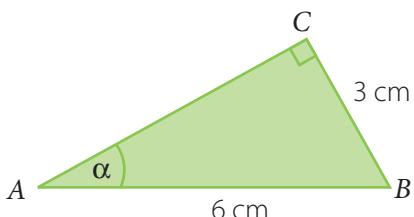


# Valores de las razones trigonométricas

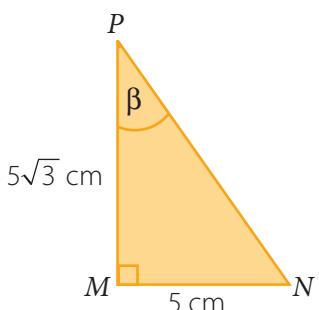
- 1. Analiza la siguiente situación.**

Imagina que eres un arquitecto y estas diseñando las diversas atracciones que tendrá un parque de diversiones. Cada triángulo representado en la imagen será una estructura diferente dentro del parque, como una rampa, un techo inclinado o una pared decorativa. Calcula la medida angular según corresponda de cada estructura.

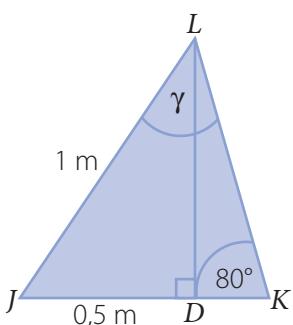
a.



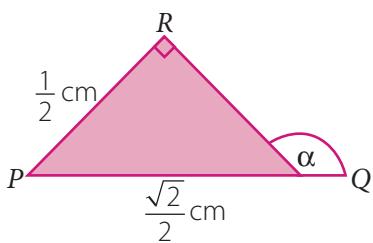
b.



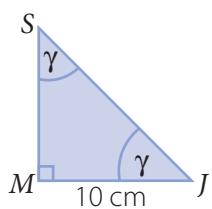
5



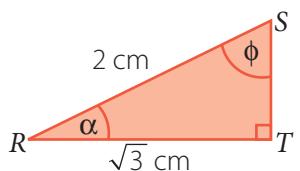
d.



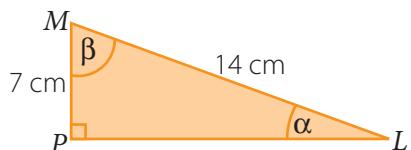
e.



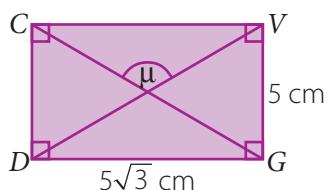
f.



g.



h.



2. Evalúa calculando, en cada caso, si la igualdad es verdadera o falsa.

3

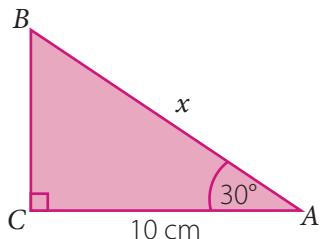
a.   $\sin 30^\circ + \sin 30^\circ = \sin 60^\circ$

b.   $\cos^2 60^\circ = 1 - \sin^2 60^\circ$

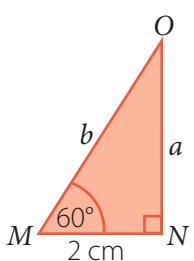
c.   $\cos 60^\circ \cdot \sin 30^\circ = \cos 30^\circ \cdot \sin 60^\circ$

3. Calcula cada longitud según corresponda.

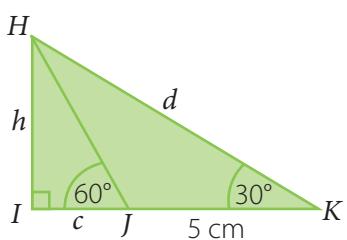
a.



b.



c.



4. Calcula el valor de cada expresión.

a.  $\sin 30^\circ + \cos 30^\circ$

g.  $\sin 45^\circ + \cos 45^\circ$

b.  $\frac{\cos 30^\circ}{\sin 60^\circ}$

h.  $\frac{\cos 30^\circ}{\sin 45^\circ}$

c.  $\tan 60^\circ - \sin 60^\circ$

i.  $\cos^2 45^\circ + \sin^2 45^\circ$

d.  $\cos 30^\circ - \sin 30^\circ$

j.  $(\sin 45^\circ + \cos 60^\circ)^2$

e.  $\cos^2 60^\circ - \sin^2 60^\circ$

k.  $\frac{\tan^2 45^\circ}{\sin^2 60^\circ + \cos^2 60^\circ}$

f.  $1 - \cos^2 30^\circ$

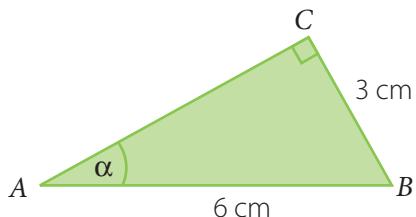
l.  $\frac{\tan^2 30^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

# Valores de las razones trigonométricas

1. Analiza la siguiente situación.

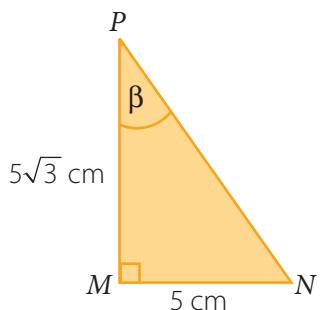
Imagina que eres un arquitecto y estas diseñando las diversas atracciones que tendrá un parque de diversiones. Cada triángulo representado en la imagen será una estructura diferente dentro del parque, como una rampa, un techo inclinado o una pared decorativa. Calcula la medida angular según corresponda de cada estructura.

a.



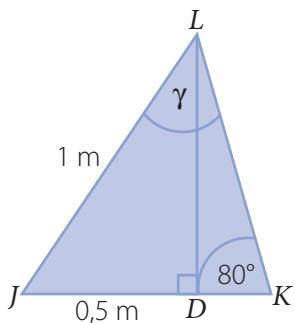
$$\operatorname{sen} \alpha = \frac{3}{6} = \frac{1}{2} \Rightarrow \alpha = 30^\circ$$

b.



$$\tan \beta = \frac{5}{5\sqrt{3}} = \frac{\sqrt{3}}{3} \Rightarrow \beta = 30^\circ$$

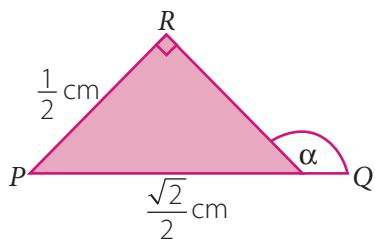
c.



$$\operatorname{sen}(\gamma - 10^\circ) = \frac{0,5}{1} = \frac{1}{2} \Rightarrow \gamma - 10^\circ = 30^\circ$$

$$\gamma = 40^\circ$$

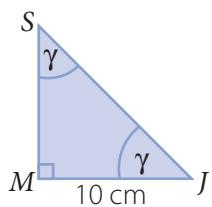
d.



$$\cos(180^\circ - \alpha) = \frac{\frac{1}{2}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{2}}{2} \Rightarrow 180^\circ - \alpha = 45^\circ$$

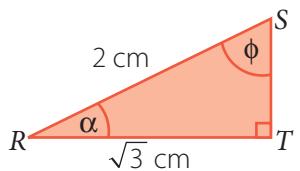
$$\alpha = 180^\circ - 45^\circ = 135^\circ$$

e.



$$\tan \gamma = \frac{10}{10} = 1 \Rightarrow \gamma = 45^\circ$$

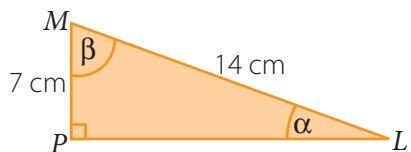
f.



$$\sin \phi = \frac{\sqrt{3}}{2} \Rightarrow \phi = 60^\circ$$

$$\alpha = 90^\circ - 60^\circ = 30^\circ$$

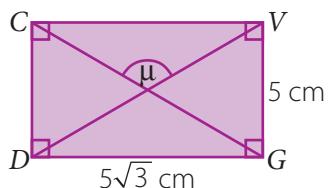
g.



$$\sin \alpha = \frac{7}{14} = \frac{1}{2} \Rightarrow \alpha = 30^\circ$$

$$\beta = 90^\circ - 30^\circ = 60^\circ$$

h.



$$\tan(\angle CVD) = \frac{5}{5\sqrt{3}} = \frac{\sqrt{3}}{3} \Rightarrow \angle CVD = 30^\circ$$

$$\mu = 180^\circ - 2 \cdot 30^\circ, \mu = 120^\circ$$

2. Evalúa calculando, en cada caso, si la igualdad es verdadera o falsa.

a.  F  $\sin 30^\circ + \sin 30^\circ = \sin 60^\circ$

$$\sin 30^\circ + \sin 30^\circ = \frac{1}{2} + \frac{1}{2} = 1,$$

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

b. **V**  $\cos^2 60^\circ = 1 - \sin^2 60^\circ$

$$\cos^2 60^\circ = \left(\frac{1}{2}\right)^2 = \frac{1}{4},$$

$$1 - \sin^2 60^\circ = 1 - \left(\frac{\sqrt{3}}{2}\right)^2 = 1 - \frac{3}{4} = \frac{1}{4}$$

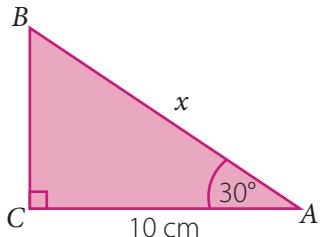
c. **F**  $\cos 60^\circ \cdot \sin 30^\circ = \cos 30^\circ \cdot \sin 60^\circ$

$$\cos 60^\circ \cdot \sin 30^\circ = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4};$$

$$\cos 30^\circ \cdot \sin 60^\circ = \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{2} = \frac{3}{4}$$

3. Calcula cada longitud según corresponda.

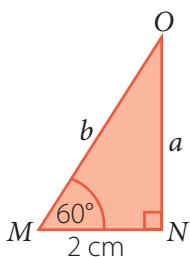
a.



$$\cos 30^\circ = \frac{10}{x} \Rightarrow x = \frac{10}{\cos 30^\circ}$$

$$x = \frac{10}{\frac{\sqrt{3}}{2}} = \frac{20}{\sqrt{3}} \Rightarrow x = \frac{20\sqrt{3}}{3} \text{ cm}$$

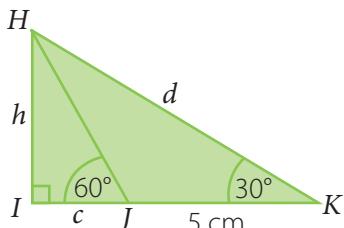
b.



$$\cos 60^\circ = \frac{2}{b} \Rightarrow b = \frac{2}{\cos 60^\circ} = \frac{2}{\frac{1}{2}} \Rightarrow b = 4 \text{ cm}$$

$$\sin 60^\circ = \frac{a}{4} \Rightarrow a = 4 \cdot \sin 60^\circ \Rightarrow a = 4 \cdot \frac{\sqrt{3}}{2} \Rightarrow a = 2\sqrt{3} \text{ cm}$$

c.



$$\tan 30^\circ = \frac{h}{5+c} \Rightarrow h = (5+c) \cdot \tan 30^\circ$$

$$\tan 60^\circ = \frac{h}{c} \Rightarrow h = c \cdot \tan 60^\circ$$

$$(5+c) \frac{\sqrt{3}}{3} = c\sqrt{3} \Rightarrow 5+c = 3c \Rightarrow 2c=5 \Rightarrow c = \frac{5}{2} \text{ cm}$$

$$h = \frac{5}{2} \sqrt{3} \text{ cm}$$

4. Calcula el valor de cada expresión.

a.  $\sin 30^\circ + \cos 30^\circ$

$$\frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{1 + \sqrt{3}}{2}$$

b.  $\frac{\cos 30^\circ}{\sin 60^\circ}$

$$\frac{\frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2}} = 1$$

c.  $\tan 60^\circ - \sin 60^\circ$

$$\sqrt{3} - \frac{\sqrt{3}}{2} = \frac{2\sqrt{3} - \sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

d.  $\cos 30^\circ - \sin 30^\circ$

$$\frac{\sqrt{3}}{2} - \frac{1}{2} = \frac{\sqrt{3} - 1}{2}$$

e.  $\cos^2 60^\circ - \sin^2 60^\circ$

$$\left(\frac{1}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1 - 3}{4} = -\frac{1}{2}$$

f.  $1 - \cos^2 30^\circ$

$$1 - \left(\frac{\sqrt{3}}{2}\right)^2 = 1 - \frac{3}{4} = \frac{1}{4}$$

g.  $\sin 45^\circ + \cos 45^\circ$

$$\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

h.  $\frac{\cos 30^\circ}{\sin 45^\circ}$

$$\frac{\frac{\sqrt{3}}{2}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{6}}{2}$$

i.  $\cos^2 45^\circ + \sin^2 45^\circ$

$$\left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} + \frac{2}{4} = 1$$

j.  $(\sin 45^\circ + \cos 60^\circ)^2$

$$\left(\frac{\sqrt{2}}{2} + \frac{1}{2}\right)^2 = \frac{(1 + \sqrt{2})^2}{4}$$

k.  $\frac{\tan^2 45^\circ}{\sin^2 60^\circ + \cos^2 60^\circ}$

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

l.  $\frac{\tan^2 30^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

$$\frac{\left(\frac{\sqrt{3}}{3}\right)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2} = \frac{\frac{3}{9}}{\frac{1+3}{4}} = \frac{12}{36} = \frac{1}{3}$$