MILANO

MECH 234 + 235

PROB. 3.83
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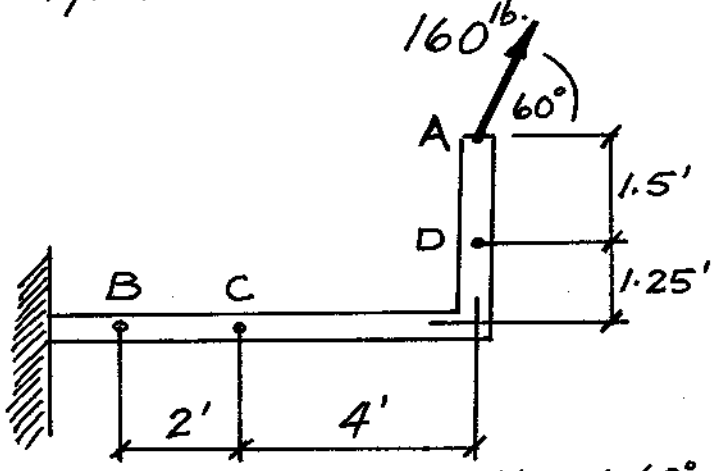
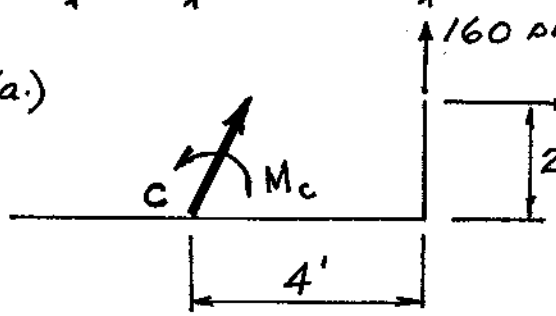


APPLIED FORCE = 160 lb.

a) EQUIV. FORCE - COUPLE AT C

b) EQUIV. SYSTEM with
- VERT. FORCE @ B
- another FORCE @ D

(a.)



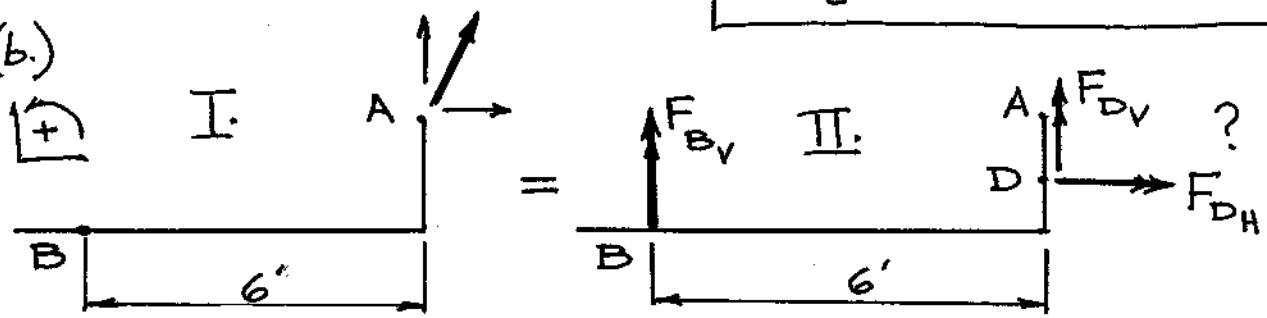
$M_c = (160^{\#} \cos 60°)(2.75') - (160^{\#} \sin 60°)(4')$

$M_c = 220'^{\#}_{CW} - 554.26'^{\#}_{CCW}$

$M_c = 334.26$ ft. lb. CCW

$+ F_c = 160$ lb. $\angle 60°$

(b.)



SYSTEM I. = SYSTEM II.

ΣF_x: $160 \cos 60° = F_{D_H}$ $\therefore$ $F_{D_H} = 80^{\#} \rightarrow$

ΣF_Y: $160 \sin 60° = F_{B_V} + F_{D_V}$

ΣM_A: $0 = -F_{B_V}(6') + F_{D_H}(1.5')$

$F_{B_Y} = \frac{80^{\#}(1.5')}{(6')} = 20^{\#} \uparrow = F_{B_V}$

$\therefore \Sigma F_Y$: $F_{D_V} = 160 \sin 60° - 20^{\#} = 118.6^{\#} \uparrow = F_{D_V}$

$F_D = 143^{\#}$, $\theta = \tan^{-1}\left[\frac{118.6}{80}\right] = 56°$