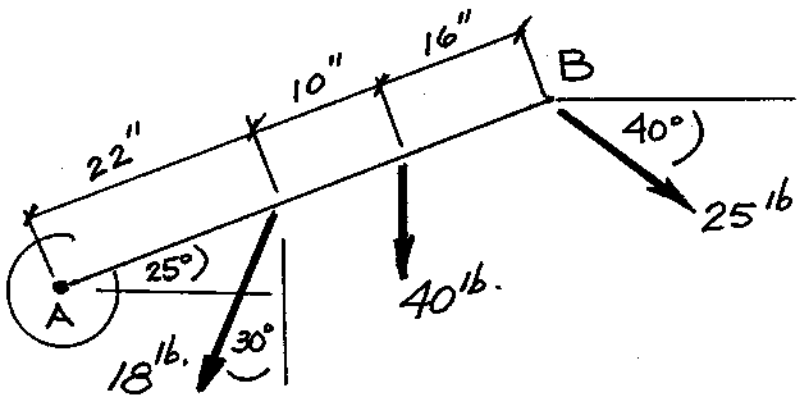
MILANO

MECH 234 • 235

PROB. 3-108
p. 135



EQUIVALENT FORCE - COUPLE AT A

$$\Sigma F_X = \Sigma F_H = -18^{\#} \sin 30° + 25^{\#} \cos 40° = +10.15^{\#} \rightarrow$$

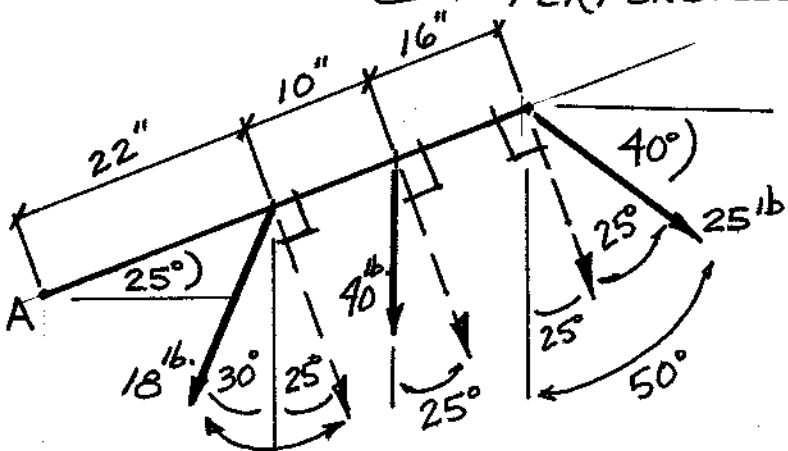
$$\Sigma F_Y = \Sigma F_V = -18^{\#} \cos 30° - 40^{\#} - 25^{\#} \sin 40° = -71.66^{\#} \downarrow$$

$$\text{EQUIV. FORCE} = \sqrt{(10.15)^2 + (71.66)^2} = 72.38 \text{ lb.}$$

$$\theta = \tan^{-1}\left[\frac{-71.66}{10.15}\right] = -81.94° \qquad \angle 278°$$

EQUIV. MOMENT

HINT: Use Force Components perpendicular to AB.



Force Components Parallel to AB produce No Mom.

$$\Sigma M_A = (18^{\#} \cos 55°)(22") + (40^{\#} \cos 25°)(32") + (25^{\#} \cos 25°)(48")$$

$$M_A = 2{,}474.78 \text{ in lb} = 206.23 \text{ ft. lb.}$$

$$F_A = 72.38 \text{ lb} \measuredangle 81.94°$$