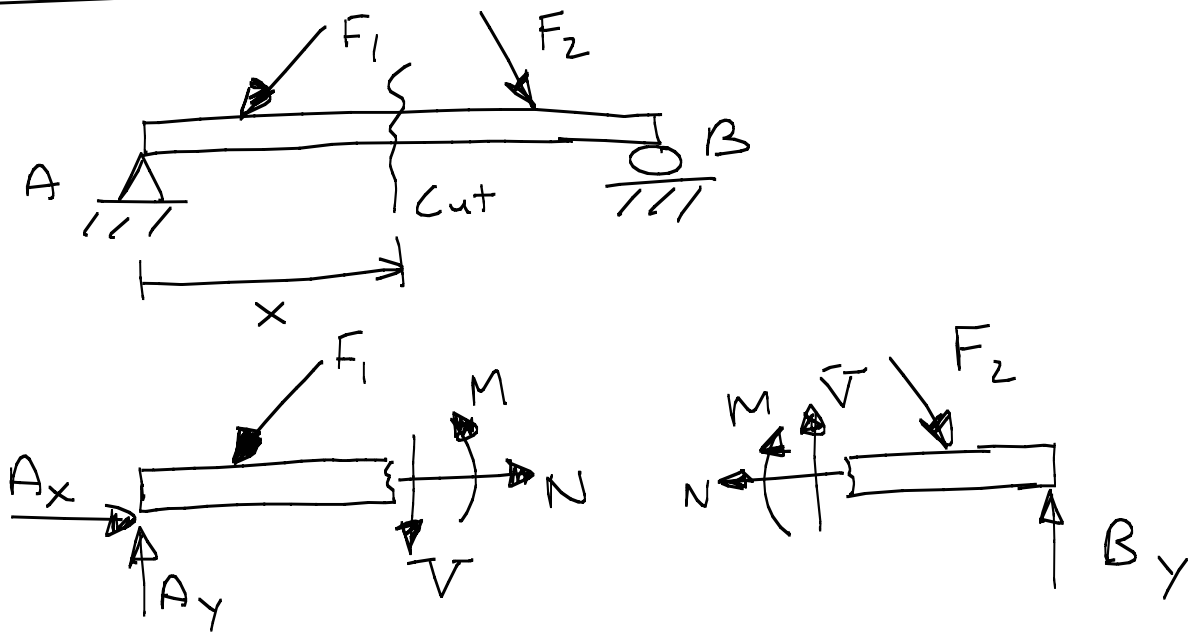
$\boxed{T_2 = 5\,lb}$

C



$\boxed{P = 5\,lb}$

Chapter 7: Internal Forces



N: Normal Force (Axial Force)

V: Shear Force

M: Bending Moment