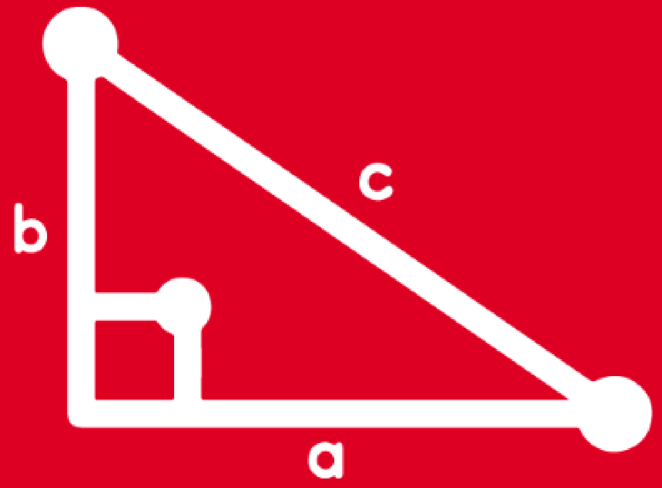
TRIGONOMETRY

Chapter 05

4th

SECONDARY



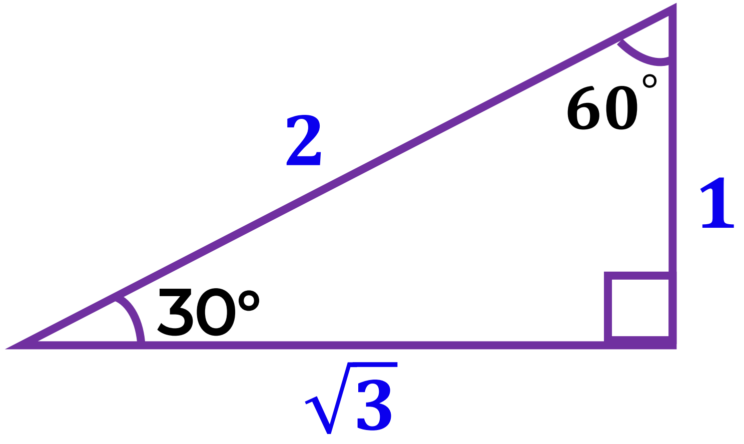
RAZONES TRIGONOMÉTRICAS DE ÁNGULOS NOTABLES

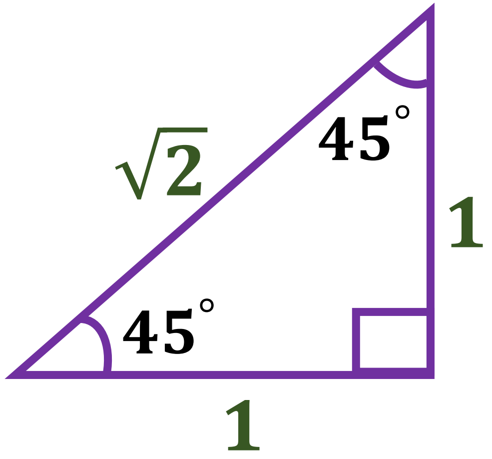
SACO OLIVEROS

ARTIFICIO PARA CALCULAR SENO Y COSENO DE ÁNGULOS NOTABLES

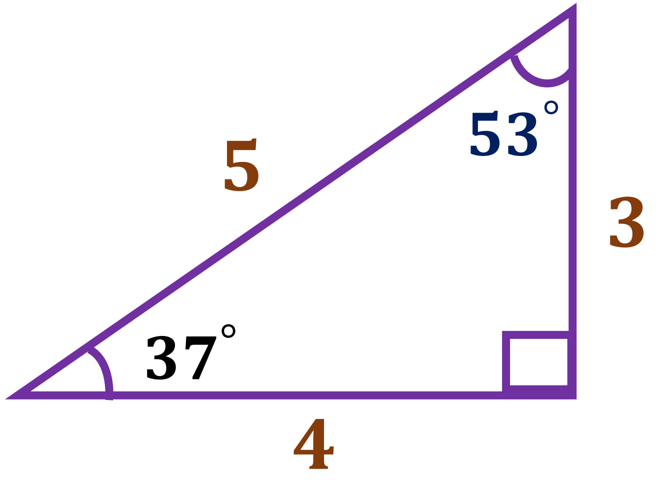
TRIÁNGULOS RECTÁNGULOS NOTABLES Y APROXIMADOS

TRIÁNGULOS NOTABLES





TRIÁNGULO APROXIMADO (PITAGÓRICO)



Luego aplicamos las definiciones de las razones trigonométricas del ángulo agudo.

$$\frac{a}{\sqrt{b}} = \frac{a\sqrt{b}}{b}$$

Ejemplo :

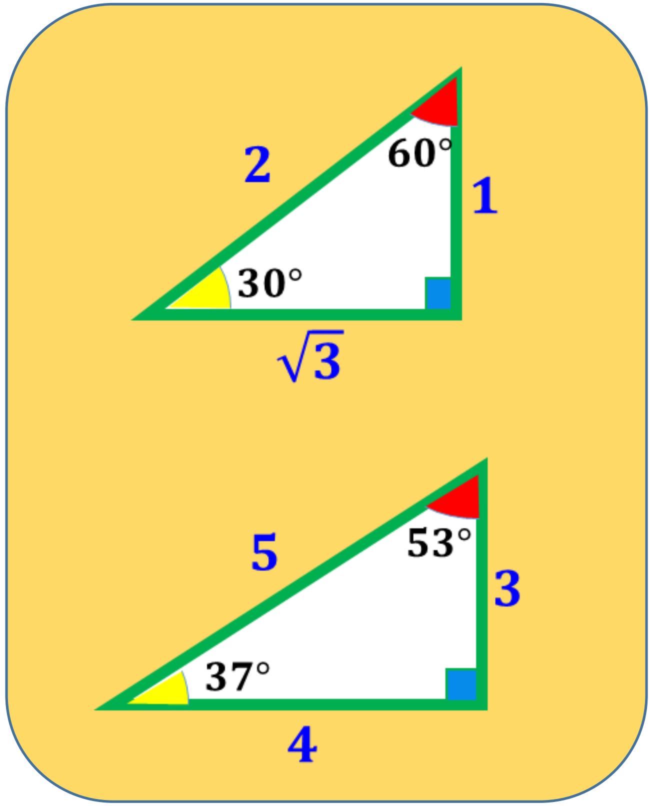
$$\csc 60° = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

RT / α	sen	cos	tan	cot	sec	csc
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	$\sqrt{2}$	$\sqrt{2}$
37°	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{3}{4}$	$\frac{4}{3}$	$\frac{5}{4}$	$\frac{5}{3}$
53°	$\frac{4}{5}$	$\frac{3}{5}$	$\frac{4}{3}$	$\frac{3}{4}$	$\frac{5}{3}$	$\frac{5}{4}$

HELICO PRACTICE 1

Efectúe $P = \left(5\,\text{sen}37° + \sqrt{3}\,\tan 60° + \cot^2 30°\right)^{\cos 60°}$

RESOLUCIÓN



$$P = \left(\cancel{5}\left(\frac{3}{\cancel{5}}\right) + \sqrt{3}\,(\sqrt{3}) + (\cancel{\sqrt{}}3)^{\cancel{2}}\right)^{1/2}$$

$$P = (3 + 3 + 3)^{1/2}$$

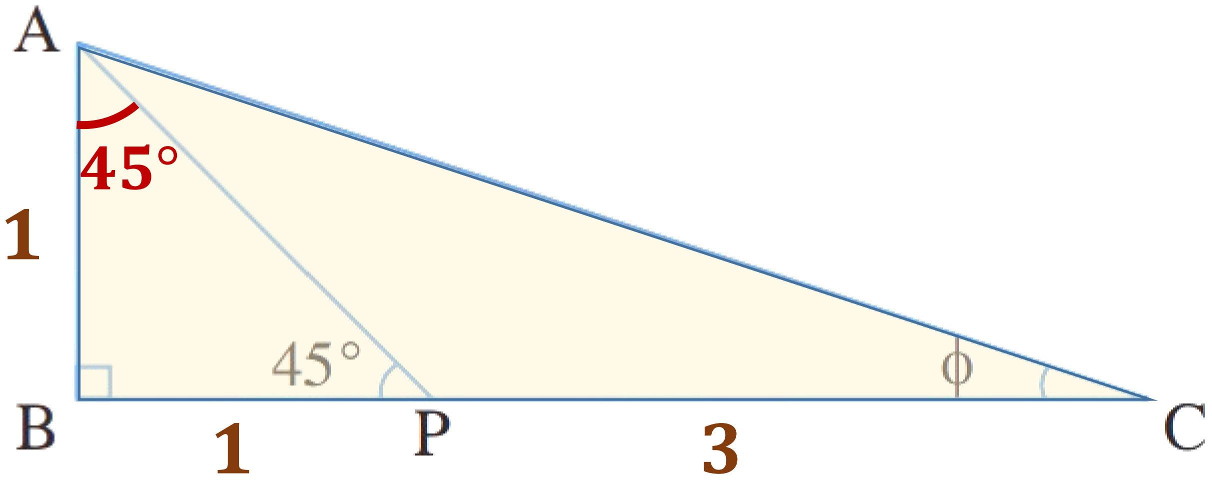
$$P = \sqrt{9}$$

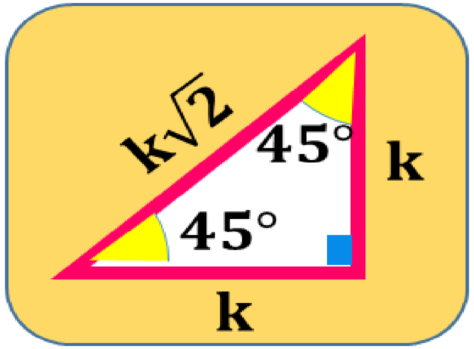
$$\boxed{\therefore\ P = 3}$$

$sen\alpha$	$cos\alpha$	$tan\alpha$	$cot\alpha$	$sec\alpha$	$csc\alpha$
$\frac{CO}{H}$	$\frac{CA}{H}$	$\frac{CO}{CA}$	$\frac{CA}{CO}$	$\frac{H}{CA}$	$\frac{H}{CO}$

HELICO PRACTICE 2

Del gráfico, calcule $\cot\phi$ si PC = 3 BP .





$$\cot\alpha = \frac{CA}{CO}$$

RESOLUCIÓN

Dato :

$$1\ PC = 3\ BP \Rightarrow \frac{PC}{BP} = \frac{3}{1}$$

En ◺ABP (Notable de 45°) :

$$AB = BP = 1$$

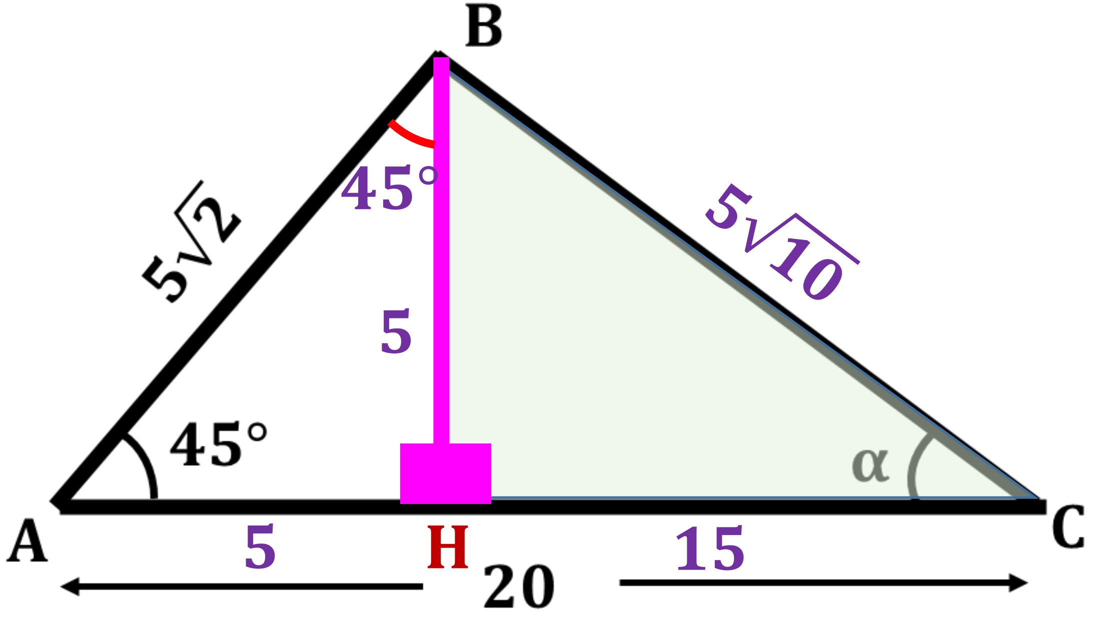
En ◺ABC : $$\cot\phi = \frac{1+3}{1}$$

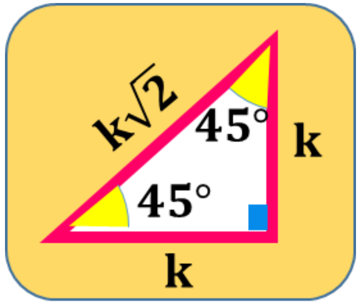
$$\boxed{\therefore \cot\phi = 4}$$

HELICO PRACTICE 3

Del gráfico, efectúe :

$$E = \sqrt{10}\,\text{sen}\alpha + \cot\alpha$$





sen α	cot α
$\dfrac{CO}{H}$	$\dfrac{CA}{CO}$

RESOLUCIÓN

En ⊿ AHB (Notable de 45°− 45º) :

$AB = 5\sqrt{2} \Rightarrow AH = HB = 5$

En ⊿ BHC : Teorema de Pitágoras

$(BC)^2 = (5)^2 + (15)^2$

$(BC)^2 = 250 \Rightarrow BC = 5\sqrt{10}$

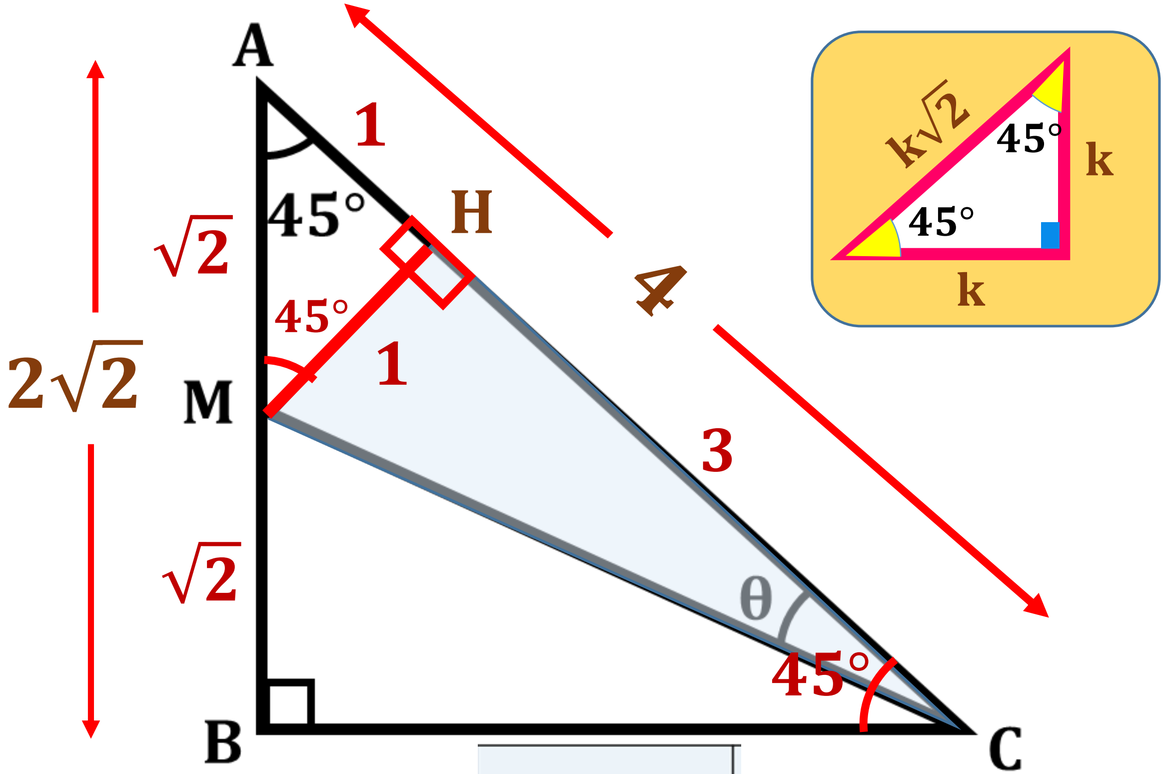
Luego : $E = \sqrt{10}\,\text{sen}\alpha + \cot\alpha$

$$E = \cancel{\sqrt{10}}\left(\frac{5}{5\cancel{\sqrt{10}}}\right) + \frac{15}{5}$$

$E = 1 + 3$ $\boxed{\therefore E = 4}$

HELICO PRACTICE 4

Del gráfico, calcule $\tan\theta$ si AM = MB .



$$\tan\alpha = \frac{CO}{CA}$$

RESOLUCIÓN

En ⊿ AHM (Notable de 45°– 45°) :

Sea : $AM = \sqrt{2} \Rightarrow AH = MH = 1$

$MB = AM = \sqrt{2}$

En ⊿ AHM (Notable de 45°– 45°) :

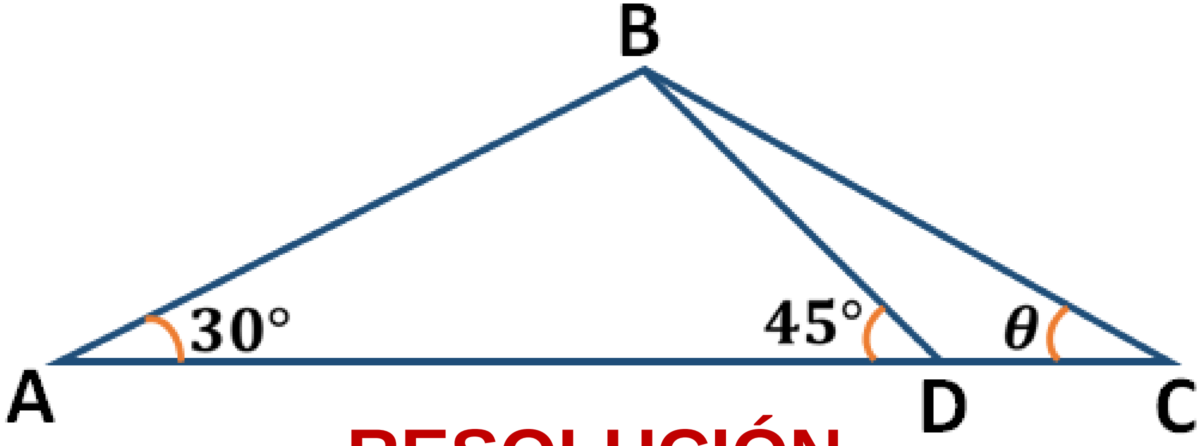
$AB = 2\sqrt{2} \Rightarrow AC = 2\sqrt{2}\,\sqrt{2}$

$AC = 4$

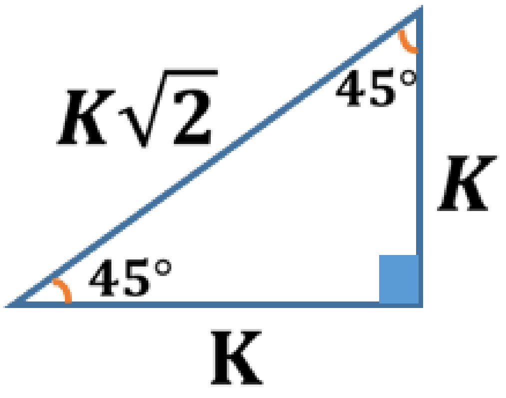
En ⊿ CHM : $\boxed{\therefore \tan\theta = \frac{1}{3}}$

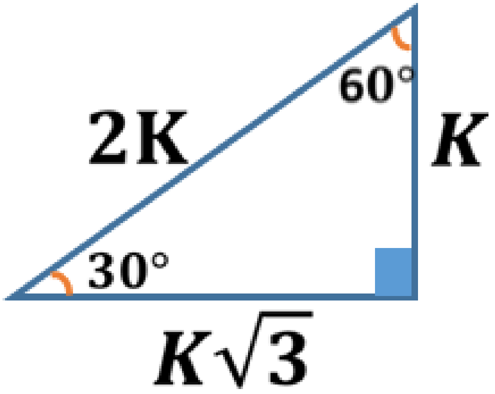
HELICO PRACTICE 5

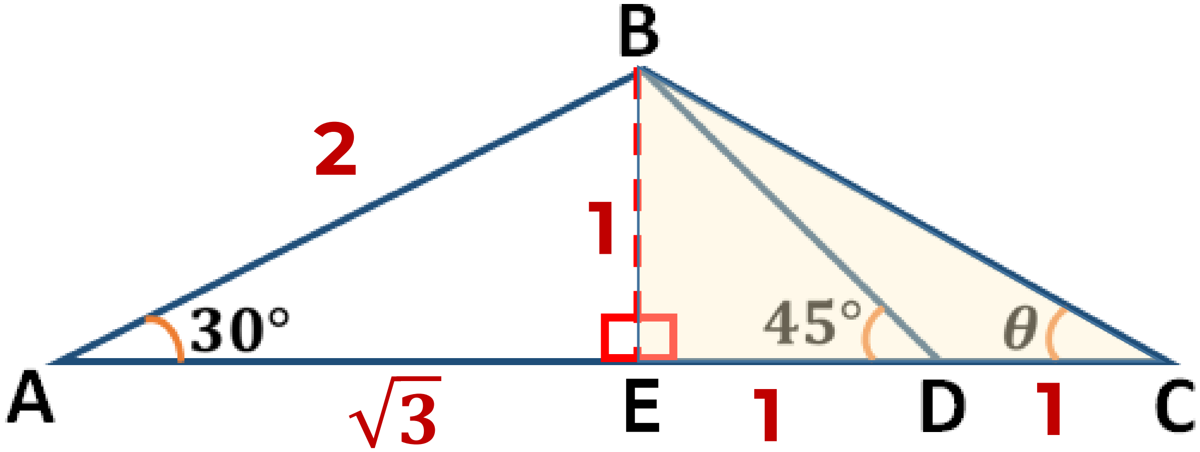
Del gráfico, calcule $\cot\theta$ si AB = 2 DC .



RESOLUCIÓN







Sean : AB = 2 ; DC = 1

Completamos lados en ⊿notables :

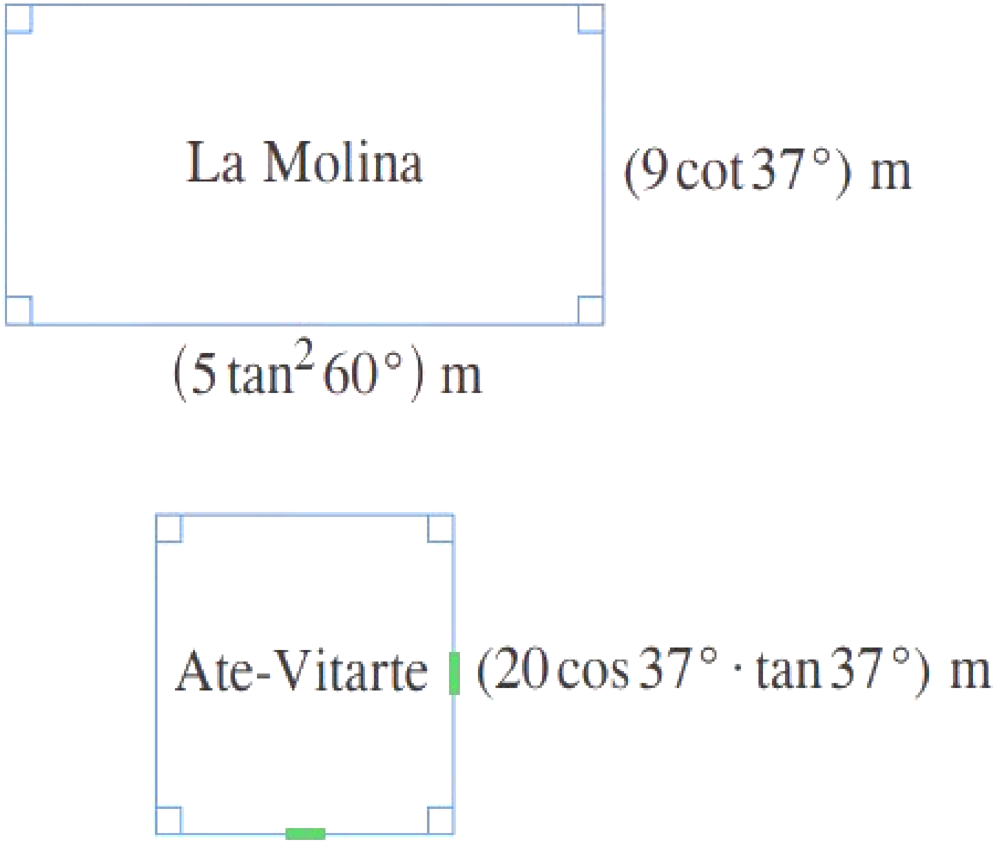
En ⊿BEC : $\cot\theta = \dfrac{1+1}{1}$

$\cot\alpha$
$\dfrac{CA}{CO}$

$$\therefore \cot\theta = 2$$

HELICO PRACTICE 6

Gigi, una corredora de bienes raíces, ante el incremento del precio del dólar decide vender uno de los terrenos que tiene.- Si el m^2 se valora en $1000.- Calcule el precio de venta del terreno de mayor área .



RESOLUCIÓN

La Molina = $(5\tan^2 60°)\mathrm{m}\ (9\cot 37°)\mathrm{m}$

$$= 5(\cancel{\sqrt{3}})^{\cancel{2}} . 9\left(\frac{4}{\cancel{3}}\right)\mathrm{m}^2 = \boxed{180\ \mathrm{m}^2}$$

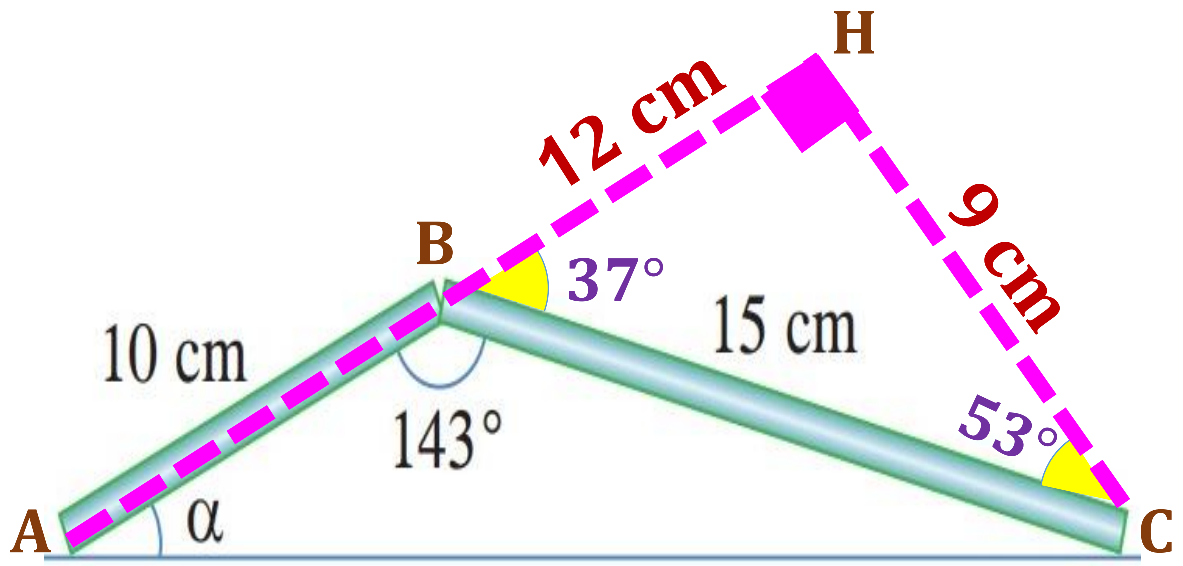
Ate Vitarte = $[(20\cos 37° . \tan 37°)\ \mathrm{m}]^2$

$$= \left[20\left(\frac{\cancel{4}}{5}\right)\left(\frac{3}{\cancel{4}}\right)\mathrm{m}\right]^2 = 144\ \mathrm{m}^2$$

$\therefore$ El terreno de mayor área es el de La Molina y cuesta $180000

HELICO PRACTICE 7

Dos barras metálicas se encuentran apoyadas en su parte superior, tal como se muestra en la figura.- Si el ángulo que forman las barras en su punto de apoyo es de 143°, calcule $E = 11\tan\alpha + \frac{1}{2}$.



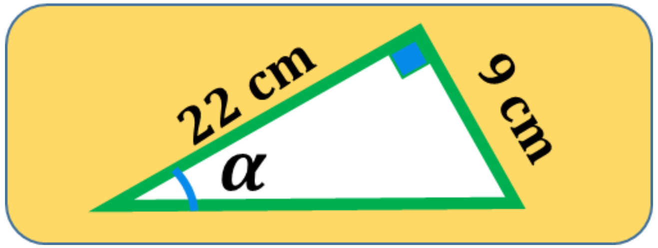
RESOLUCIÓN

En el ΔBHC (Notable de 37° y 53°) :

$BC = 5k = 15\text{ cm} \Rightarrow k = 3\text{ cm}$

Luego : $HC = 3k = 3(3\text{ cm}) = 9\text{ cm}$

$HB = 4k = 4(3\text{ cm}) = 12\text{ cm}$



Luego :

$$E = \cancel{11}^{\,1}\left(\frac{9}{\cancel{22}_{\,2}}\right) + \frac{1}{2}$$

$\tan\alpha$
$\frac{CO}{CA}$

$$E = \frac{9}{2} + \frac{1}{2}$$

$$\boxed{\therefore\ E = 5}$$

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