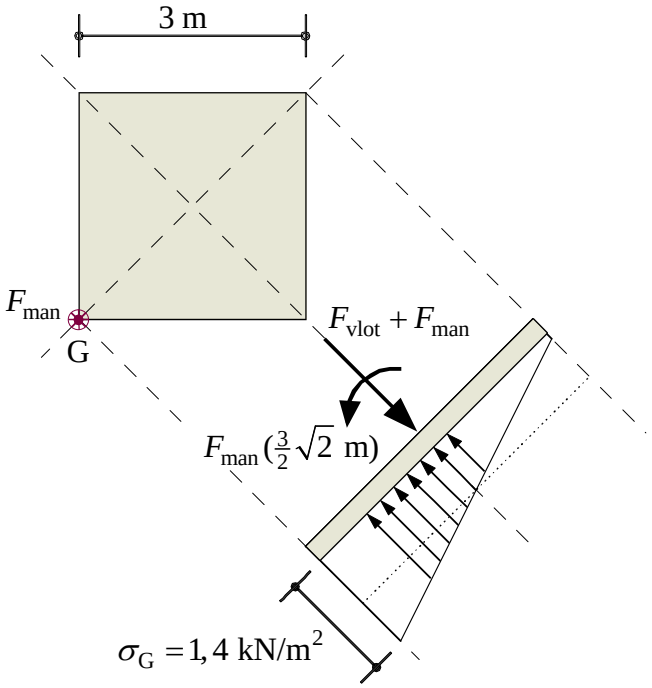
Remarks: See §4.4, pages 168 till 170
See §4.5, pages 171 till 184

Answer:

a. $G = 90$ kg



Explanation:

Weight of raft: $F_{raft} = (500 \text{ kg/m}^3)(10 \text{ N/kg})(0{,}14 \text{ m})(3 \text{ m})^2 = 6{,}3 \text{ kN}$

Rake the weight of the person: F_{man}

"Cross-section properties": $A = (3 \text{ m})^2 = 9 \text{ m}^2$ and $I = \frac{1}{12}(3 \text{ m})^4 = 6{,}75 \text{ m}^4$

The water pressure $(\rho g h)$ is proportional with the sag of the raft and varies linearly. See the figure. At G the water pressure is:

$$\rho g h = (1000 \text{ kg/m}^3)(10 \text{ N/kg})(0{,}14 \text{ m}) = 1{,}4 \text{ kN/m}^2$$

Water pressure at G due to F_{raft} and F_{man}:

$$\sigma_G = \frac{F_{\text{raft}} + F_{\text{man}}}{A} + \frac{F_{\text{man}}(\frac{3}{2}\sqrt{2} \text{ m}) \times (\frac{3}{2}\sqrt{2} \text{ m})}{I} =$$

$$= \frac{(6{,}3 \text{ kN}) + F_{\text{man}}}{9 \text{ m}^2} + \frac{F_{\text{man}} \times (4{,}5 \text{ m}^2)}{6{,}75 \text{ m}^4} = 1{,}4 \text{ kN/m}^2$$

This gives $F_{\text{man}} = 0{,}9 \text{ kN} = 900 \text{ N}$