UDS

Licenciatura en Arquitectura

Nombre del alumno:

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Materia:

Resistencia de materiales de construcción

Nombre del profesor:

Arq. Pedro Alberto García López

Cuatrimestre:

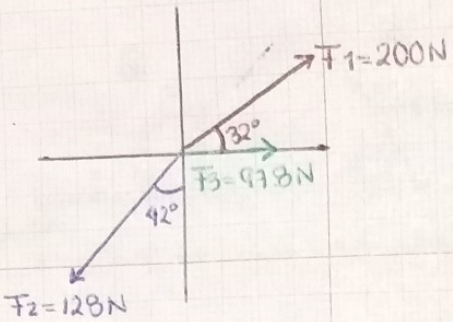
Cuarto

Nombre de la actividad:

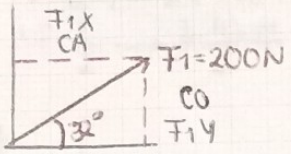
Unidad I: Ejercicios

Fecha: 24 de septiembre de 2023

EJERCICIO 1:



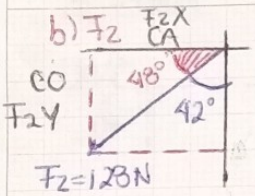
a) F_1



$\text{Sen}\,\theta = \frac{CO}{HA} \rightarrow \text{Sen}\,32° = \frac{F_1Y}{200N} \rightarrow F_1Y = \text{Sen}\,32°\,(200N) = 105.983\,N$

$\text{Cos}\,\theta = \frac{CA}{H} \rightarrow \text{Cos}\,32° = \frac{F_1X}{200N} \rightarrow F_1X = \text{Cos}\,32°\,(200N) = 169.609\,N$

b) F_2



$\text{Sen}\,\theta = \frac{CO}{H} \rightarrow \text{Sen}\,48° = \frac{F_2Y}{128N} \rightarrow F_2Y = \text{Sen}\,48°\,(128N) = -95.122\,N$

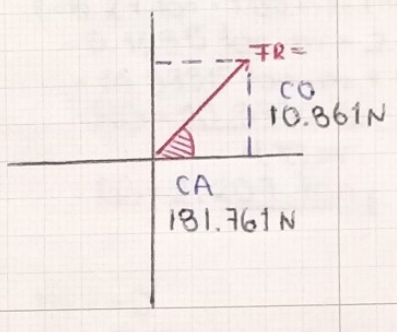
$\text{Cos}\,\theta = \frac{CA}{H} \rightarrow \text{Cos}\,48° = \frac{F_2X}{128N} \rightarrow F_2X = \text{Cos}\,48°\,(128N) = -85.648\,N$

c) F_3

97.8N

$\Sigma FX = 169.609N + (-85.648N) + 97.8N = 181.761\,N$

$\Sigma FY = 105.983N - 95.122N = 10.861\,N$



← Fuerza Resultante:

$H = \sqrt{CA^2 + CO^2}$

$H = \sqrt{(181.761N)^2 + (10.861)^2}$

$H = \sqrt{33037.061 + 117.961}$

$H = 182.085\,N$

← Ángulo

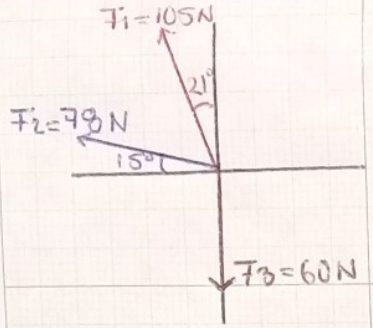
$\text{Tan}\,\theta = \frac{CO}{CA}$

$\text{Tan}\,\theta = \frac{10.861N}{181.761N} = 0.059\,N$

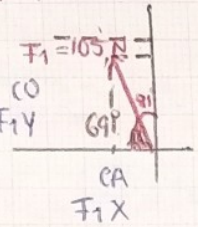
$\theta = \tan^{-1}(0.059N) = 3.376°$

$90 - 3.376 = 86.624°$

EJERCICIO 2:



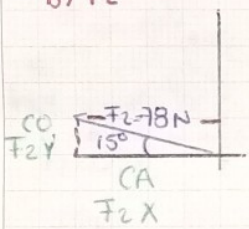
a) T_1



$\text{Sen}\,\theta = \frac{CO}{H} \rightarrow \text{Sen}\,69° = \frac{T_1Y}{105N} \rightarrow T_1Y = \text{Sen}\,69°\,(105N) = 98.025\,N$

$\text{Cos}\,\theta = \frac{CA}{H} \rightarrow \text{Cos}\,69° = \frac{T_1X}{105N} \rightarrow T_1X = \text{Cos}\,69°\,(105N) = 37.628\,N$

b) T_2



$\text{Sen}\,\theta = \frac{CO}{H} \rightarrow \text{Sen}\,15° = \frac{T_2Y}{78N} \rightarrow T_2Y = \text{Sen}\,15°\,(78N) = 20.187\,N$

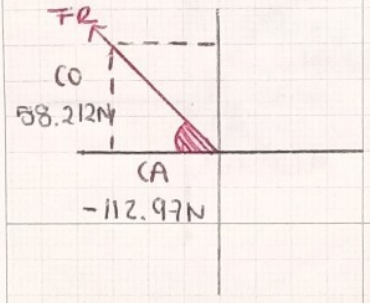
$\text{Cos}\,\theta = \frac{CA}{H} \rightarrow \text{Cos}\,15° = \frac{T_2X}{78N} \rightarrow T_2X = \text{Cos}\,15°\,(78N) = -75.342\,N$

c) T_3

$-60N$

$\Sigma Fx = -37.628N - 75.342N = -112.97N$

$\Sigma Fy = 98.025N + 20.187N - 60N = 58.212\,N$



← Fuerza Resultante

$H = \sqrt{CA^2 + CO^2}$

$H = \sqrt{(-112.97N)^2 + (58.212)^2}$

$H = \sqrt{12762.220 + 3388.636N}$

$H = \boxed{127.086\,N}$

← Ángulo

$\text{Tan}\,\theta = \frac{CO}{CA}$

$\text{Tan}\,\theta = \frac{58.212\,N}{-112.97\,N} = -0.515\,N$

$\tan^{-1}(-0.515N) = \boxed{-27.248°}$

$90 - 27.248° = 62.752°$

$180 - 27.248° = 152.752°$