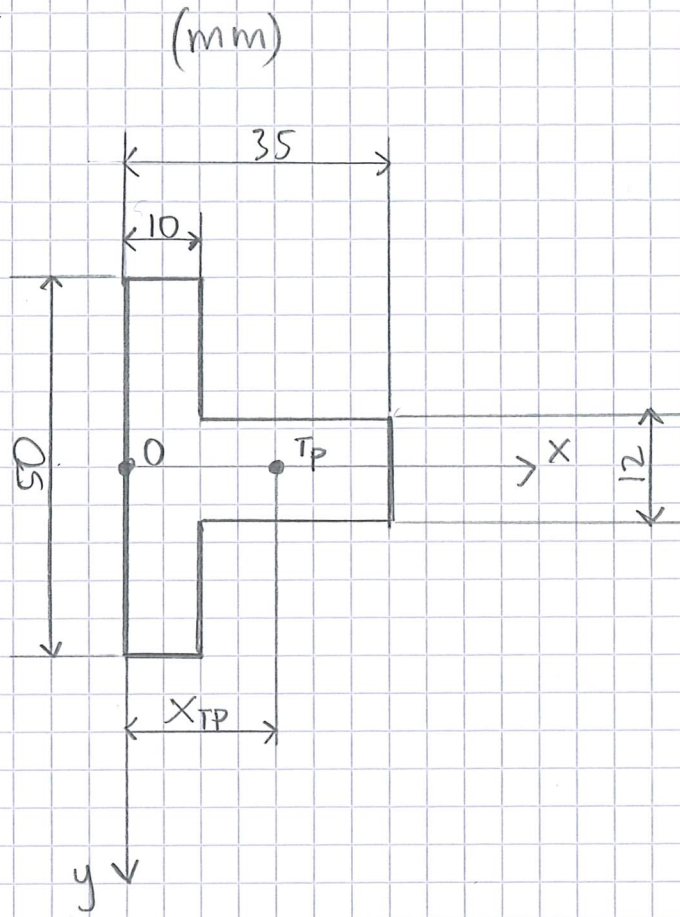


①

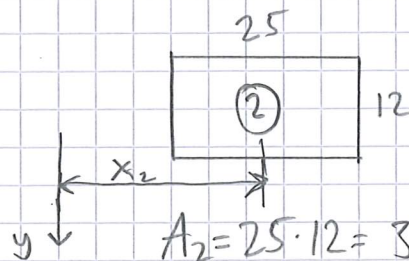


Delat ugg. i delareor



$$A_1 = 50 \cdot 10 = 500 \text{ mm}^2$$

$$X_1 = 5 \text{ mm}$$



$$A_2 = 25 \cdot 12 = 300 \text{ mm}^2$$

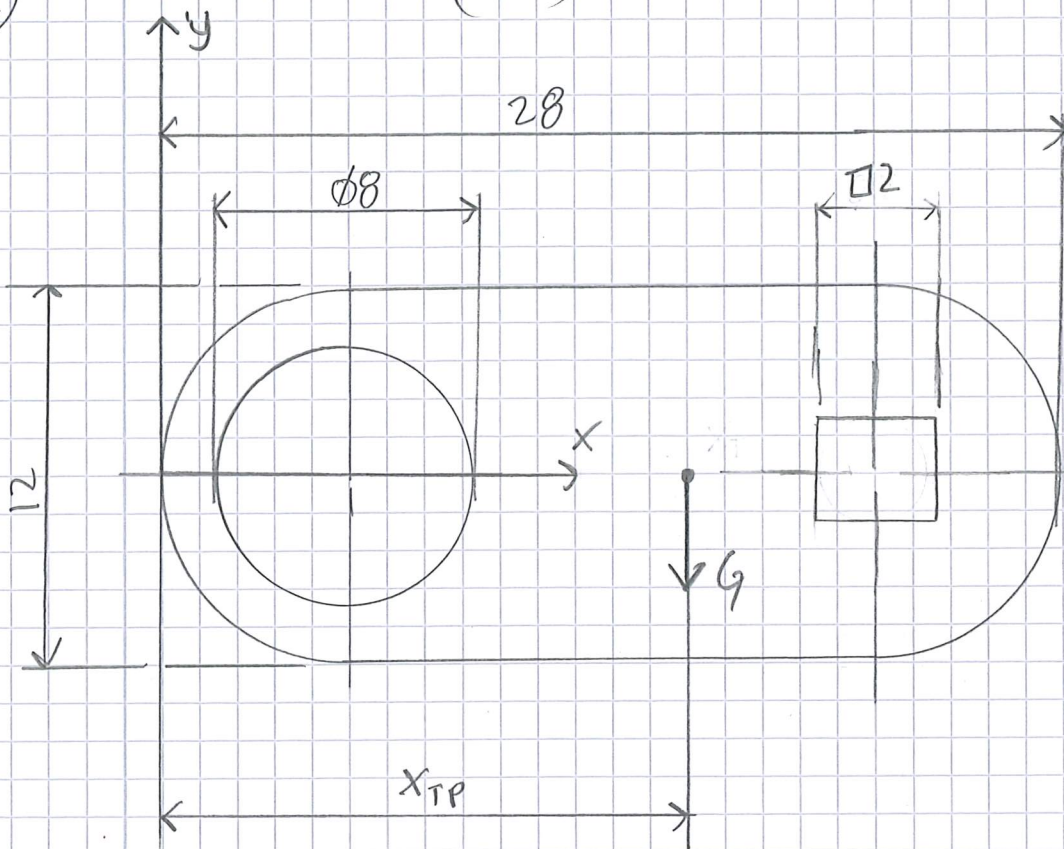
$$X_2 = 22,5 \text{ mm}$$

$$X_{TP} = \frac{A_1 \cdot X_1 + A_2 \cdot X_2}{A_1 + A_2} = \frac{500 \cdot 5 + 300 \cdot 22,5}{500 + 300} \approx \underline{\underline{11,56 \text{ mm}}}$$

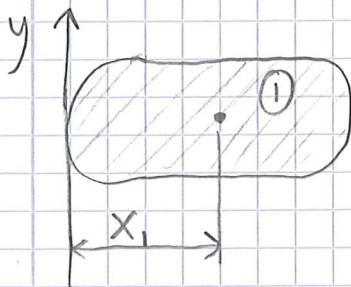
$$y_{TP} = \underline{\underline{0 \text{ mm}}}$$

2

(mm)

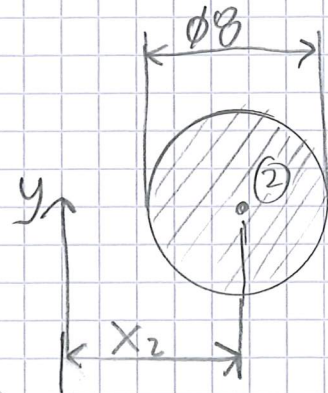


Dela upp i delareor



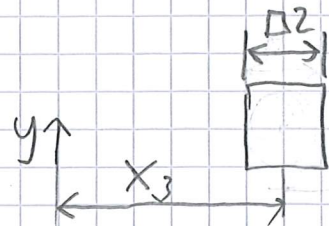
$$A_1 = 12 \cdot 16 + \frac{\pi \cdot 12^2}{4} = 192 + 36\pi \text{ mm}^2$$

$$X_1 = 14 \text{ mm}$$



$$A_2 = \frac{\pi \cdot 8^2}{4} = 16\pi \text{ mm}^2$$

$$X_2 = 6 \text{ mm}$$



$$A_3 = 4 \text{ mm}^2$$

$$X_3 = 28 - 6 = 22 \text{ mm}$$

1/2

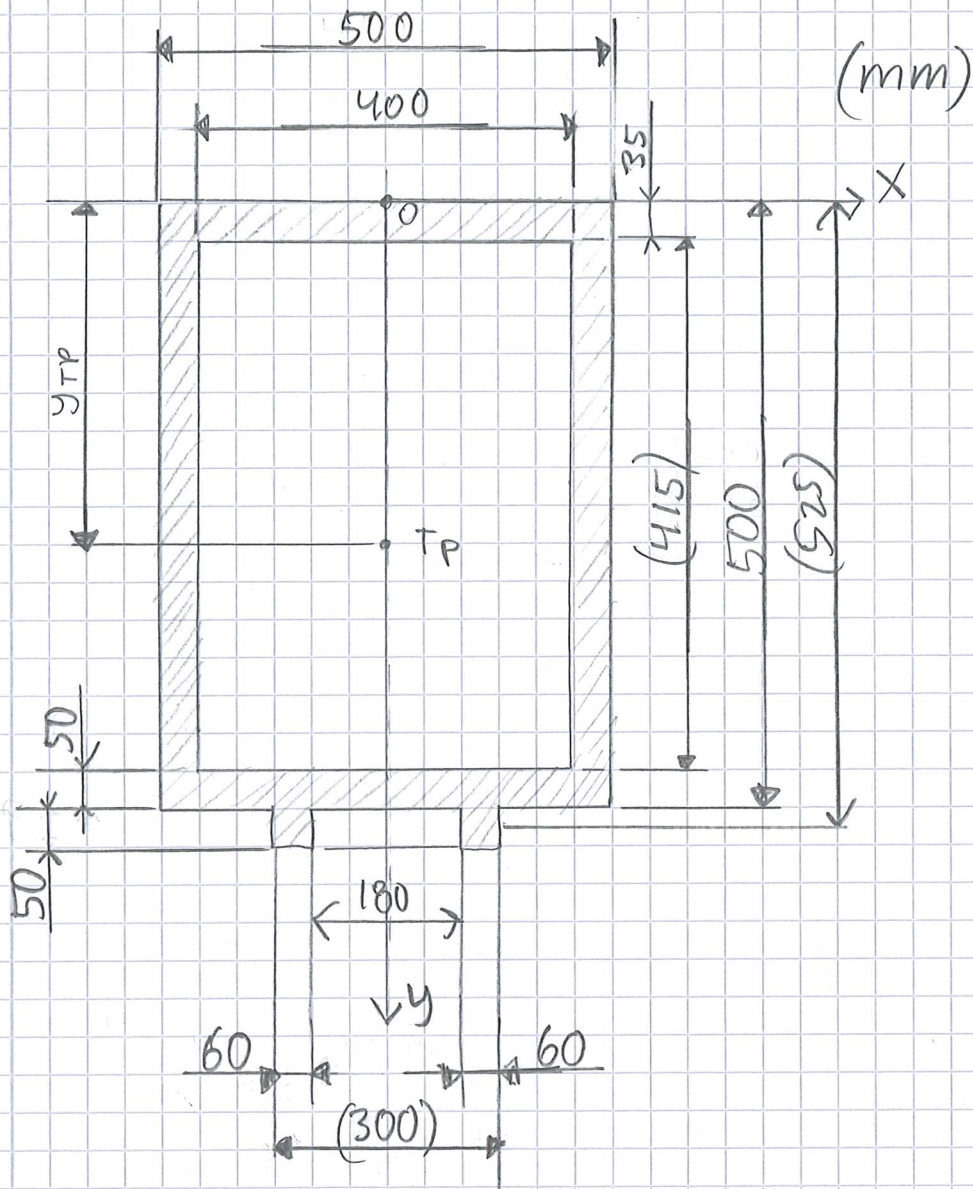
②

V_i tar bort materia, ...

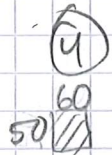
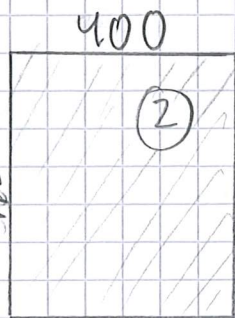
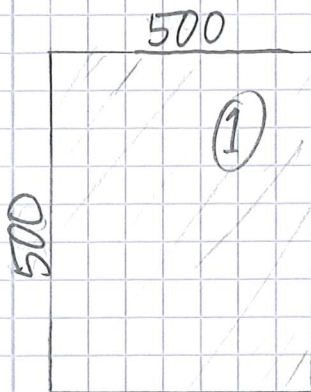
$$X_{TP} = \frac{A_1 \cdot X_1 - A_2 \cdot X_2 - A_3 \cdot X_3}{A_1 - A_2 - A_3} =$$

$$= \frac{(192 + 36\pi) \cdot 14 - 16\pi \cdot 6 - 4 \cdot 22}{(192 + 36\pi) - 16\pi - 4} \approx \underline{\underline{15,48 \text{ mm}}}$$

3



Delapan segi delapan



$$A_1 = 500 \cdot 500 = 250\,000 \text{ mm}^2$$

$$A_2 = 400 \cdot 415 = 166\,000 \text{ mm}^2$$

$$A_3 = A_4 = 50 \cdot 60 = 3\,000 \text{ mm}^2$$

$$X_1 = 250 \text{ mm}$$

$$X_2 = 242,5 \text{ mm}$$

$$X_3 = X_4 = 525 \text{ mm}$$

1/2

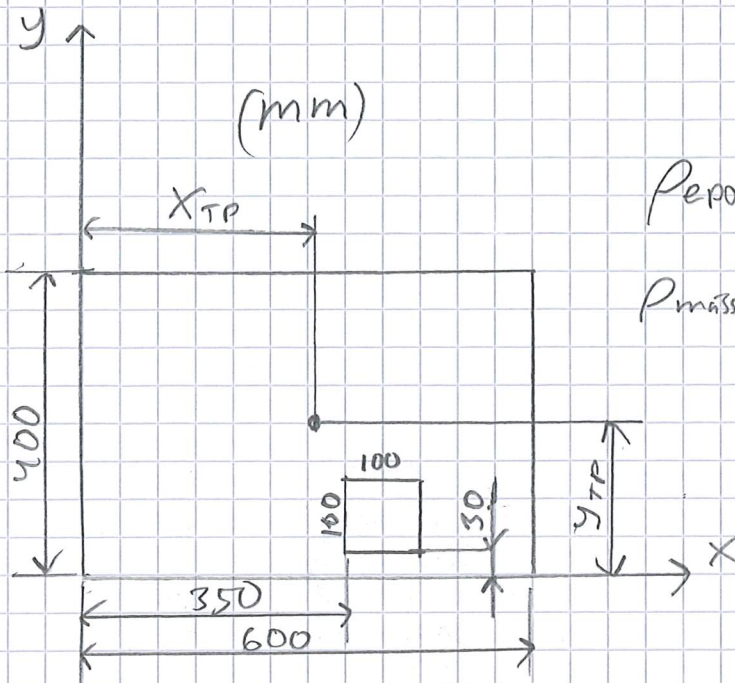
3

$$y_{TP} = \frac{A_1 \cdot X_1 - A_2 \cdot X_2 + A_3 \cdot X_3 + A_4 \cdot X_4}{A_1 - A_2 + A_3 + A_4} =$$

$$= \frac{250\,000 \cdot 250 - 166\,000 \cdot 200 + 3\,000 \cdot 525 + 3\,000 \cdot 525}{250\,000 - 166\,000 + 3\,000 + 3\,000} \approx$$

$$\approx \underline{\underline{282,17 \text{ mm}}}$$

4

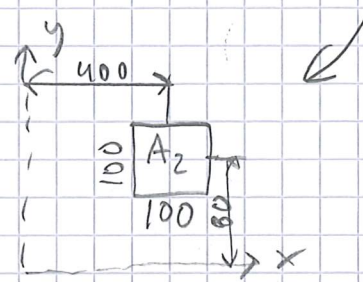
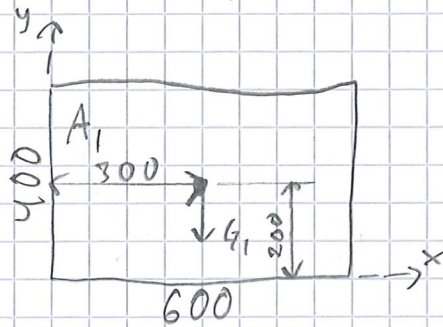


$$\rho_{\text{epoxy}} = \rho_e = 1,0 \text{ kg/dm}^3$$

$$\rho_{\text{mässing}} = \rho_m = 8,7 \text{ kg/dm}^3$$

Delar upp i areor

Först placeras en del bort; epoxy.



$$A_1 = 400 \cdot 600 = 240\,000 \text{ mm}^2$$

$$A_2 = 100 \cdot 100 = 10\,000 \text{ mm}^2$$

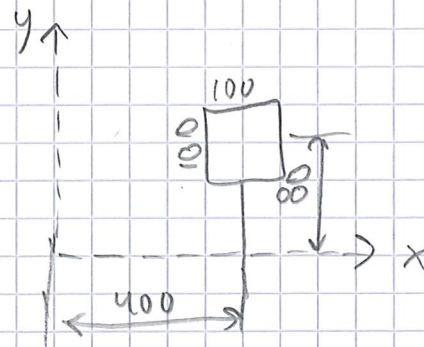
$$X_1 = 300 \text{ mm}$$

$$X_2 = 400 \text{ mm}$$

$$y_1 = 200 \text{ mm}$$

$$y_2 = 80 \text{ mm}$$

Sedan ersätts "hållet" med mässing.



$$A_3 = 100 \cdot 100 = 10\,000 \text{ mm}^2$$

$$X_3 = 400 \text{ mm}$$

$$y_3 = 80 \text{ mm}$$

1/2

4)

$$x_{TP} = \frac{\rho_e [A_1 \cdot x_1 - A_2 \cdot x_2] + \rho_m [A_3 \cdot x_3]}{\rho_e [A_1 - A_2] + \rho_m \cdot A_3} = \text{De olika materialen "viktas" med dess densitet.}$$

$$= \frac{1,0 [240\,000 \cdot 300 - 10\,000 \cdot 400] + 8,7 [10\,000 \cdot 400]}{1,0 [240\,000 - 10\,000] + 8,7 \cdot 10\,000} \approx 324,3 \text{ mm}$$

$$y_{TP} = \frac{\rho_e [A_1 \cdot y_1 - A_2 \cdot y_2] + \rho_m [A_3 \cdot y_3]}{\rho_e [A_1 - A_2] + \rho_m \cdot A_3} =$$

$$= \frac{1,0 [240\,000 \cdot 200 - 10\,000 \cdot 80] + 8,7 [10\,000 \cdot 80]}{1,0 [240\,000 - 10\,000] + 8,7 \cdot 10\,000} \approx 170,1 \text{ mm}$$

$$z_{TP} = \frac{500}{2} = 250 \text{ mm (halva djupet)}$$