

F5

Tyngdpunkt - Masscentrum

Tyngdkraft: $G = m \cdot g$

G dir prop mot m

Tyngd = m $g \approx 9,82 \text{ m/s}^2$

$m = \text{massa kg}$
 $\rho = \text{densitet kg/m}^3$
 $V = \text{volym}$ $A = \text{area}$

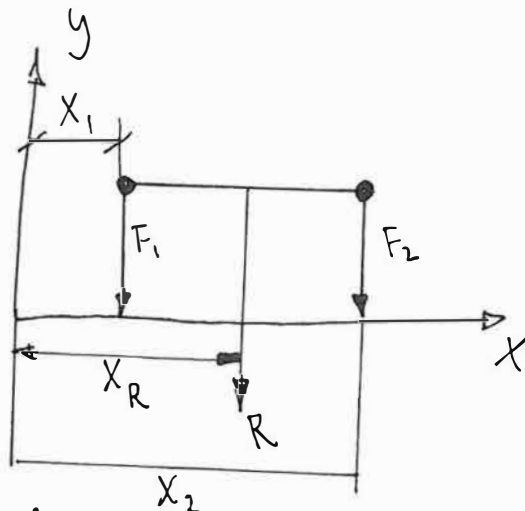
$l = \text{längd.}$

$G = \rho \cdot V \cdot g$ ($\rho \text{ o } g \text{ konst}$) : G prop mot V .

$G = \rho \cdot A \cdot l \cdot g$ ($\rho, g \text{ o } l \text{ konst}$) : G dir prop mot A .

$G = \rho \cdot A \cdot l \cdot g$ ($\rho, g \text{ o } A \text{ konst}$) G dir prop mot l .

Paralellkraft system



Det helas moment = summan av delarnas moment.

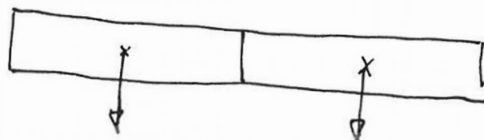
Resultant: $\downarrow: R = F_1 + F_2$

$\circlearrowleft: R \cdot X_R = F_1 \cdot X_1 + F_2 \cdot X_2$

$$X_R = \frac{F_1 X_1 + F_2 X_2}{F_1 + F_2}$$

Olika densitet

l_1, ρ_1
 A, g

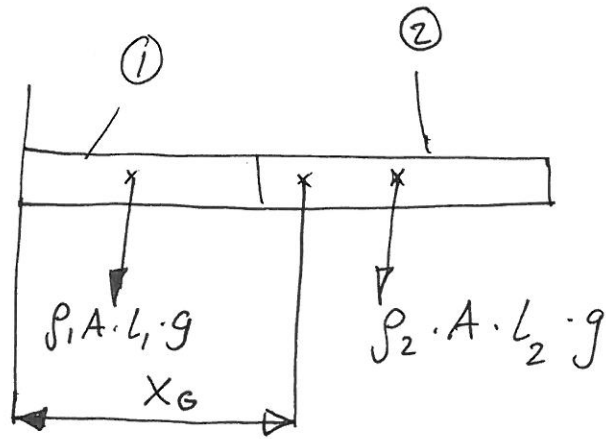


\Rightarrow Ny sida.

1.5) Olika densitet samma tvärsnittsarea A

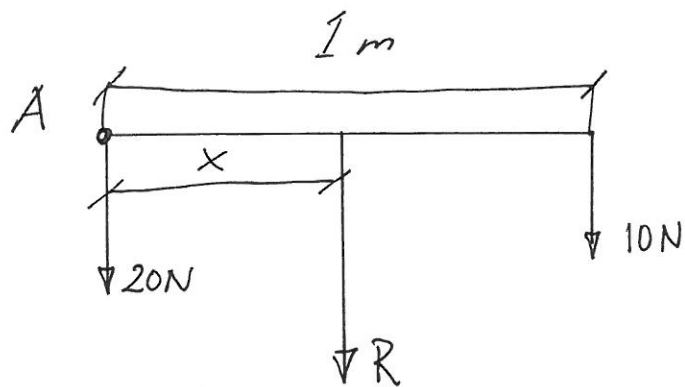
F4

l_1
 $A_1 = A$
 ρ_1
 g



l_2
 $A_2 = A$
 ρ_2
 g

② Ex)

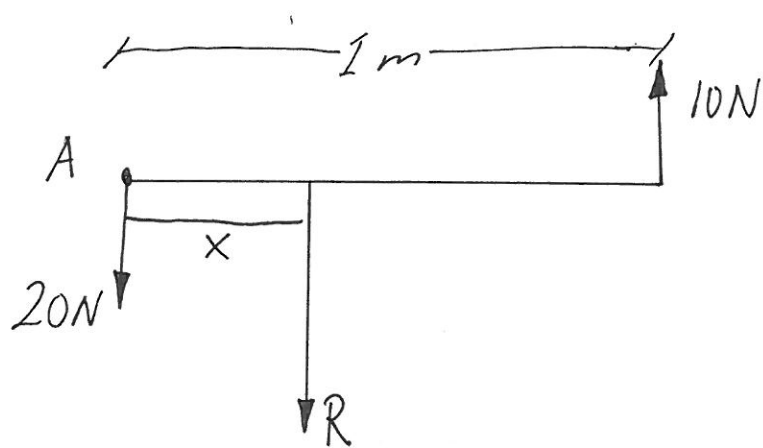


$$\downarrow: R = 20 + 10 = 30 \text{ N}$$

$$\curvearrow A: R \cdot x = 20 \cdot 0 + 10 \cdot 1$$

$$x = \frac{10}{R} = \frac{10}{30} = \frac{1}{3} \text{ m}$$

Ex)



$$\downarrow: R = 20 - 10 = 10 \text{ N}$$

$$\curvearrow A: R \cdot x = 20 \cdot 0 - 10 \cdot 1$$

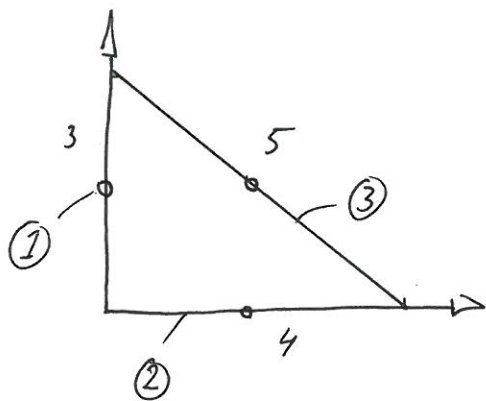
$$x = \frac{-10}{R} = \frac{-10}{10} = -1 \text{ m} \quad \left(\begin{array}{l} \text{till vänster om} \\ A \end{array} \right)$$

46) Ex)

Linje - Träd Längd

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$$(l_1 + l_2 + l_3) X_G = l_1 \cdot X_1 + l_2 \cdot X_2 + l_3 \cdot X_3$$



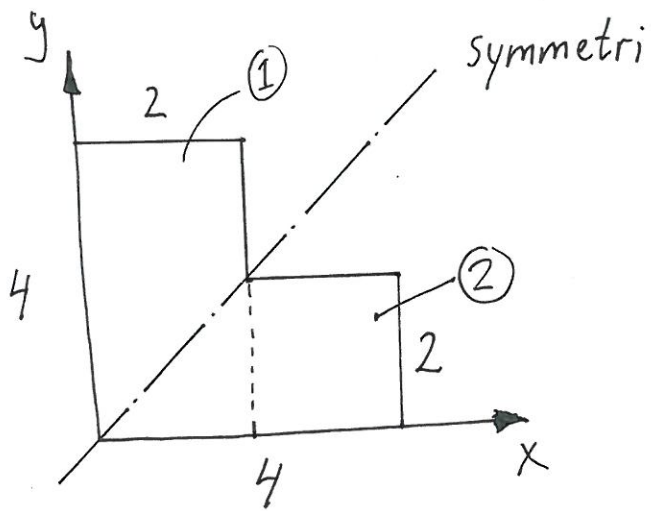
$$(3 + 4 + 5) X_G = 3 \cdot 0 + 4 \cdot 2 + 5 \cdot 2$$

$$X_G = \frac{18}{12} = 1,5$$

$$12 \cdot y_G = \overbrace{3 \cdot 1,5}^{4,5} + 4 \cdot 0 + \overbrace{5 \cdot 1,5}^{7,5}$$

$$y_G = \frac{12}{12} = 1,0$$

5 Ex Area:

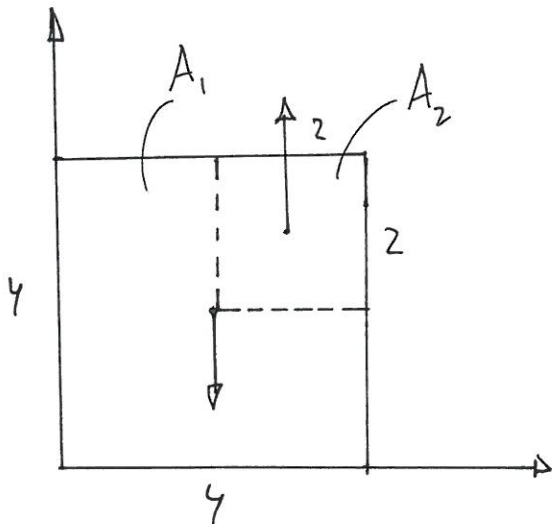


$$(A_1 + A_2) \cdot X_G = A_1 \cdot X_1 + A_2 \cdot X_2 \Rightarrow (2 \cdot 4 + 2 \cdot 2) X_G = 2 \cdot 4 \cdot 1 + 2 \cdot 2 \cdot 3$$
$$X_G = \frac{20}{12} = \frac{5}{3} = 1,67$$

$$12 \cdot y_G = 8 \cdot 2 + 4 \cdot 1$$

$$y_G = \frac{20}{12} = \frac{5}{3} = 1,67$$

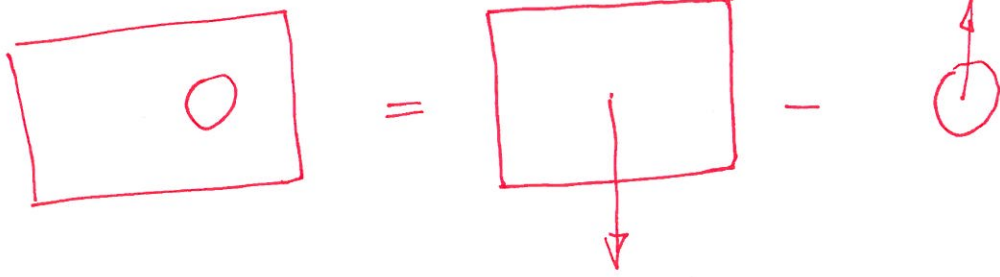
Alt.



$$(4 \cdot 4 - 2 \cdot 2) \cdot X_G = 4 \cdot 4 \cdot 2 - 2 \cdot 2 \cdot 3$$

$$X_G = \frac{20}{12} = 1,67$$

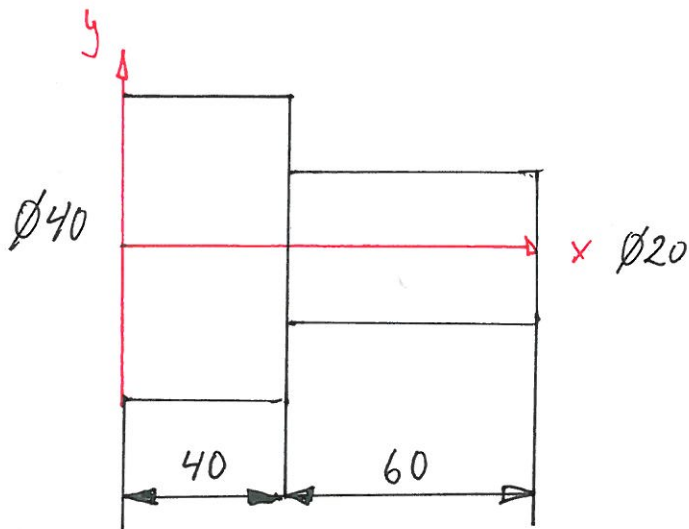
6



6

Volym

[mm]



$$(V_1 + V_2) \cdot X_G = V_1 \cdot X_1 + V_2 \cdot X_2$$

$$(\pi \cdot 20^2 \cdot 40 + \pi \cdot 10^2 \cdot 60) X_G = \pi \cdot 20^2 \cdot 40 \cdot 20 + \pi \cdot 10^2 \cdot 60 \cdot 70$$

$$X_G = \frac{740000}{22000} = 33,6 \text{ mm.}$$

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