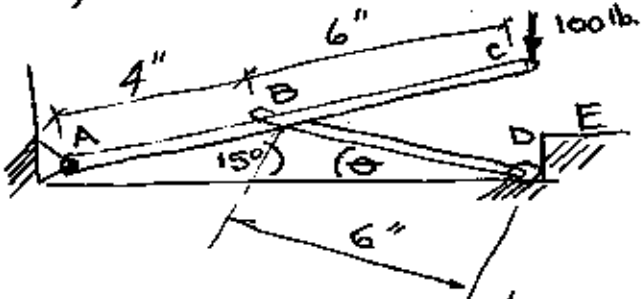
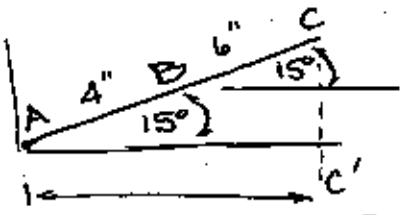
MECH 234 — FRAMES — 6.123 MILANO p. 323

PAY ATTENTION TO GEOMETRY.



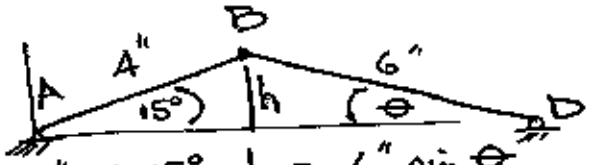
FIND THE FORCE ON E.

GEOMETRY FIRST!



$AC' = 10" \cos 15°$

$AC' = 9.659$

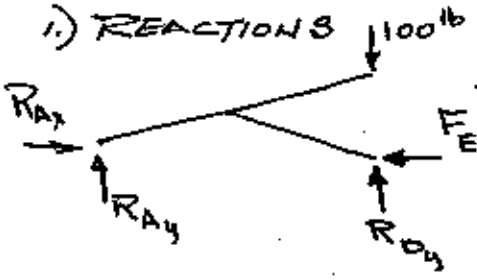


$4" \sin 15° = h = 6" \sin\theta$

$\theta = \sin^{-1}\left[\frac{4" \sin 15°}{6"}\right] = 9.936°$

BUT $AD = 4" \cos 15° + 6" \cos\theta = 9.774"$ ≠ AC'

1.) REACTIONS



$\Sigma F_x = R_{Ax} - F_E = 0$

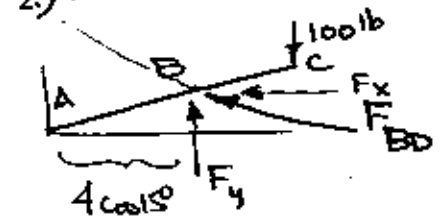
$\Sigma F_y = R_{Ay} + R_{Dy} - 100^{lb} = 0$

$\Sigma M_A = -100^{lb}(AC') + R_{Dy}(AD) = 0$

$R_{Dy} = \frac{100^{lb}(AC')}{(AD)} = \frac{100(9.659)}{(9.774)} = 98.823^{lb}\uparrow$

$\therefore R_{Ay} = 1.177\uparrow$

2.) FORCES ON ABC



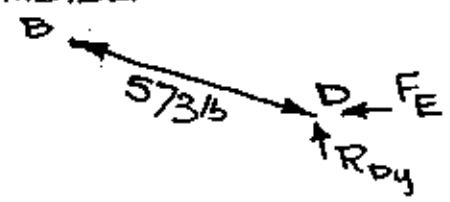
$\Sigma M_A = -100^{lb}(9.659") + F_y(4\cos 15°) + F_x(4\sin 15°) = 0$

where $F_x = F_{BD}\cos\theta$ $\quad F_y = F_{BD}\sin\theta$

$-965.9 + F_{BD}\left[\sin 9.936°(4\cos 15°) + \cos 9.936°(4\sin 15°)\right]$

$\boxed{F_{BD} = 572.75^{lb}}$

MEMBER BD



FORCE EXERTED ON BLOCK E = F_{BDx}

$F_{BDx} = 573\cos\theta$

$\boxed{F_{on\,E} = 564.16^{lb} \rightarrow}$