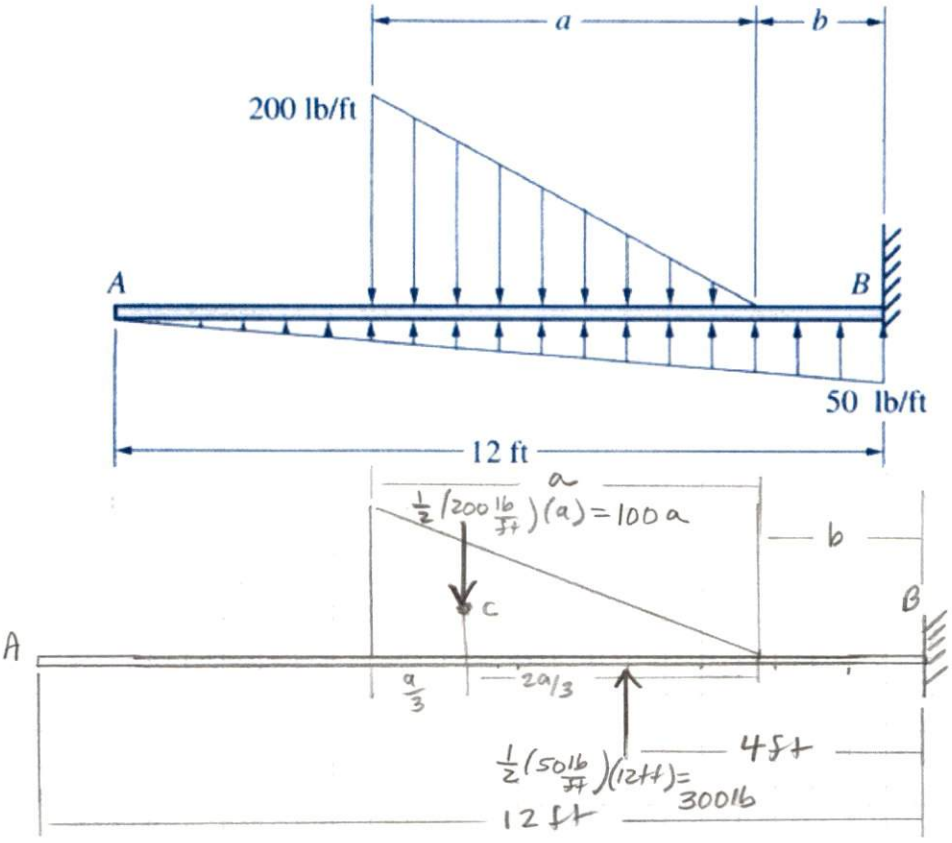
2-86

Determine the distances a and b of the triangular load in Fig. P2-86 so that the resultant force of the loading is a 200-lb force acting downward at the midpoint of the beam.

2-86

Solution.



For the Resultant $R = 200\ lb \downarrow$

$$R_y = \Sigma F_y = -100a + 300\ lb = -200\ lb$$

$$a = 5\ ft$$

For the Resultant to be located at the mid-span

$$R(6ft) = M_B$$

$$= 100a\left(\frac{2a}{3} + b\right) - 300\ lb(4ft)$$

$$= 100\ (5ft)\left(\frac{2(5ft)}{3} + b\right) - 300\ lb\ (4ft)$$

$$\left(\frac{200\ lb(6ft) + 300\ lb(4ft)}{100\ (5ft)}\right) - \frac{10\ ft}{3} = b$$

$$b = 1.47\ ft$$