UDS

Licenciatura en Arquitectura

Nombre del alumno:

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Materia:

Resistencia de materiales de construcción

Nombre del profesor:

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Cuatrimestre:

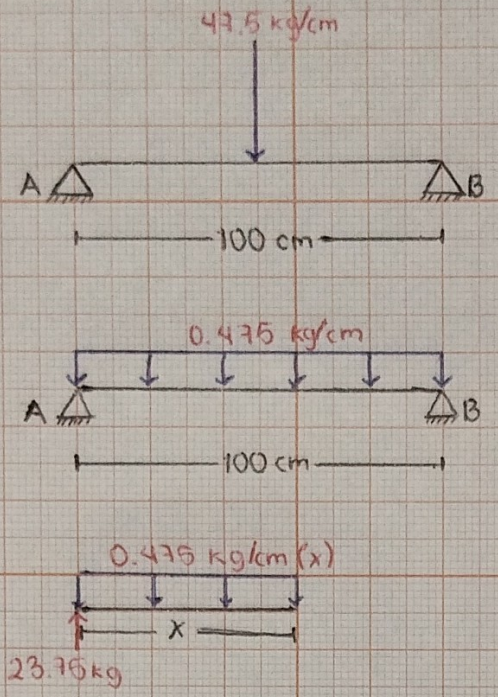
Cuarto

Nombre de la actividad:

Unidad IV: Esfuerzos y Deformaciones (Ejercicios)

Fecha: 03 de diciembre de 2023

MÉTODO POR ECUACIONES



① Carga distribuida

$$\frac{47.5\ kg}{100\ cm} = 0.475\ kg/cm$$

② Reacciones → $RA = RB = \frac{qL}{2}$

$$\frac{0.475\ kg/cm\ (100\ cm)}{2} = 23.75\ kg$$

③ Ecuación de cortante → $\Sigma FY = 0$

$$23.75\ kg - [0.475\ kg/cm\ (x)] - V = 0$$

$$\leftarrow V = 23.75\ kg - [0.475\ kg/cm\ (x)]$$

④ Ecuación en momentos → $\Sigma M = 0$

$$-23.75\ kg\ (x) + [0.475\ kg/cm\ (x)(x/2)] + M = 0$$

$$-23.75\ kg\ (x) + \frac{[0.475\ kg/cm\ (x)^2]}{2} + M = 0$$

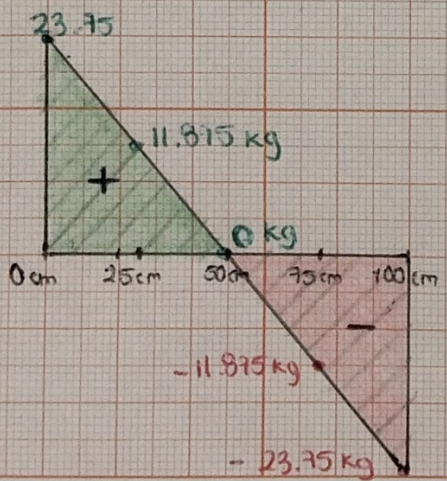
$$-23.75\ kg\ (x) + 0.2375\ kg/cm\ (x^2) + M = 0$$

$$\leftarrow M = 23.75\ kg\ (x) - 0.2375\ kg/cm\ (x^2)$$

⑤ Gráfica de cortante

X	0 cm	25 cm	50 cm	75 cm	100 cm
V	23.75 kg	11.875 kg	0 kg	-11.875 kg	-23.75 kg

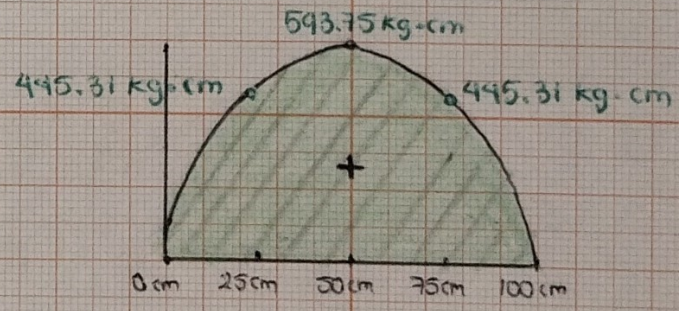
$V = 23.75\ kg - [0.475\ kg/cm\ (0\ cm)] = 23.75\ kg$
$V = 23.75\ kg - [0.475\ kg/cm\ (25\ cm)] = 11.875\ kg$
$V = 23.75\ kg - [0.475\ kg/cm\ (50\ cm)] = 0\ kg$
$V = 23.75\ kg - [0.475\ kg/cm\ (75\ cm)] = -11.875\ kg$
$V = 23.75\ kg - [0.475\ kg/cm\ (100\ cm)] = -23.75\ kg$



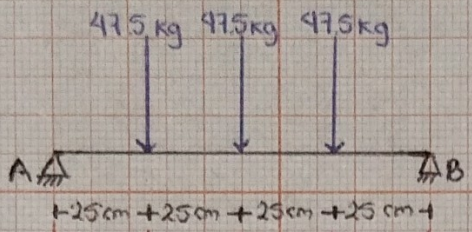
⑥ Gráfica de momentos

X	0 cm	25 cm	50 cm	75 cm	100 cm
M	0 kg-cm	445.31 kg-cm	593.75 kg-cm	445.31 kg-cm	0 kg-cm

$M = 23.75\ kg\ (0) - 0.2375\ kg/cm\ (0\ cm)^2 = 0\ kg \cdot cm$
$M = 23.75\ kg\ (25\ cm) - 0.2375\ kg/cm\ (25\ cm^2) = 445.31\ kg \cdot cm$
$M = 23.75\ kg\ (50\ cm) - 0.2375\ kg/cm\ (50\ cm^2) = 593.75\ kg \cdot cm$
$M = 23.75\ kg\ (75\ cm) - 0.2375\ kg/cm\ (75\ cm^2) = 445.31\ kg \cdot cm$
$M = 23.75\ kg\ (100\ cm) - 0.2375\ kg/cm\ (100\ cm^2) = 0\ kg \cdot cm$



MÉTODO POR ÁREAS



① Reacciones

$RA = RB = \frac{37}{2}$

$\frac{3(47.5\ kg)}{2} = 71.25\ kg$

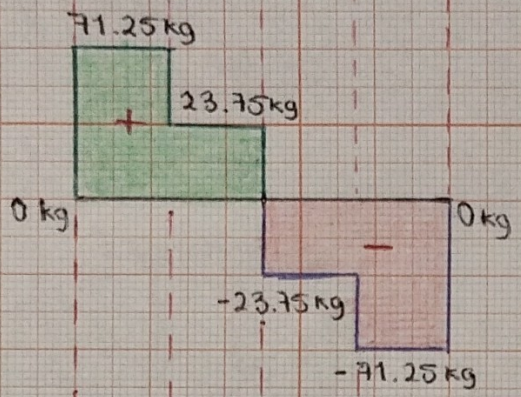
$0\ kg + (25\ cm \times 71.25\ kg) = 1781.25\ kg \cdot cm$

$1781.25\ kg + (25\ cm \times 23.75\ kg) = 2375\ kg \cdot cm$

$2375\ kg + (25\ cm \times -23.75\ kg) = 1781.25\ kg \cdot cm$

$1781.25\ kg + (25\ cm \times -71.25\ kg) = 0\ kg \cdot cm$

V)



← Comprobación

$M = \frac{7 \cdot l}{2}$

$M = \frac{(47.5\ kg)(100\ cm)}{2}$

$M = 2375\ kg \cdot cm$

M)