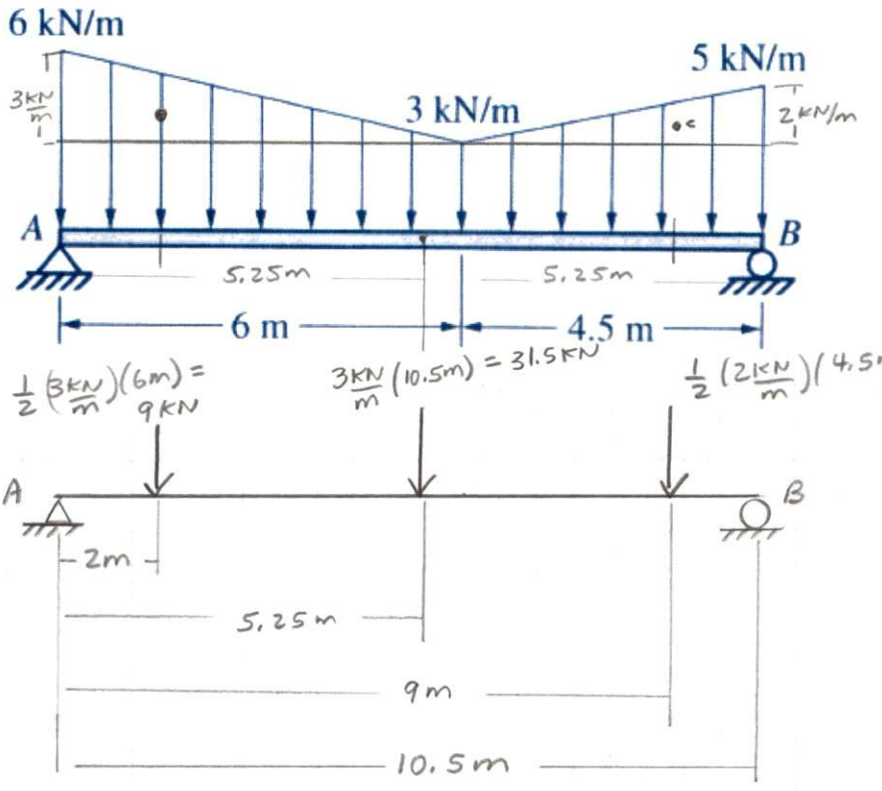
2-76 to 2-81 Replace the loading on the beams shown in Figs. P2-76 to Fig. P2-81 with an equivalent resultant force and specify their location along each beam measured from the left-hand end A.

2-78

Solution.



Magnitude

$R_x = \Sigma F_x = 0$

$R_y = \Sigma F_y = -9kN - 31.5kN - 4.5kN = -45kN = 45kN \downarrow$

$R = 45kN$

Direction

$\theta = 270^\circ$ or $\downarrow$

Location

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

$= -9kN(2m) - 31.5kN(5.25m) - 4.5kN(9m)$

$\bar{x} = \frac{223.875\ kN \cdot m}{45\ kN} = 4.975\ m$ to the right of A

$R = 45kN \downarrow$ located 4.975 m to the right of A