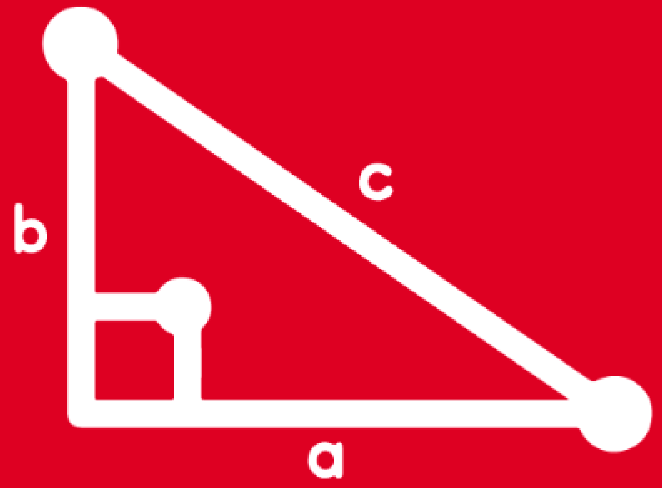
TRIGONOMETRY

Chapter 06

3rd

SECONDARY



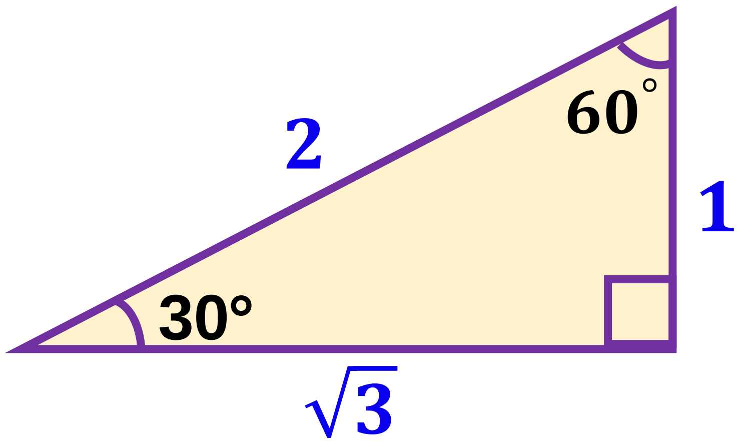
RAZONES TRIGONOMÉTRICAS DE ÁNGULOS NOTABLES I

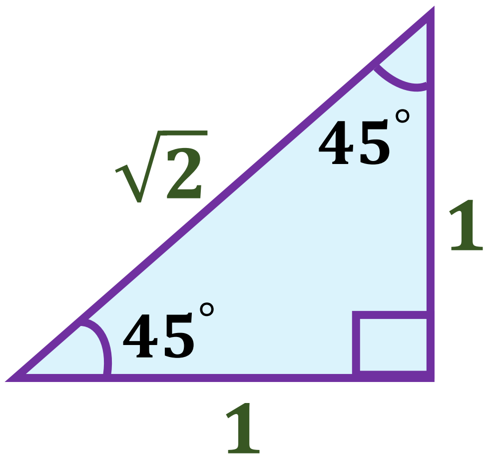
SACO OLIVEROS

¿ EXISTEN TRIÁNGULOS RECTÁNGULOS EN LA VIDA COTIDIANA ?

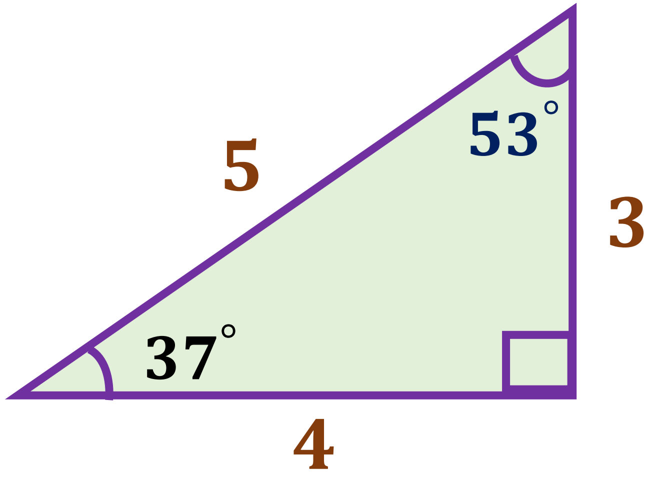
TRIÁNGULOS RECTÁNGULOS NOTABLES Y APROXIMADOS

TRIÁNGULOS NOTABLES





TRIÁNGULO APROXIMADO (PITAGÓRICO)



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

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

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

Ejemplo :

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

HELICO PRACTICE 1

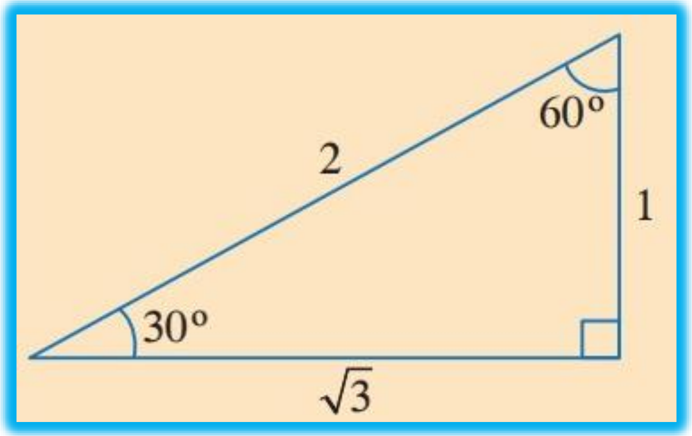
Efectúe E = cos60°. cot37°. sen30°

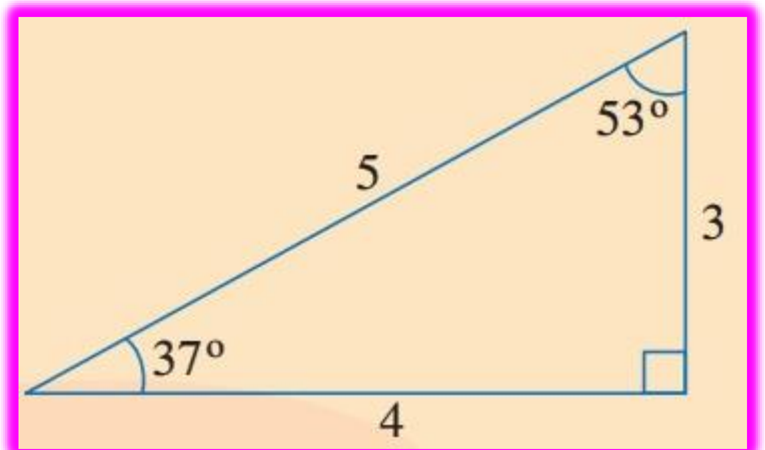
RESOLUCIÓN

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

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

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





HELICO PRACTICE 2

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

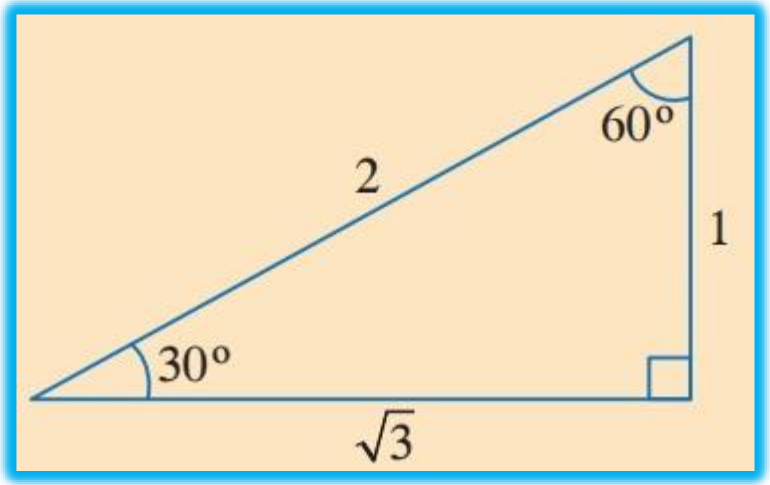
RESOLUCIÓN

$$A = \sqrt{3\left(\cancel{\sqrt{3}}\right)^{\cancel{2}}.\,\overset{4}{\cancel{8}}\left(\frac{1}{\cancel{2}}\right)}$$

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

$$A = \sqrt{36}$$

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

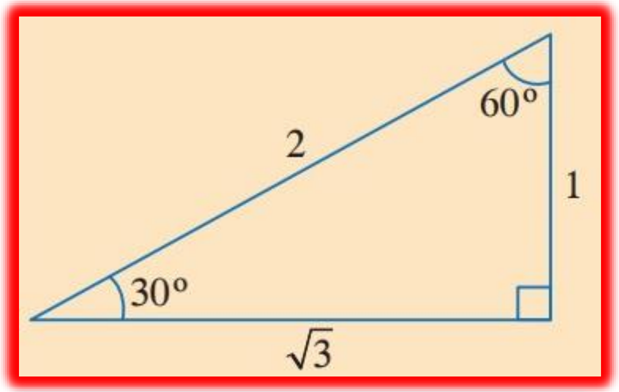
RESOLUCIÓN

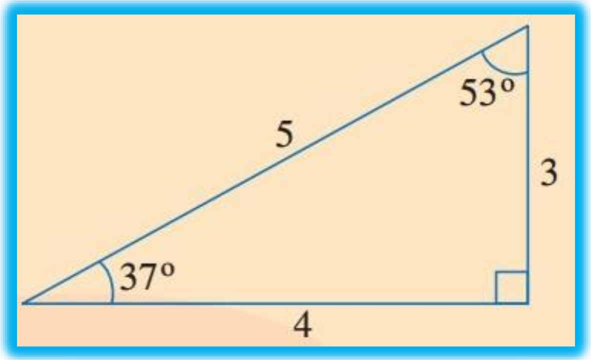
$$T = \frac{\sqrt{8}\,\sqrt{2} + \left(\sqrt{3}\right)^{\cancel{4}\,2}}{\left(\frac{3}{5}\right)\left(\frac{5}{3}\right)} = \frac{\sqrt{16} + 3^2}{1}$$

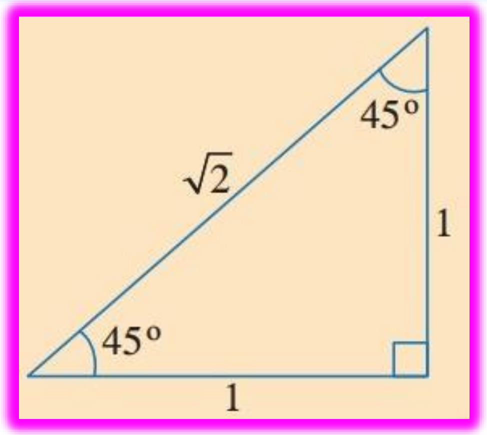
$$T = \frac{4 + 9}{1}$$

$\therefore\ T = 13$

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







HELICO PRACTICE 4

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

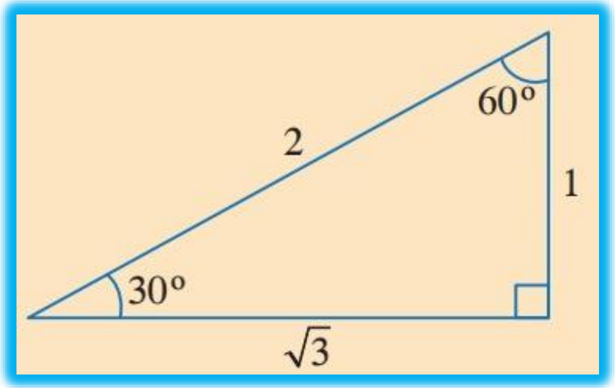
RESOLUCIÓN

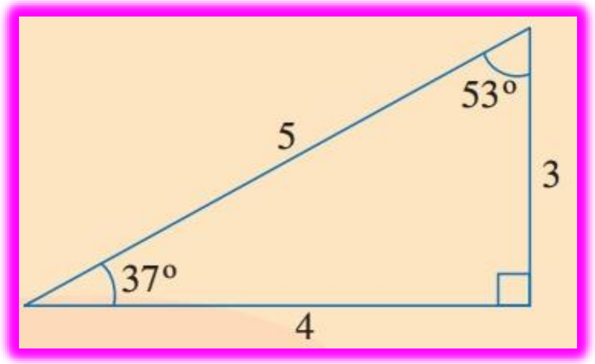
$$Q = \frac{(32)^{\frac{3}{5}} + (16)^{\frac{1}{2}}}{\sqrt{6}^{\,2(1)}} = \frac{\left(\sqrt[5]{32}\right)^{3} + \sqrt{16}}{\cancel{\sqrt{6}}^{\,\cancel{2}}}$$

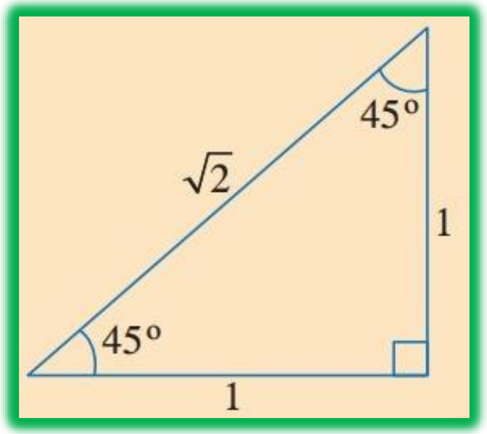
$$Q = \frac{(2)^{3} + 4}{6} = \frac{8 + 4}{6}$$

$\therefore\ Q = 2$

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



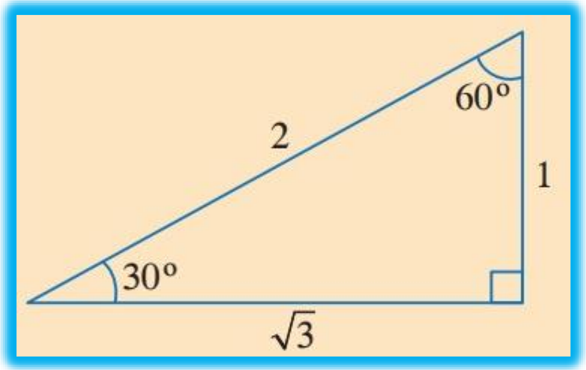




HELICO PRACTICE 5

Si cotβ = sen30°, siendo β un ángulo agudo; efectúe

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



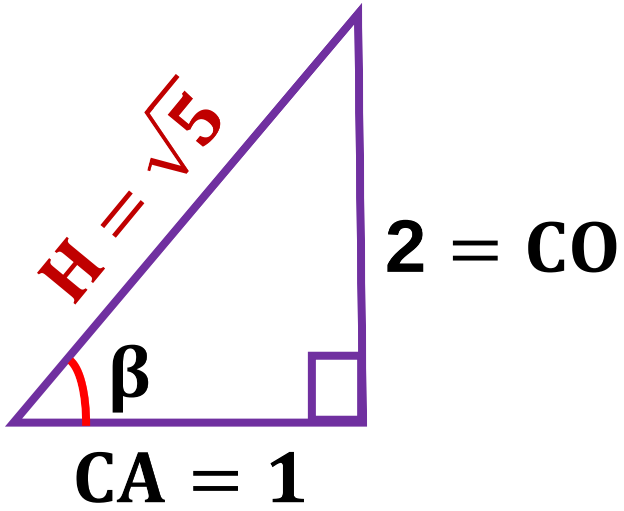
senβ	cosβ	cotβ
$\frac{CO}{H}$	$\frac{CA}{H}$	$\frac{CA}{CO}$

RESOLUCIÓN

Según dato :

cotβ = sen30°

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



Luego :

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

$$M = \sqrt{5}\left(\frac{2}{\sqrt{5}} + \frac{1}{\sqrt{5}}\right) = \cancel{\sqrt{5}}\left(\frac{3}{\cancel{\sqrt{5}}}\right)$$

$$\therefore\ M = 3$$

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

$(9 \cot 37°)$ m

$(5 \tan^2 60°)$ m

SAN BORJA

$(30 \operatorname{sen} 30°)$ m

$(7 \sec^2 45°)$ m

RESOLUCIÓN

Calculamos las áreas :

$$A_M = (5 \tan^2 60°)\ (9 \cot 37°)$$

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

$$A_M = 180 \text{ m}^2$$

$$A_{SB} = (7 \sec^2 45°)\ (30 \operatorname{sen} 30°)$$

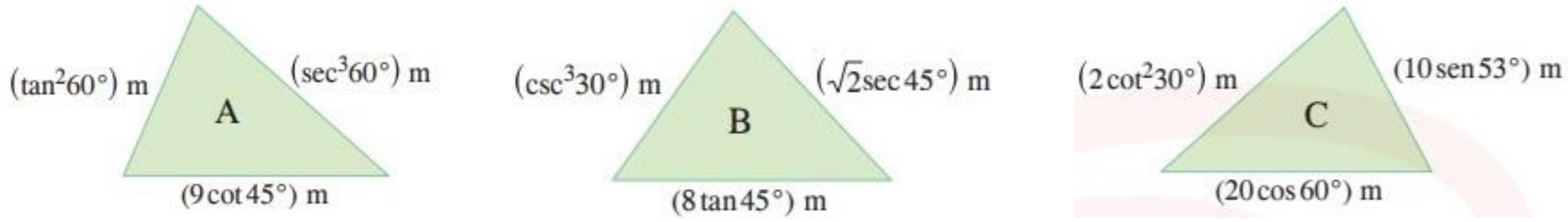
$$A_{SB} = (7 \sqrt{2}^2) (30 (\tfrac{1}{2})) = (14) (15)$$

$$\boxed{A_{SB} = 210 \text{ m}^2}$$

∴ 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 ?



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

SACO OLIVEROS