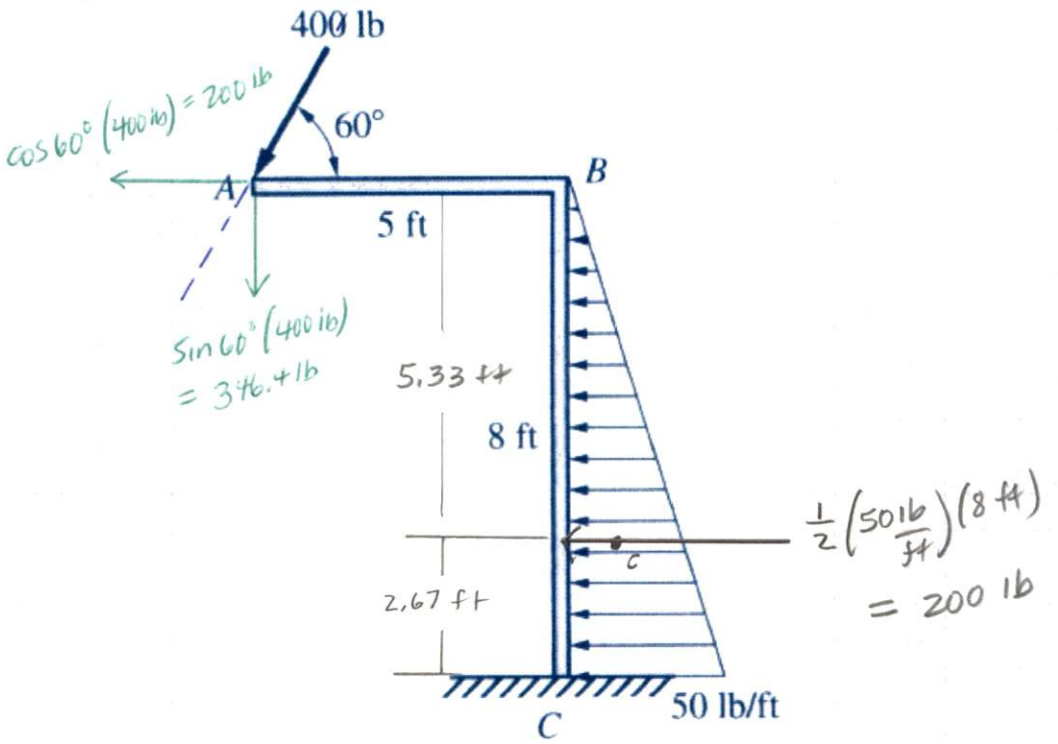
2-83 and 2-84 Replace the loading on the brackets in Fig. P2-83 and Fig. P2-84 with an equivalent resultant force and specify its location along AB mea-sured from a convenient point.

2-84

Solution.



Magnitude

$R_x = \Sigma F_x = -200\text{ lb} - 200\text{ lb} = -400\text{ lb} = 400\text{ lb} \leftarrow$

$R_y = \Sigma F_y = -346.4\text{ lb} = 346.4\text{ lb} \downarrow$

} Resultant lies in Quad 3

$R = \sqrt{400\text{ lb}^2 + 346.4\text{ lb}^2} = 529\text{ lb}$

Direction

$\alpha = \tan^{-1}\left|\frac{346.4\text{ lb}}{400\text{ lb}}\right| = 40.9°$

$\theta = 180° + 40.9° = 220.9°$

Location

From A

$R_y \bar{x} = \Sigma M_A$

$= -200\text{ lb}(5.33\text{ ft}) = -1066\text{ lb·ft}$ ↺

$\bar{x} = \frac{1066\text{ lb ft}}{346.4\text{ lb}} = 3.08\text{ ft}$ to the right of A

$R = 529\text{ lb} \angle 220.9°$ located 3.08 ft to the right of A