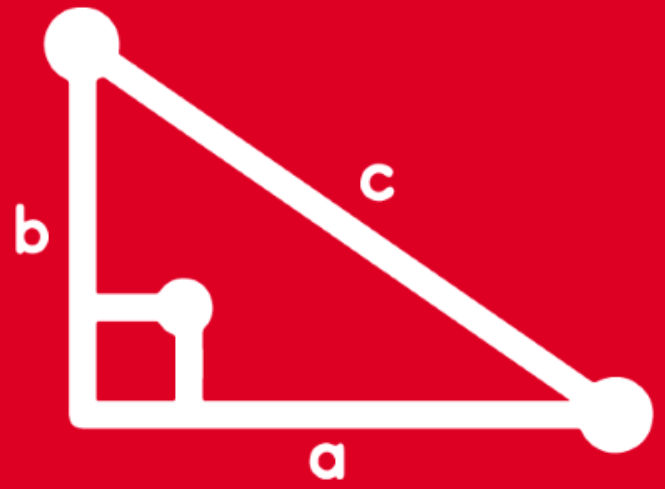
TRIGONOMETRY

Chapter 06

3rd

SECONDARY



RAZONES TRIGONOMÉTRICAS DE ÁNGULOS NOTABLES I

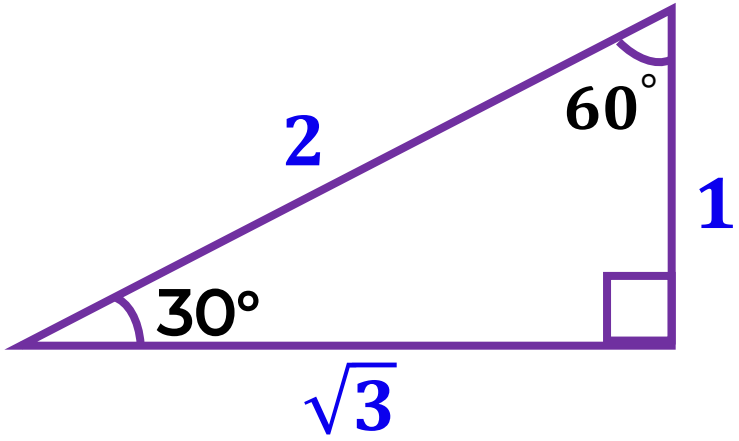
SACO OLIVEROS

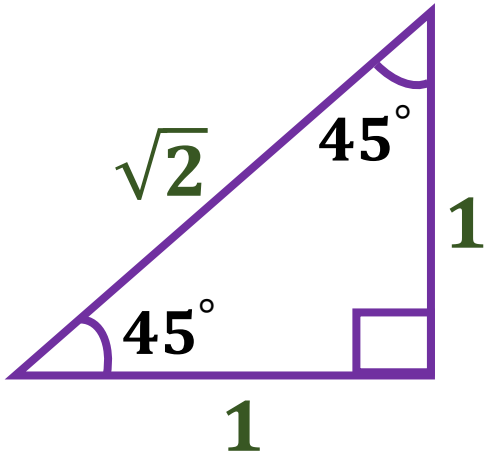
HELICO - MOTIVACIÓN

¿ EXISTEN TRIÁNGULOS RECTÁNGULOS EN LA VIDA COTIDIANA ?

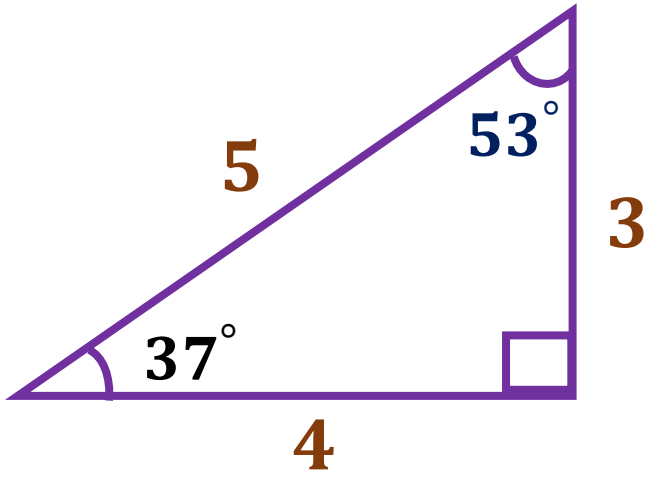
TRIÁNGULOS RECTÁNGULOS NOTABLES Y APROXIMADOS

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 :

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

α \ RT	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°	$\frac{4}{5}$	$\frac{3}{5}$	$\frac{4}{3}$	$\frac{3}{4}$	$\frac{5}{3}$	$\frac{5}{4}$

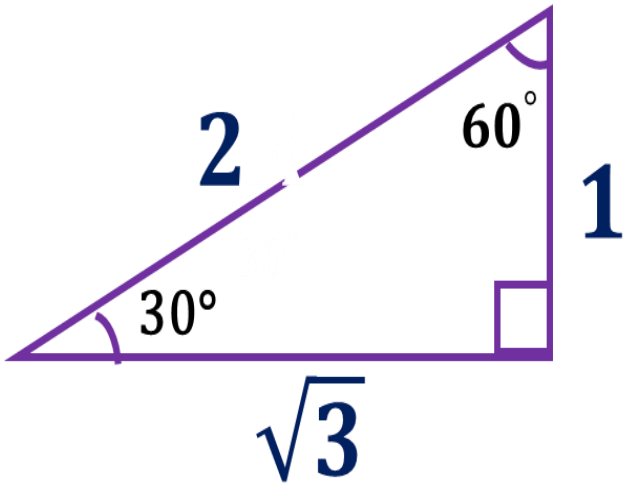
HELICO PRACTICE 1

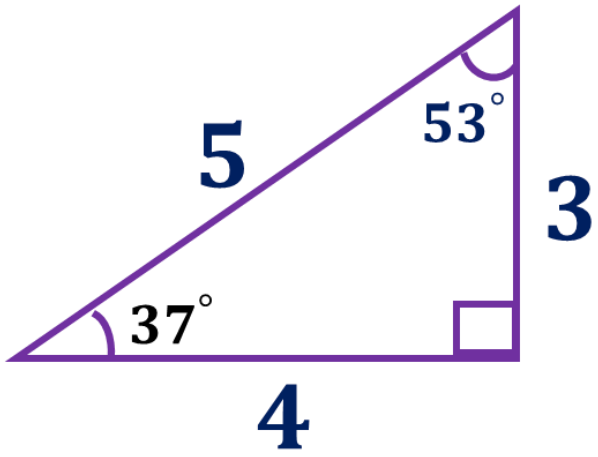
Efectúe E = cos60°. cot37°. sen30°

RESOLUCIÓN

$$E = \left(\frac{1}{2}\right)\left(\frac{4}{3}\right)\left(\frac{1}{2}\right)$$

$$\therefore \quad E = \frac{1}{3}$$





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

HELICO PRACTICE 2

Efectúe $A = \sqrt{3\tan^2 60° . 8\,\text{sen}30°}$

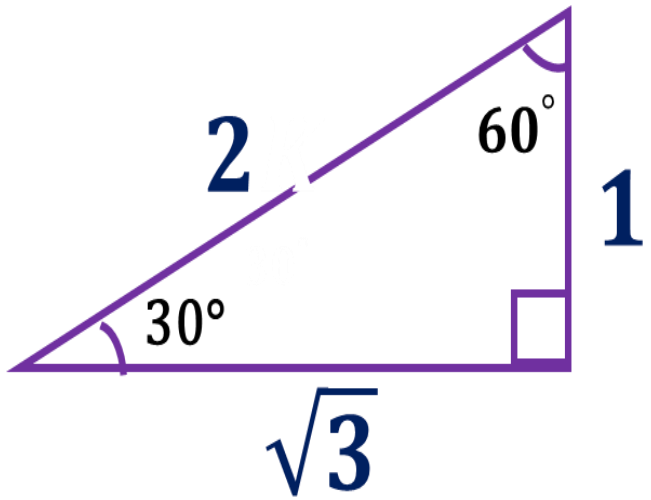
RESOLUCIÓN

$$A = \sqrt{3\left(\sqrt{3}\right)^2 . 8\left(\frac{1}{2}\right)}$$

$$A = \sqrt{3 . 3 . 4}$$

$$A = \sqrt{36}$$

$$\therefore A = 6$$



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

HELICO PRACTICE 3

Efectúe $T = \dfrac{\sqrt{8}\,\sec 45° + \tan^4 60°}{\text{sen}37°.\ \sec 53°}$

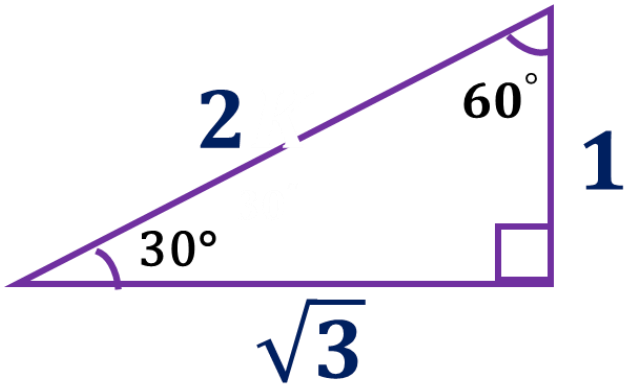
RESOLUCIÓN

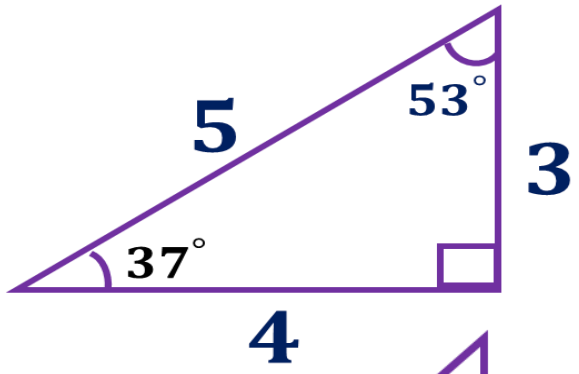
$$T = \frac{\sqrt{8}\sqrt{2} + \left(\sqrt{3}\right)^{4}}{\left(\frac{3}{5}\right)\left(\frac{5}{3}\right)} = \frac{\sqrt{16} + 3^2}{1}$$

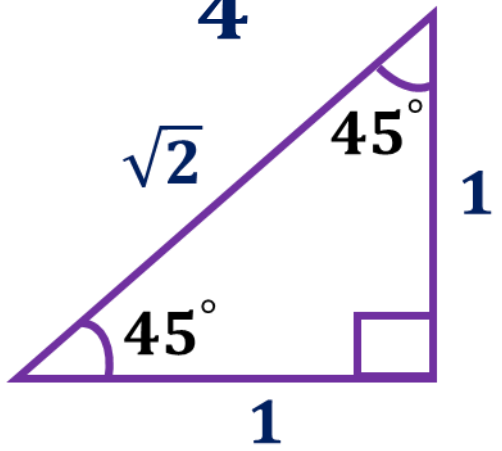
$$T = \frac{4 + 9}{1}$$

$\therefore\ T = 13$

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







HELICO PRACTICE 4

Efectúe $Q = \dfrac{32^{\operatorname{sen}37^\circ} + 16^{\cos 60^\circ}}{\sqrt{6}^{\,2\tan 45^\circ}}$

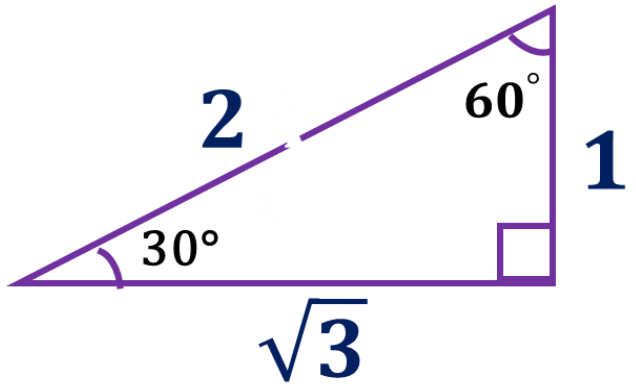
RESOLUCIÓN

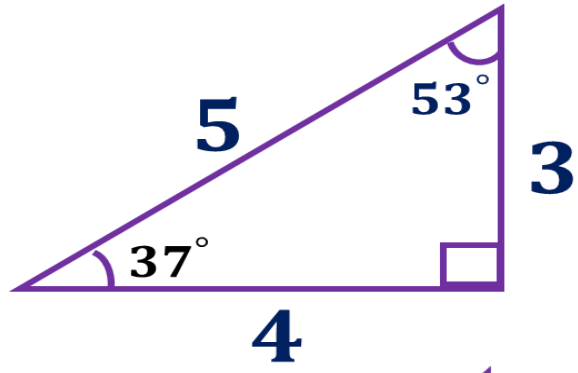
$$Q = \frac{(32)^{\frac{3}{5}} + (16)^{\frac{1}{2}}}{\sqrt{6}^{\,2(1)}} = \frac{\left(\sqrt[5]{32}\right)^3 + \sqrt{16}}{\sqrt{6}^{\,2}}$$

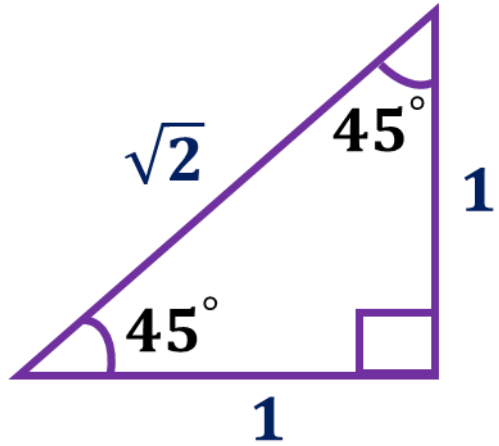
$$Q = \frac{(2)^3 + 4}{6} = \frac{8 + 4}{6}$$

$\therefore$ **Q = 2**

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







HELICO PRACTICE 5

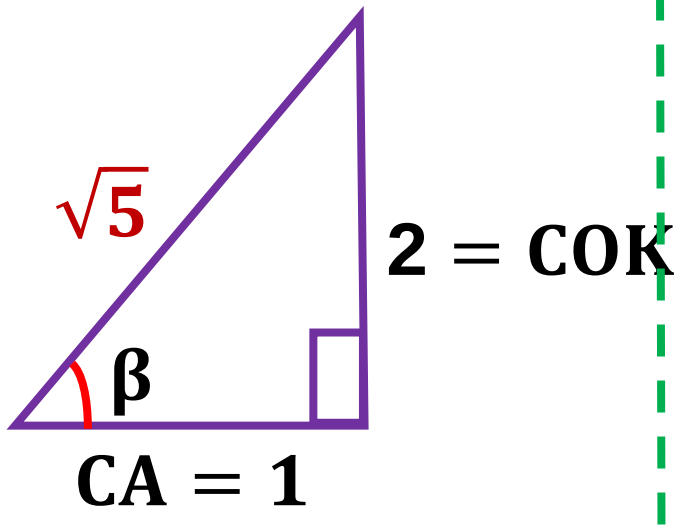
Si $\cot\beta = \operatorname{sen}30°$, siendo β un ángulo agudo; efectúe

$$M = \sqrt{5}\,(\operatorname{sen}\beta + \cos\beta)$$

RESOLUCIÓN

Según dato :

$$\cot\beta = \frac{1}{2} = \frac{CA}{CO}$$



Luego :

$$M = \sqrt{5}\,(\operatorname{sen}\beta + \cos\beta)$$

$$M = \cancel{\sqrt{5}}\left(\frac{2}{\cancel{\sqrt{5}}} + \frac{1}{\cancel{\sqrt{5}}}\right)$$

$$\therefore M = 3$$

HELICO PRACTICE 6

Mauro tiene 2 terrenos : uno en el distrito de Miraflores y otro en San Borja.- Si los terrenos tienen las dimensiones mostradas . ¿ Cuál de ellos tiene mayor área ?

MIRAFLORES

(9 cot37°) m

(5 tan²60°) m

SAN BORJA

(30 sen30°) m

(7 sec²45°) m

RESOLUCIÓN

Calculamos las áreas :

A_M = (5 tan²60°) (9 cot37°)

$A_M = (5 \sqrt{3^2}) (9 (\frac{4}{3})) = (15) (12)$

A_M = 180 m²

A_{SB} = (7 sec²45°) (30 sen30°)

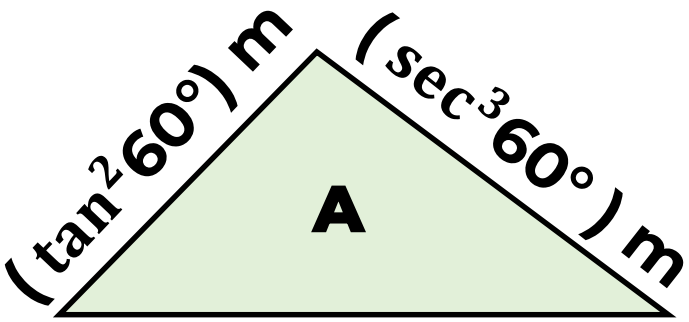
$A_{SB} = (7 \sqrt{2^2}) (30 (\frac{1}{2})) = (14) (15)$

A_{SB} = 210 m²

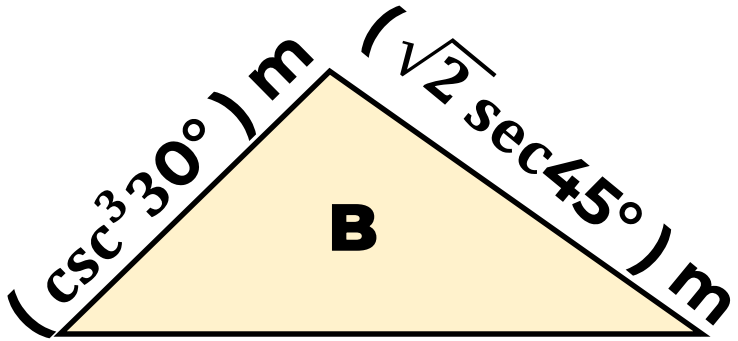
∴ Rpta : El terreno de San Borja tiene mayor área .

HELICO PRACTICE 7

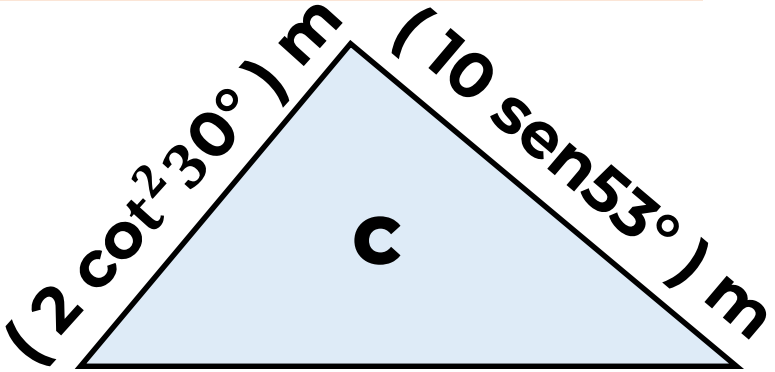
A Víctor, el jardinero de mi escuela, le han propuesto cercar tres terrenos en forma de triángulos; para lo cual le pagarán s/.10 por cada metro del perímetro triangular que ha trabajado.- ¿ Cuál de las opciones le conviene más y cuánto es lo máximo que podría ganar ?



(9 cot45°) m



(8 tan45°) m



(20 cos60°) m

RESOLUCIÓN

2p (A) = $\tan^2 60° + \sec^3 60° + 9\cot 45° = \sqrt{3}^2 + 2^3 + 9(1) = 20$ m ➡ s/200

2p (B) = $\csc^3 30° + \sqrt{2}\sec 45° + 8\tan 45° = 2^3 + \sqrt{2}(\sqrt{2}) + 8(1) = 18$ m ➡ s/180

2p (C) = $2\cot^2 30° + 10\,\mathrm{sen}53° + 20\cos 60° = 2\sqrt{3}^2 + 10(\frac{4}{5}) + 20(\frac{1}{2}) = 24$ m ➡ s/ 240


SACO
OLIVEROS