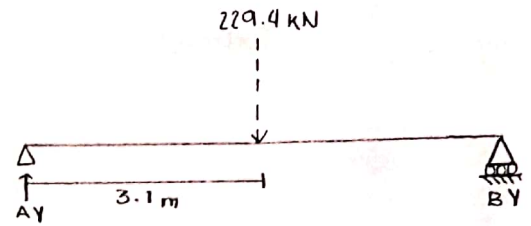
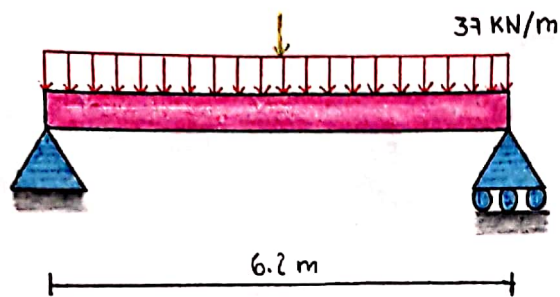


VIGA CON CARGA DISTRIBUIDA



$$\sum F_y = 0$$

$$A_y + B_y - 229.4 \text{ kN} = 0$$

$$\sum \mathcal{M}_A = 0$$

$$-229.4 \text{ kN}(3.1 \text{ m}) - B_y(6.2 \text{ m}) = 0$$

$$-711.14 \text{ kN/m} + 6.2 B_y = 0$$

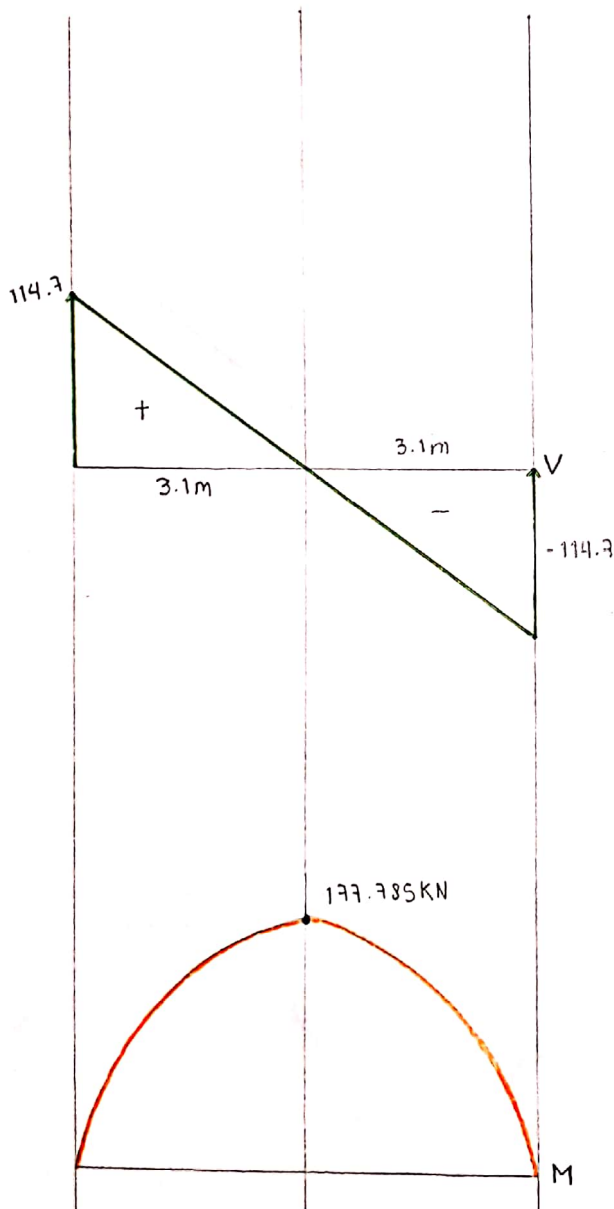
$$B_y = \frac{711.14}{6.2}$$

$$B_y = 114.7 \text{ kN}$$

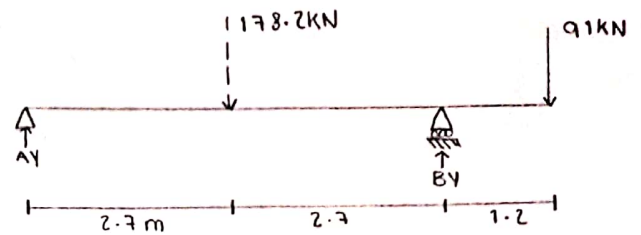
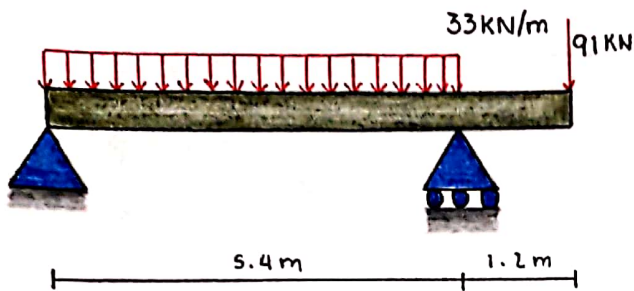
$$A_y + 114.7 \text{ kN} - 229.4 \text{ kN}$$

$$A_y = 229.4 \text{ kN} - 114.7 \text{ kN}$$

$$A_y = 114.7 \text{ kN}$$



VIGA CON CARGA COMBINADA



$$A_x = 0$$

$$+\uparrow \sum F_y = 0$$

$$A_y + B_y - 178.2 \text{ kN} - 91 \text{ kN} = 0$$

$$+\circlearrowleft \sum M_A = 0$$

$$-178.2 \text{ kN}(2.7 \text{ m}) - 91 \text{ kN}(6.6 \text{ m}) + B_y(5.4) = 0$$

$$-481.14 \text{ kN}\cdot\text{m} - 600.6 \text{ kN}\cdot\text{m} + 5.4 B_y = 0$$

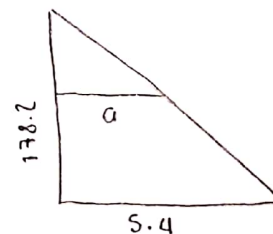
$$B_y = \frac{1081.74}{5.4}$$

$$B_y = 200.32 \text{ kN}$$

$$A_y + 200.32 \text{ kN} - 178.2 \text{ kN} - 91 \text{ kN} = 0$$

$$A_y = 68.88$$

$$A_y = 68.88 \text{ kN}$$

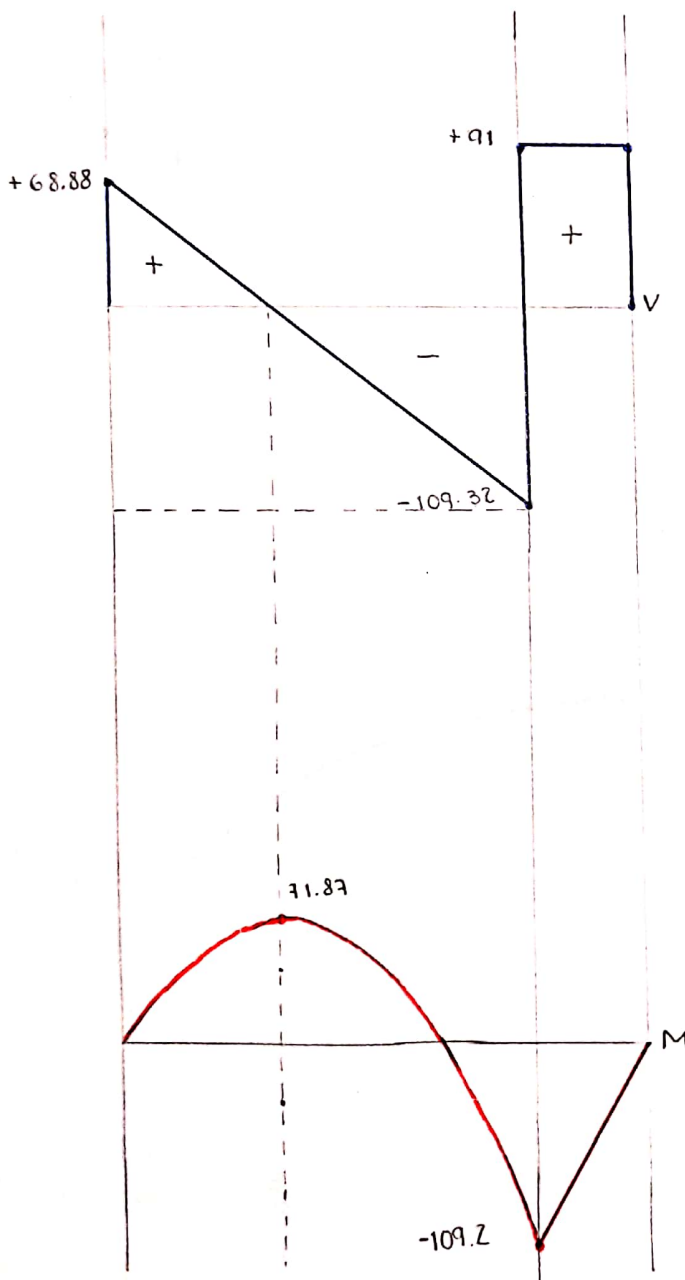


$$\frac{178.2}{5.4} = \frac{68.88}{a}$$

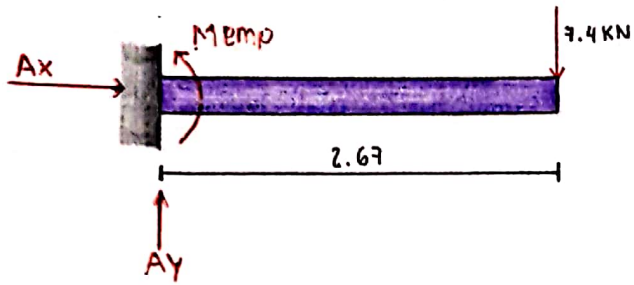
$$a = \frac{68.88(5.4)}{178.2}$$

$$a = 2.087 \text{ m}$$

$$b = 3.313 \text{ m}$$



VIGA EMPOTRADA



$$A_x = 0$$

$$+\uparrow \sum F_y = 0$$

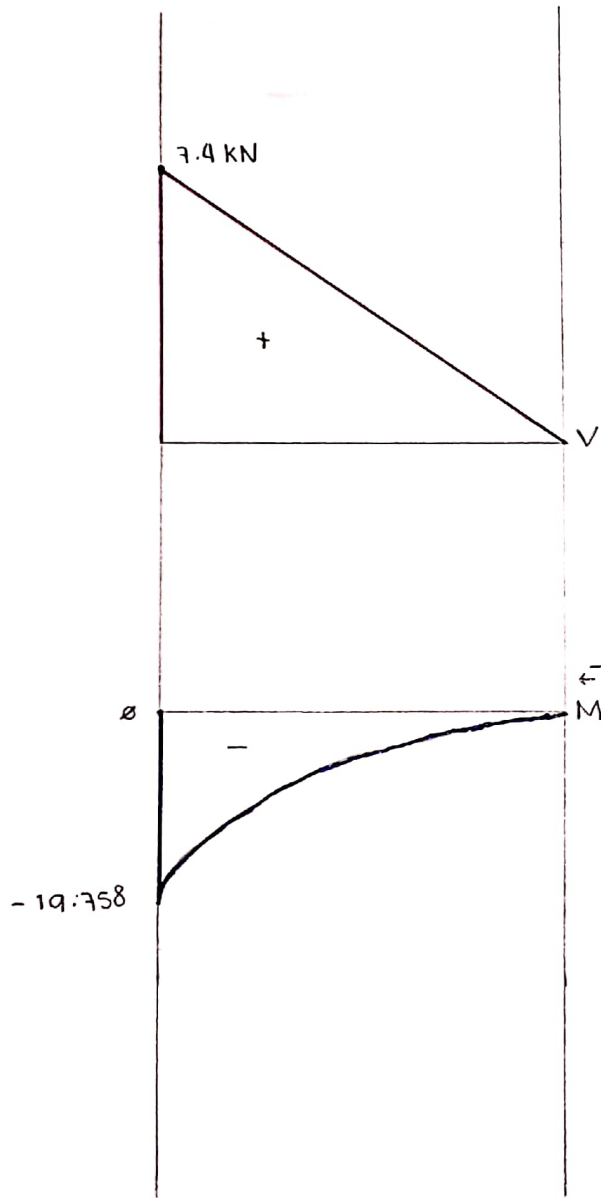
$$-7.4 \text{ kN} + A_y = 0$$

$$A_y = 7.4 \text{ kN}$$

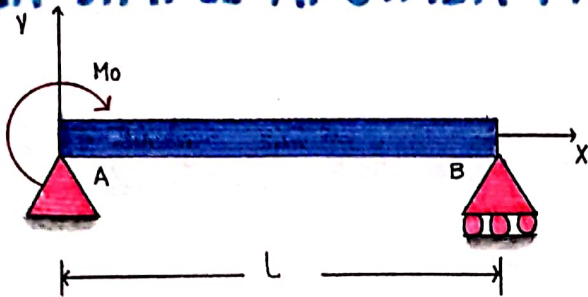
$$\sum M_A = 0$$

$$(2.67) \cdot 7.4 \text{ kN} + M_{\text{empa}} = 0$$

$$M_{\text{empa}} = -19.758 \text{ kN/m}$$



VIGA SIMPLE APOYADA MOMENTO HORARIO EN "A".



$$L = 8.6 \text{ m}$$

$$x = 3.63 \text{ m}$$

$$EI = 20.6 \times 10^{10} \text{ Nm}^2 \text{ Acero aleado}$$

$$M_0 = 7.85 \text{ N}$$

DEFLEXION

$$y_{AB} = \frac{(-7.85 \text{ N})(3.63)}{6(8.6)(20.6 \times 10^{10})} (2(8.6)^2 - 3(8.6)(3.63) + (3.63)^2)$$

$$\frac{-28.4955}{1.0629 \times 10^{13}} (147.92 - 93.654 + 13.1769)$$

$$\frac{-2.6309 \times 10^{-12} (67.4429)}{1.0629 \times 10^{13}} = -1.80807 \text{ m}$$

$$y_{\max} = \frac{(-7.85)(8.6)^2}{9\sqrt{3} \cdot 20.6 \times 10^{10}}$$

$$\frac{-580.586}{3.2112 \times 10^{12}} = -1.808003 \text{ m}$$

PENDIENTE

$$\theta_{AB} = \frac{-7.85}{6(20.6 \times 10^{10})(8.6)} (2(8.6)^2 - 6(8.6)(3.63) + 3(3.63)^2)$$

$$\frac{-7.85}{1.0629 \times 10^{13}} (147.92 - 187.308 + 39.5307)$$

$$\frac{-7.3854 \times 10^{-13} (0.1477)}{1.0629 \times 10^{13}} = -1.0538 \times 10^{-13}$$

$$\theta_A = \frac{-7.85(8.6)}{3(20.6 \times 10^{10})}$$

$$= -1.0923 \times 10^{-10}$$

$$\theta_B = \frac{7.85(8.6)}{6(20.6 \times 10^{10})}$$

$$= 5.46197 \times 10^{-11}$$

MOMENTO

$$M_{AB} = \frac{(7.85)}{8.6} (8.6 - 3.63)$$

$$(0.9127)(4.97) = 4.5361 \text{ Nm}$$

CORTANTE

$$V_{AB} = \frac{-7.85}{8.6}$$

$$= -0.912790 \text{ N}$$

REACCIONES

$$R_A = \frac{-7.85}{8.6}$$

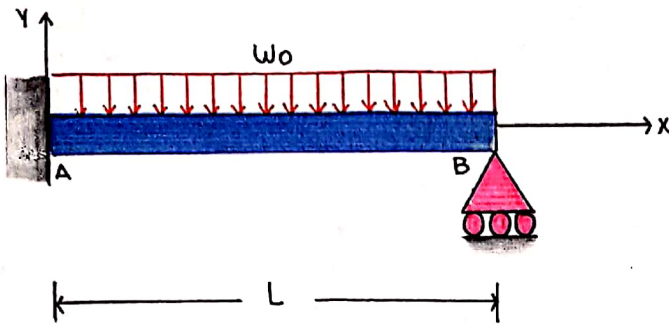
$$= -0.9127 \text{ N}$$

$$R_B = \frac{7.85}{8.6}$$

$$= 0.9127 \text{ N}$$

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VIGA EMPOTRADA/APOYADA CARGA UNIFORME



$$\begin{aligned}
 L &= 11.4 \text{ m} \\
 x &= 4.81 \text{ m} \\
 EI &= 8.82612 \text{ e}^9 \text{ Madera} \\
 M_0 &= 9.76 \text{ N}
 \end{aligned}$$

DEFLEXIÓN

$$\Delta_{AB} = \frac{(-9.76)(4.81)^2}{48(8.82612 \text{ e}^9)} (3(11.4)^2 - 5(11.4)(4.81) + 2(4.81)^2)$$

$$\frac{-225.8083}{3432901.974} (389.88 - 274.17 + 46.2722)$$

$$(-6.57776 \times 10^{-5})(161.9822) = -0.010654 \text{ m}$$

PENDIENTE

$$\theta_{AB} = \frac{(-9.76)(4.81)}{48(8.82612 \text{ e}^9)} (6(11.4)^2 - 15(11.4)(4.81) + 8(4.81)^2)$$

$$\frac{-46.9456}{3432901.974} (779.76 - 872.51 + 185.0888)$$

$$-1.367519 \times 10^{-5} (142.3388) = -1.946510 \times 10^{-3}$$

MOMENTO

$$M_{AB} = \frac{-9.76}{8} ((11.4)^2 - 5(11.4)(4.81) + 4(4.81)^2)$$

$$-1.22 (129.96 - 274.17 + 92.5444)$$

$$-1.22 (-51.6656) = 63.032032 \text{ Nm}$$

CORTANTE

$$V_{AB} = \frac{(9.76)}{8} (5(11.4) - 8(4.81))$$

$$1.22 (57 - 38.48)$$

$$1.22 (23.52) = 28.6944 \text{ N}$$

REACCIONES

$$R_A = \frac{5(9.76)(11.4)}{8} = \frac{556.32}{8} = 69.54 \text{ N}$$

$$R_B = \frac{3(9.76)(11.4)}{8} = \frac{333.792}{8} = 41.72 \text{ N}$$

DALILA FLORES VILLA