UDS

Licenciatura en Arquitectura

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Materia:

Estática para la arquitectura

Nombre del profesor:

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Cuatrimestre:

Tercero

Nombre de la actividad:

Unidad II: Centros de Gravedad (Ejercicios)

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EJERCICIO 1:

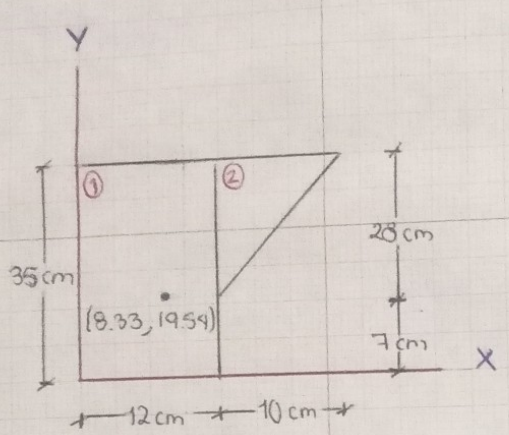

Figura 1:

$C_{X_1} = 6\ cm$

$\frac{b}{2} = \frac{12\ cm}{2} = 6\ cm$

$C_{Y_1} = 17.5\ cm$

$\frac{h}{2} = \frac{35\ cm}{2} = 17.5\ cm$

$A_1 = 420\ cm^2$

$b \times h = (12\ cm)(35\ cm) = 420\ cm^2$

Figura 2:

$C_{X_2} = 15.33\ cm$

$\frac{b}{3} = \frac{10\ cm}{3} = 3.33\ cm$

$3.33\ cm + 12\ cm = 15.33\ cm$

$C_{Y_2} = 25.66\ cm$

$\frac{h}{3} = \frac{28\ cm}{3} = 9.33\ cm$

$9.33\ cm \times 2 = 18.66\ cm + 7 = 25.66\ cm$

$A_2 = 140\ cm^2$

$\frac{b \times h}{2} = \frac{(10\ cm)(28\ cm)}{2} = 140\ cm^2$

Fórmula:

$$C_X = \frac{(420\ cm^2 \cdot 6\ cm) + (140\ cm^2 \cdot 15.33\ cm)}{420\ cm^2 + 140\ cm^2} = \frac{4,666.2\ cm}{560\ cm^2} = \boxed{8.33\ cm}$$

$$C_Y = \frac{(420\ cm^2 \cdot 17.5\ cm) + (140\ cm^2 \cdot 25.66\ cm)}{420\ cm^2 + 140\ cm^2} = \frac{10942.4\ cm}{560\ cm^2} = \boxed{19.54\ cm}$$

Ejercicio 2:

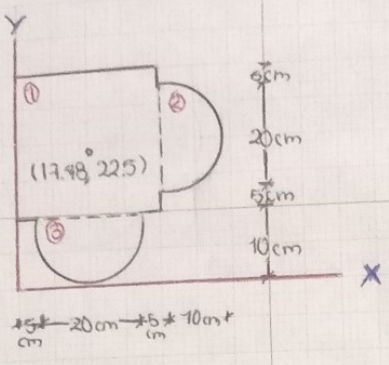

Figura 1:

$C_{X1} = 15\ cm$

$\frac{b}{2} = \frac{30\ cm}{2} = 15\ cm$

$C_{Y1} = 25\ cm$

$\frac{h}{2} = \frac{30\ cm}{2} = 15\ cm$

$15\ cm + 10\ cm = 25\ cm$

$A_1 = 900\ cm^2$

$b \times h = 30\ cm \times 30\ cm = 900\ cm^2$

Figura 2:

$C_{X2} = 34.244\ cm$

$\frac{4R}{3\pi} = \frac{4(10)}{3\pi} = 4.244\ cm$

$4.244\ cm + 30\ cm = 34.244\ cm$

$C_{Y2} = 25\ cm$

$\frac{h}{2} = \frac{20\ cm}{2} = 10\ cm$

$10\ cm + 15\ cm = 25\ cm$

$A_2 = 157.08\ cm^2$

$\frac{\pi \times r^2}{2} = \frac{\pi\ (10)^2 cm}{2} = 157.08\ cm^2$

Figura 3:

$C_{X3} = 5.76\ cm$

$\frac{4R}{3\pi} = \frac{4(10)}{3\pi} = 4.244\ cm$

$10 - 4.244\ cm = 5.76\ cm$

$C_{X3} = 15\ cm$

$\frac{h}{2} = \frac{20\ cm}{2} = 10\ cm$

$10\ cm + 5\ cm = 15\ cm$

$A_3 = 157.08\ cm^2$

$\frac{\pi \cdot r^2}{2} = \frac{\pi \cdot (10)^2 cm}{2} = 157.08\ cm^2$

Fórmula:

$$C_X = \frac{(900\ cm^2 \cdot 15\ cm) + (157.08\ cm^2 \cdot 34.244\ cm) + (157.08\ cm^2 \cdot 15\ cm)}{900\ cm^2 + 157.08\ cm^2 + 157.08\ cm^2} = \frac{21235.24752\ cm^2 \cdot cm}{1214.16\ cm^2}$$

$C_X = \boxed{17.48\ cm}$

$$C_Y = \frac{(900\ cm^2 \cdot 25\ cm) + (157.08\ cm^2 \cdot 25\ cm) + (157.08\ cm^2 \cdot 5.76\ cm)}{900\ cm^2 + 157.08\ cm^2 + 157.08\ cm^2} = \frac{27331.7808\ cm^2 \cdot cm}{1214.16\ cm^2}$$

$C_Y = \boxed{22.5\ cm}$