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Nombre del tema: Fuerzas Coplanares

Parcial: I

Nombre de la Materia: Resistencia de Materiales de Construcción

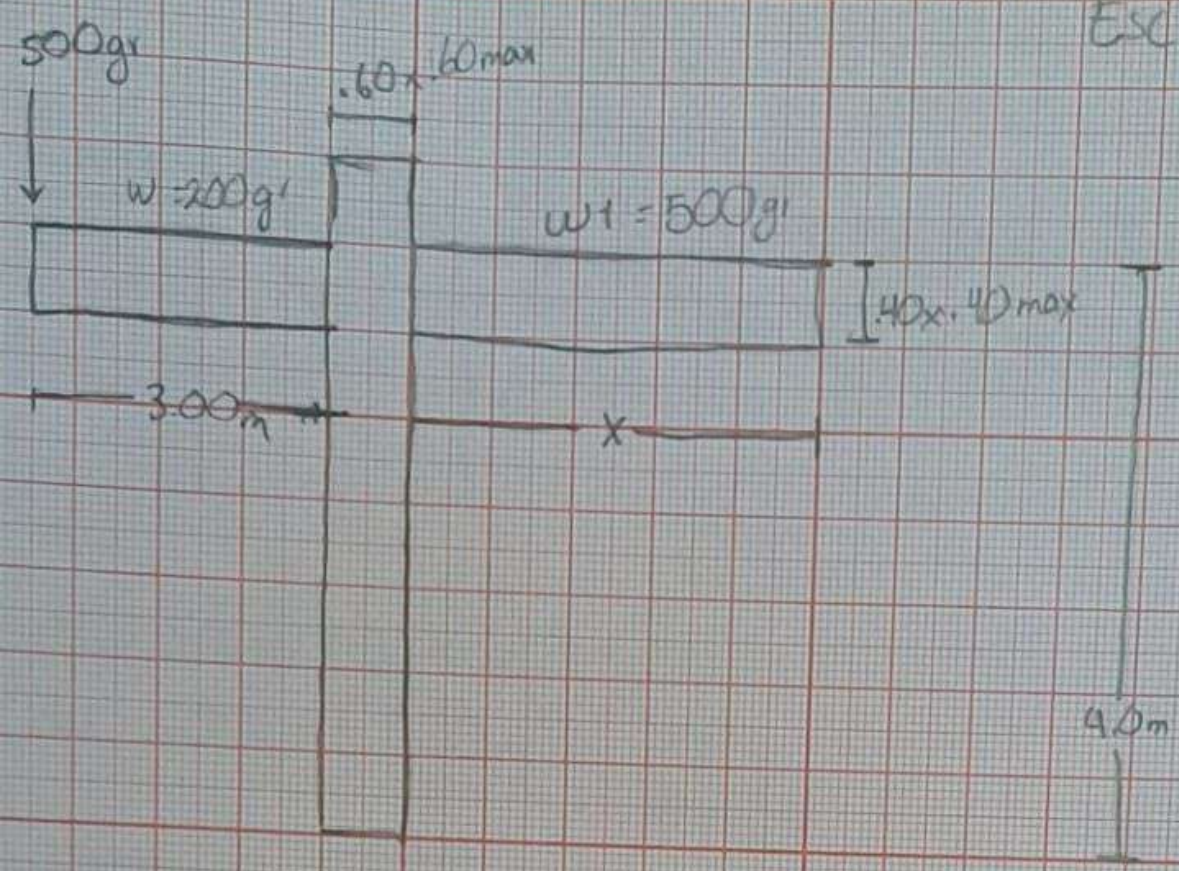
Nombre del profesor: Pedro Alberto Garcia Lopez

Nombre de la Licenciatura: Arquitectura

Cuatrimestre: Cuarto Cuatrimestre

Comitán de Domínguez a 23 de septiembre del 2023.

Esc. 1:50



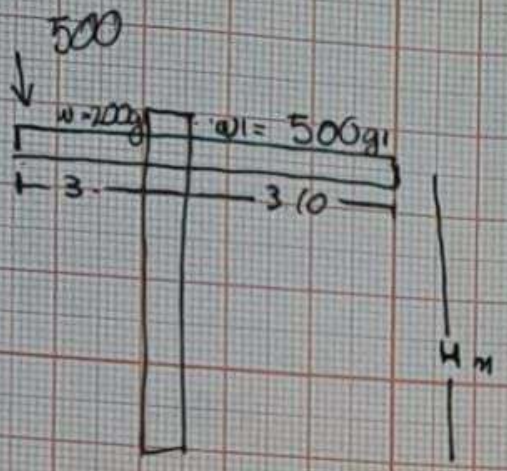
$M1 = (500gr \cdot 1.5m/5) = 900gr$

$M2 = (500gr \cdot 3m) = 1500gr$

$2400gr$

$\frac{\sqrt{2 M_A}}{\omega} \rightarrow \frac{\sqrt{2(2400)}}{500} = 3.0983$

3.1)



$w = 200 gr/m\ (3.00 m) = 600 gr$

$UP = \frac{300}{2} = 1.50\ m/s$

$M_1 = 500 gr\ (3.00 m/s) = 1500 gr$

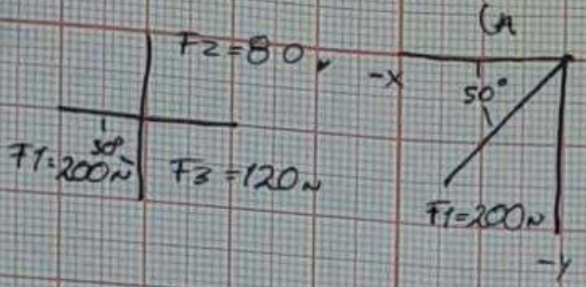
$w = 600 gr\ (1.50 m/s = \frac{900 gr}{2400 gr}$

$\frac{\sqrt{2M_1}}{w} = \frac{\sqrt{2(2400 gr)}}{500} = \sqrt{\frac{4800 gr}{500 gr}} = \sqrt{9.6} = 3.09838$

$w_1 = 500 gr\ (3.00) = 1550 gr$

$UP = \frac{3.10 m/s}{2} = 1.55 m/s$

$w_1 = 1550 gr\ (1.55 m/s) = 2402.5 gr$

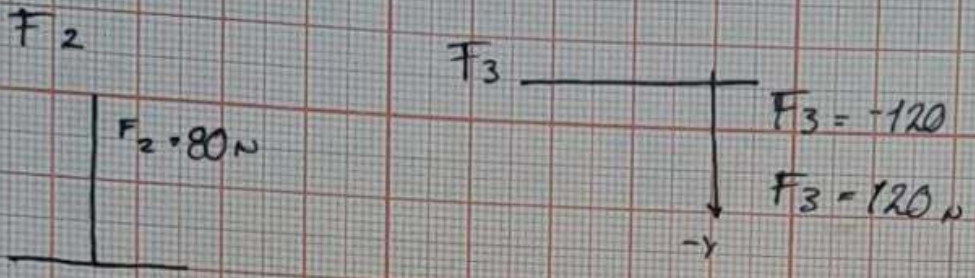


$F_{1X} =$

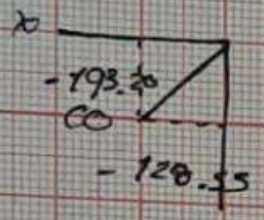
$\cos 50°(200) = 128.55$

$F_{1Y} =$

$\operatorname{Sen} 50°(200) = -153.20$



$\sum FY = -153.20 + 80 - 120 = -193.2$ $\quad \sum FX = -128.55$

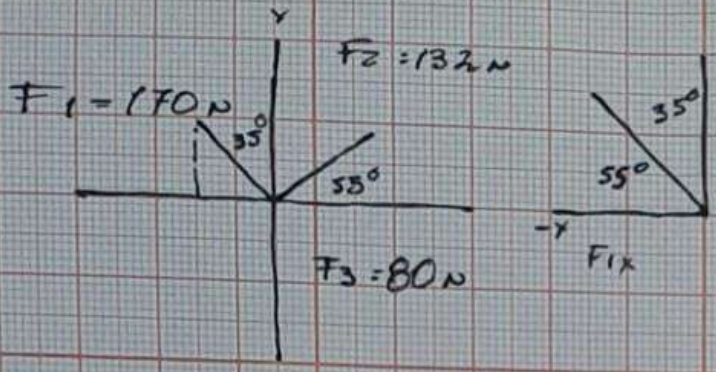


$H = \sqrt{(193.2)^2 + (128.55)^2}$

$\theta \quad \tan\theta = \frac{193.2}{128.55} = \tan\theta = 1.502$

$\theta = \tan^{-1}(1.502)$

$\theta = 56.36$



F1 170

$\cos\theta \frac{CA}{H} \rightarrow \cos 55° = \frac{CA}{170} \rightarrow \cos 55°(170)$

$0.573(170) = CA \rightarrow CA = -97.507$ F1X

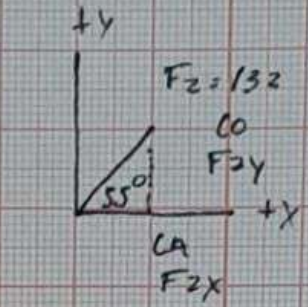
$\text{Sen}\theta = \frac{CO}{H} \rightarrow \text{SEN}55° \frac{CO}{170} \rightarrow \text{Sen}55°(170) CA$

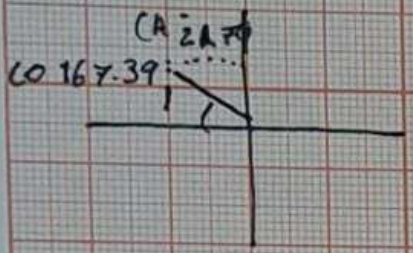
$0.819(170) = CO \rightarrow CA = 139.255 F1y$

F2

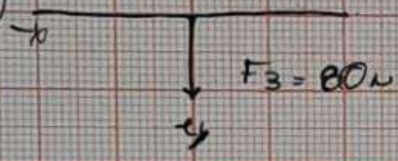
$\cos 55°(132) = CA \rightarrow$ F2X 75.712

$\text{Sen}\ 55°\ (132) = CO \rightarrow$ F2y 108.128





F3



$H \sqrt{CO^2 + CA^2} = \sqrt{(167.39)^2 + (-21.79)^2} = 168.78 N$

$\theta \rightarrow \tan\theta \frac{CO}{CA} \rightarrow \tan\theta = \frac{167.37}{21.79} \rightarrow \tan\theta = 7.690$

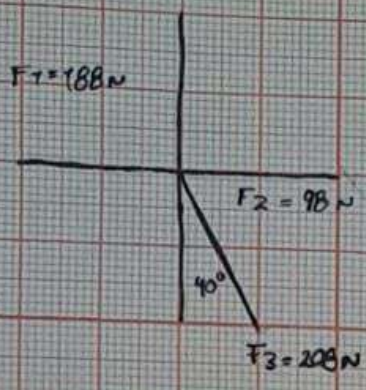
$\theta = \tan^{-1}(7.68) = 82.58°$

$\Sigma F_y = 139.25 + 108.128 - 80$

$\Sigma F_y = 167.378$

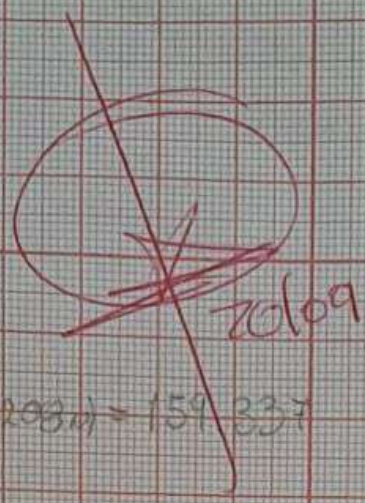
$\Sigma F_x = -97.507 + 75.712$

$\Sigma F_x = -21.195$

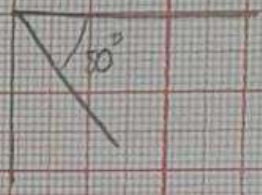


Seno es para X

Coseno es para Y



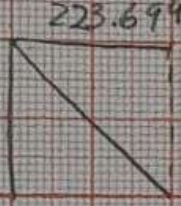
$\frac{\text{Sen } F_{3x}}{208N} \rightarrow \text{Sen } 50°(208N) = 159.337$



$\frac{\text{Cos } F_{3x}}{208N} \quad \text{Cos } 50°(208) = 133.699$

$\Sigma FX = +159.337$

$\Sigma FY = 188 - 98 + 133.699 = 223.699$



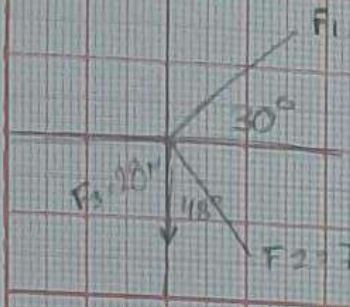
$h = \sqrt{(159.337)^2 + (223.699)^2}$

$h = 274.644\ N$

$\tan\theta\ (-0.712)$

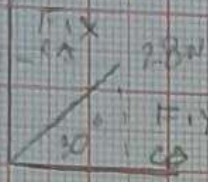
$\theta = -35.461 + 360$

$\theta = 324.538°$



$\Sigma FX = 24.248 N + 52.763 N = 77.01 N$

$\Sigma FY = 14 N - 47.508 - 28 N = -61.508$



$\sin\theta = \frac{F_{1y}}{28 N} \rightarrow F_{1y} = \sin 30°(28 N) = 14 N$

$\cos\theta = \frac{F_{1x}}{28 N} \rightarrow F_{1x} = \cos 30°(28 N) = 24.248 N$

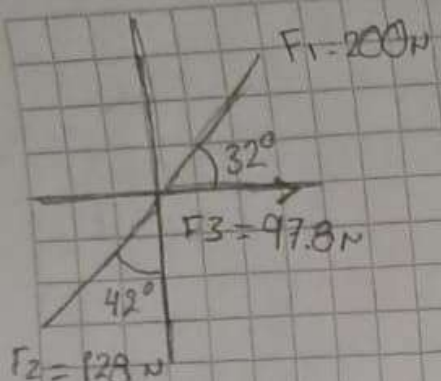
$\sin 42°(71 N) = 47.509 N$

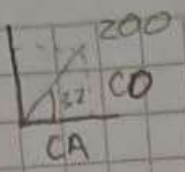
$\cos 42°(71 N) = 52.763 N$

$\sqrt{(77.01 N)^2 + (-61.508)^2} = 98.584 N$

$\tan\theta = \frac{CO}{CA} \rightarrow \tan^{-1} = \frac{CO}{CA} \rightarrow \frac{-61.508}{77.01} = -38.614$

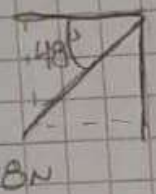
$360 - 38.614 = 321.386°$





Sen 32° (200N) = 105.9838N (Y)

Cos 32° (200N) = 169.6096N (X) → F1



F2Y

Sen 48° (128N) = 95.1225N (X)

Cos 48° (128N) = 85.6487N (X) → F2

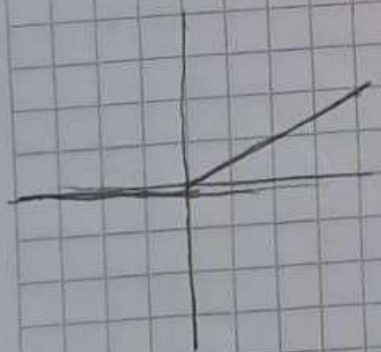
F2X

F3 → 97.8 (x)

$\Sigma FX = 169.6096N - 85.6487N + 97.8N$

$= 181.7609$

$\Sigma FY = 105.9838N - 95.1225N = 10.8613$



$\sqrt{(181.7609)^2 + (10.8613)^2} = 182.0851$

$\tan\theta^{-1} = \frac{10.8613}{181.7609} = 3.4196\ 3$