



TRIGONOMETRY

Chapter 06

3th
SECONDARY

Razones trigonométricas de
ángulos notables (parte 1)



 **SACO OLIVEROS**

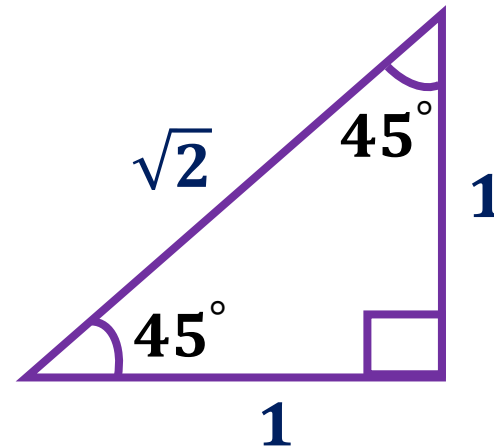
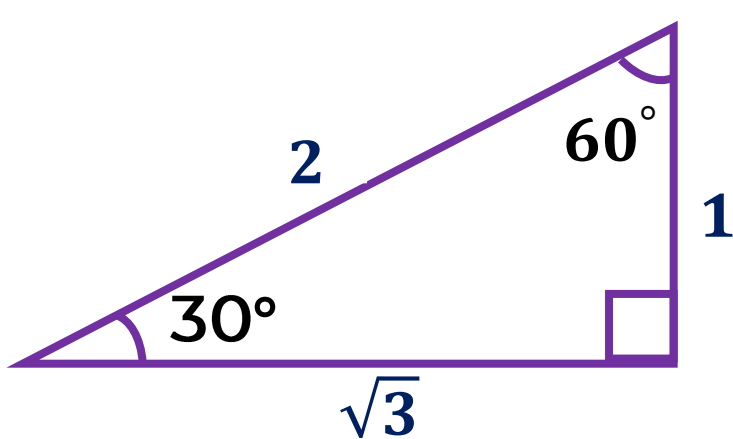


“No es lo que sabes,
es lo que haces con
lo que sabes”

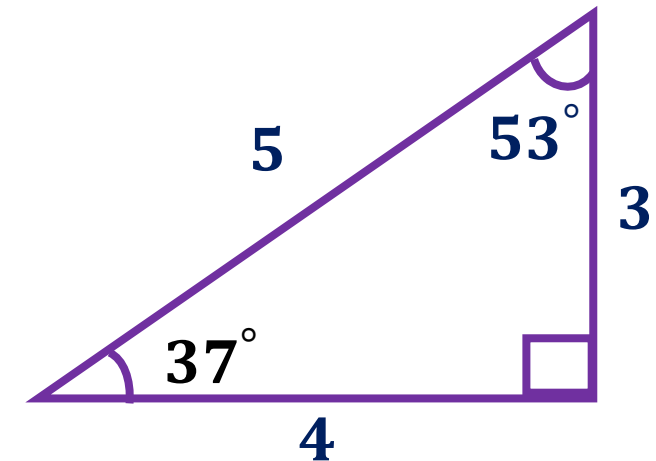


TRIÁNGULOS NOTABLES Y APROXIMADOS

TRIÁNGULOS NOTABLES



TRIÁNGULO APROXIMADO (PITAGÓRICO)





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

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

$$\csc 60^\circ = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

α R T	<i>sen</i>	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°	$\frac{4}{5}$	$\frac{3}{5}$	$\frac{4}{3}$	$\frac{3}{4}$	$\frac{5}{3}$	$\frac{5}{4}$



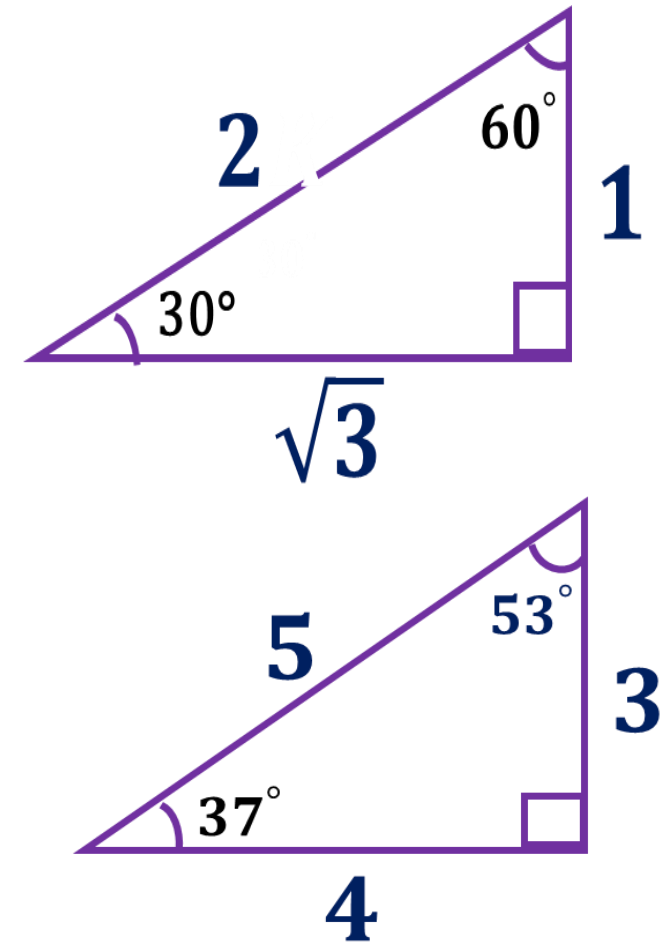
1) Efectúe $E = \cos 60^\circ \cdot \cot 37^\circ$.

$\text{sen} 30^\circ$
RÉSOLUCIÓN

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

$$E = \frac{4}{12} \quad \therefore E = \frac{1}{3}$$

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





2) Efectúe $A = \sqrt{3 \tan^2 60^\circ \cdot 8 \operatorname{sen} 30^\circ}$

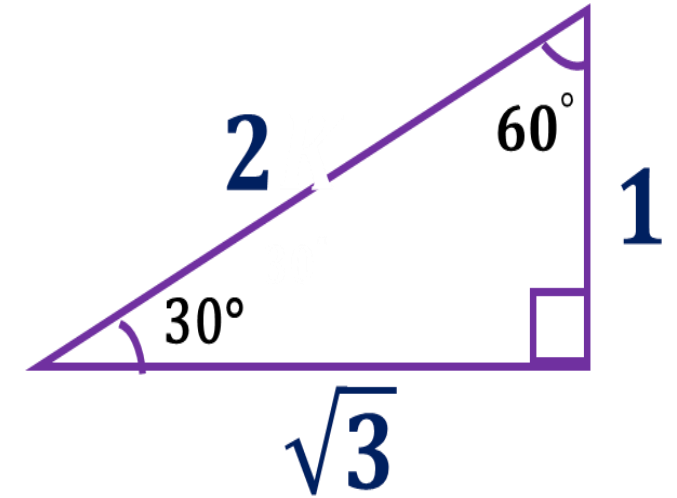
RESOLUCIÓN

$$\underline{N} \quad A = \sqrt{3 (\cancel{\sqrt{3}})^2 \cdot \cancel{8} \left(\frac{1}{\cancel{2}} \right)}$$

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

$$\therefore A = \sqrt{36} = 6$$

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





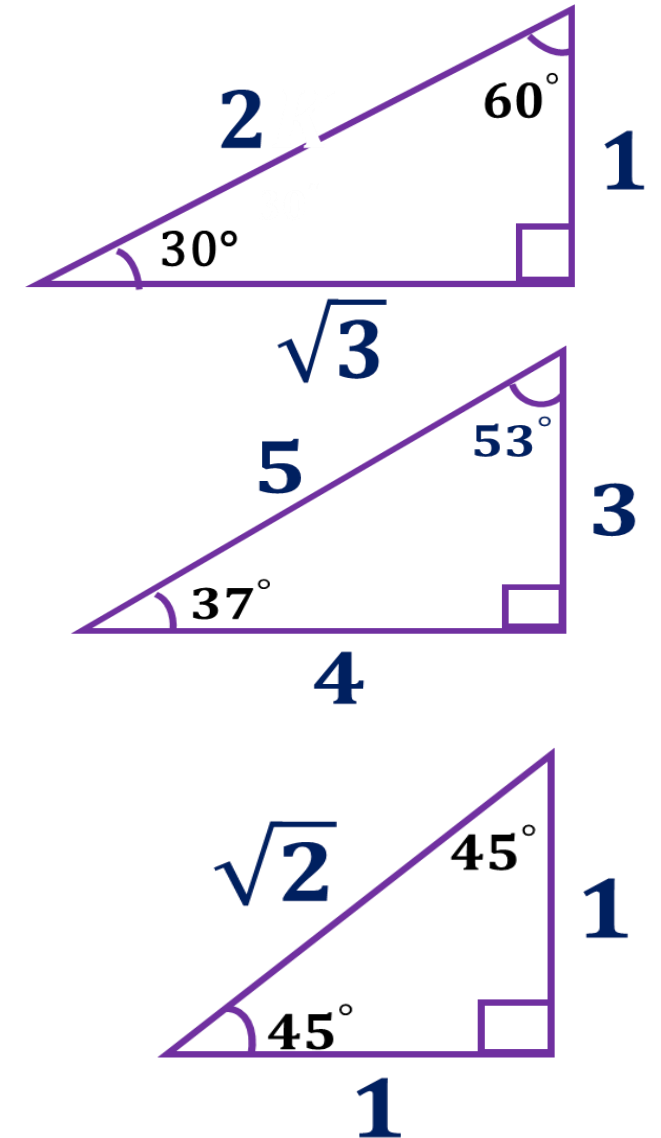
3) Efectúe $T = \frac{\sqrt{8} \sec 45^\circ + \tan^4 60^\circ}{\operatorname{sen} 37^\circ \cdot \sec 53^\circ}$

RESOLUCIÓN

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

$$\therefore T = 13$$

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



4) Efectúe $Q =$

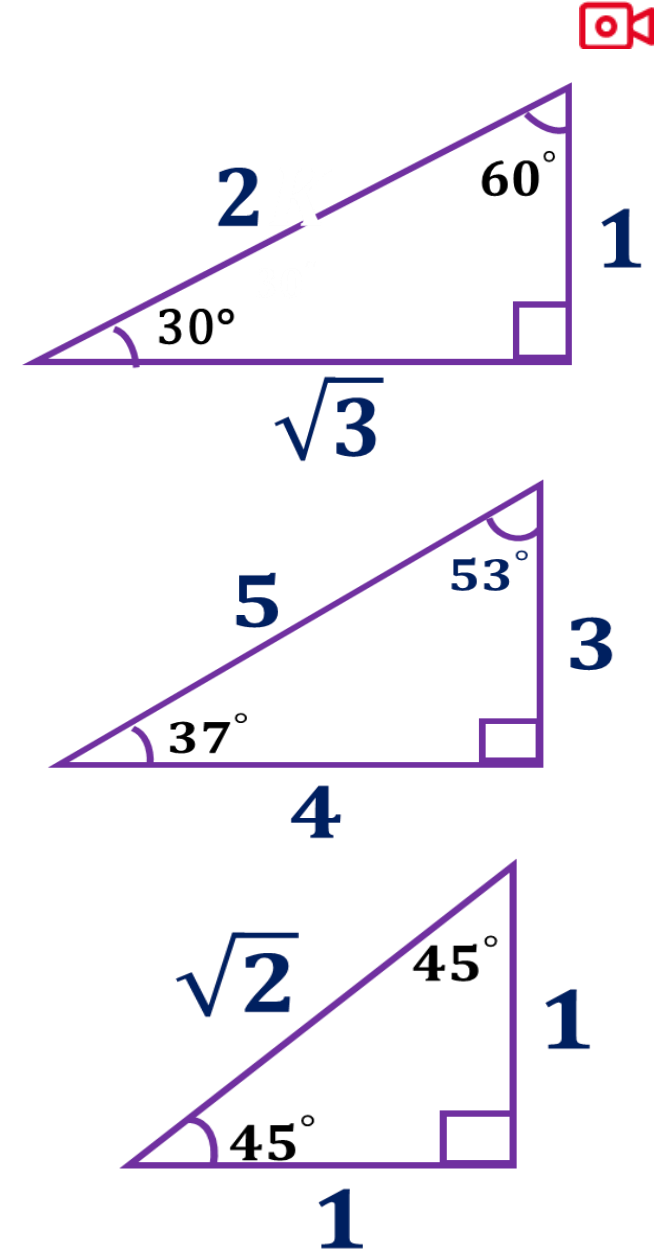
$$\frac{32^{\text{sen}37^\circ} + 16^{\text{cos}60^\circ}}{\sqrt{6}^{2 \tan 45^\circ}}$$

RESOLUCIÓN

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

$$\therefore Q = \frac{8 + 4}{6} = 2$$

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





5) Halle el valor de x si

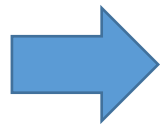
$$3x \tan 53^\circ - \sec^2 60^\circ = \sqrt{8} \operatorname{sen} 45^\circ + 3^{\csc 30^\circ}$$

RESOLUCIÓN

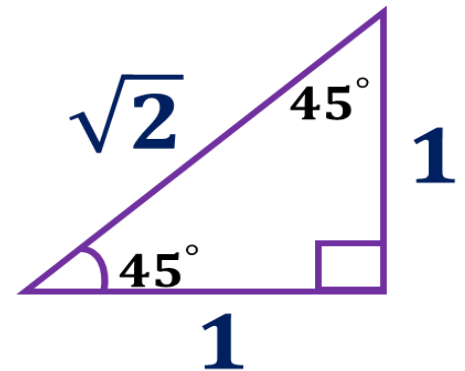
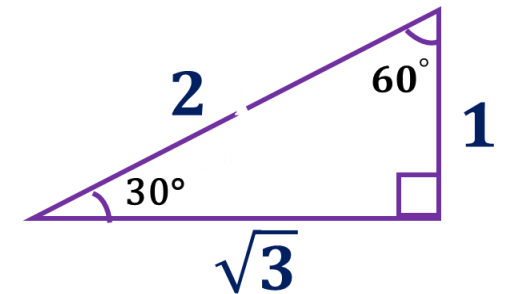
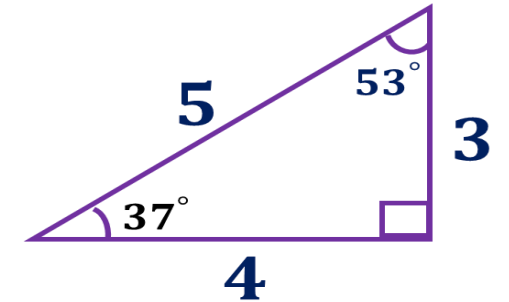
$$\cancel{3}x \left(\frac{4}{\cancel{3}} \right) - (2)^2 = \sqrt{8} \left(\frac{\sqrt{2}}{2} \right) + 3^2$$

$$4x - 4 = \frac{\sqrt{16}}{2} + 9$$

$$4x = 2 + 9 + 4$$



$$\therefore x = \frac{15}{4}$$





6) Halle el valor de x
si

$$\frac{10 \operatorname{sen} 37^\circ}{\sec^2 60^\circ} = \frac{5x + 3}{4x - 6}$$

RESOLUCIÓN

N

$$\frac{\cancel{10}^2 \left(\frac{3}{\cancel{5}} \right)}{2^2} = \frac{5x + 3}{4x - 6}$$

$$\frac{6}{4} \neq \frac{5x + 3}{4x - 6}$$

$$6(4x - 6) = 4(5x + 3)$$

$$24x - 36 = 20x + 12$$

$$24x - 20x = 12 + 36$$

$$4x = 48$$

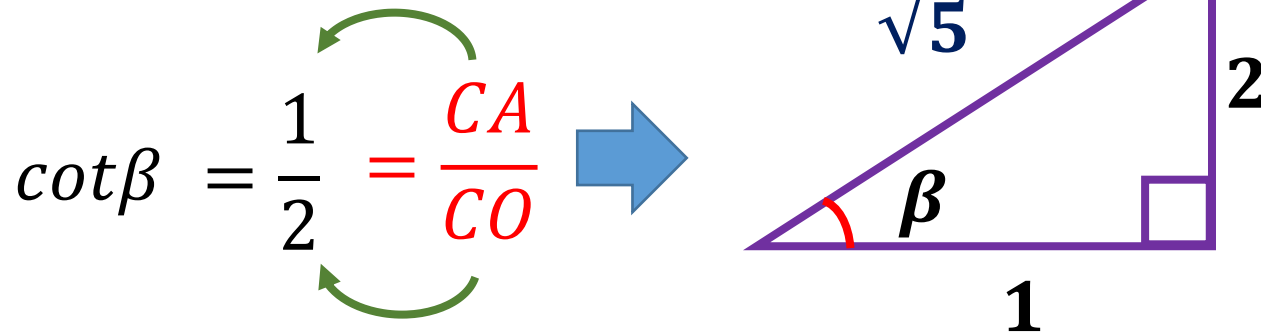
$$\therefore x = 12$$



7) Si $\cot\beta = \text{sen}30^\circ$, siendo β un ángulo agudo; efectúe
 $M = \sqrt{5} (\text{sen}\beta + \cos\beta)$

RESOLUCIÓN

Del dato tenemos:



Piden:

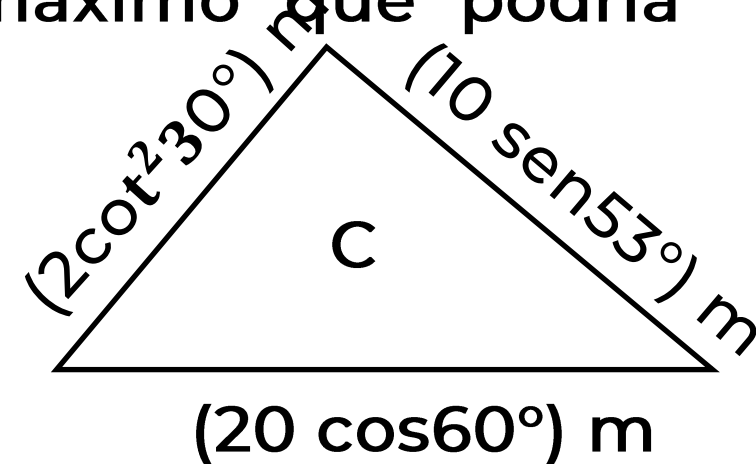
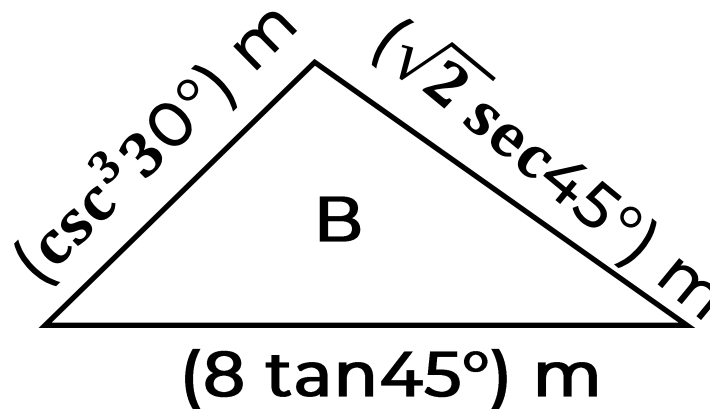
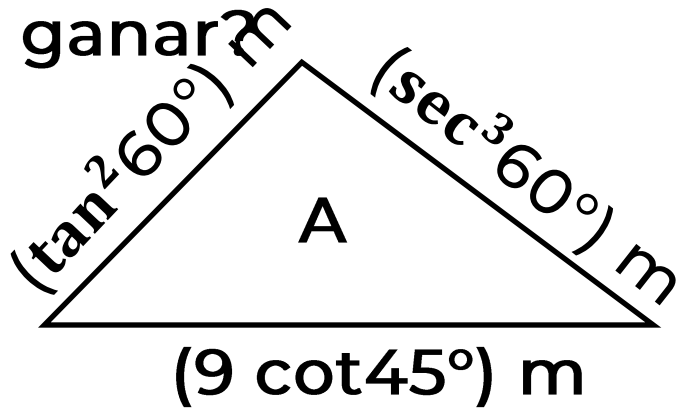
$$M = \sqrt{5}(\text{sen}\beta + \cos\beta)$$

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

$$\therefore M = 3$$



8) 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

Perímetro de A: $\tan^2 60^\circ + \sec^3 60^\circ + 9 \cot 45^\circ = \sqrt{3}^2 + 2^3 + 9(1) = 20 \rightarrow \text{s/200}$

Perímetro de B: $\csc^3 30^\circ + \sqrt{2} \sec 45^\circ + 8 \tan 45^\circ = 2^3 + \sqrt{2}(\sqrt{2}) + 8(1) = 18 \rightarrow \text{s/180}$

Perímetro de C: $2 \cot^2 30^\circ + 10 \sen 53^\circ + 20 \cos 60^\circ = 2\sqrt{3}^2 + 10 \cdot \frac{4}{5} + 20 \cdot \frac{1}{2} = 24 \rightarrow \text{s/240}$



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