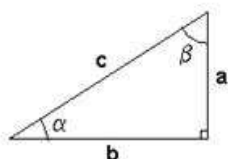


FORMULARIO DE TRIGONOMETRÍA

RAZONES TRIGONOMÉTRICAS EN EL TRIÁNGULO RECTÁNGULO

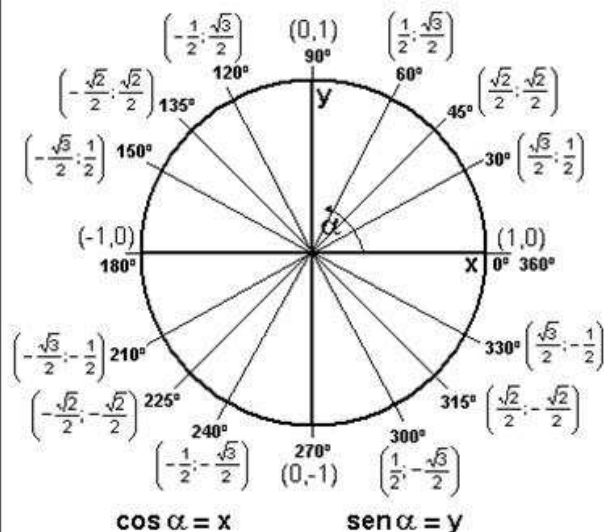


$$\begin{aligned}\operatorname{sen} \alpha &= \frac{\text{cateto opuesto a } \alpha}{\text{hipotenusa}} = \frac{a}{c} \\ \cos \alpha &= \frac{\text{cateto adyacente a } \alpha}{\text{hipotenusa}} = \frac{b}{c} \\ \operatorname{tg} \alpha &= \frac{\text{cateto opuesto a } \alpha}{\text{cateto adyacente a } \alpha} = \frac{a}{b}\end{aligned}$$

RAZONES TRIGONOMÉTRICAS DE LOS ÁNGULOS NOTABLES

		Sen	Coseno	Tangente
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$

CÍRCULO TRIGONOMÉTRICO



$$180^\circ \rightarrow \pi$$

RELACIONES ENTRE LAS FUNCIONES TRIGONOMÉTRICAS

$$\begin{aligned}\operatorname{sen}^2 \alpha + \cos^2 \alpha &= 1 & \operatorname{tg} \alpha &= \frac{\operatorname{sen} \alpha}{\cos \alpha} & \sec \alpha &= \frac{1}{\cos \alpha} \\ 1 + \operatorname{tg}^2 \alpha &= \sec^2 \alpha & \operatorname{ctg} \alpha &= \frac{\cos \alpha}{\operatorname{sen} \alpha} & \csc \alpha &= \frac{1}{\operatorname{sen} \alpha} \\ 1 + \operatorname{ctg}^2 \alpha &= \csc^2 \alpha & \operatorname{tg} \alpha &= \frac{1}{\operatorname{ctg} \alpha}\end{aligned}$$

SIGNO DE LAS FUNCIONES EN CADA CUADRANTE

	I	II	III	IV
sen	+	+	-	-
cos	+	-	-	+
tg	+	-	+	-

IDENTIDADES DE SUMA Y DIFERENCIA DE ÁNGULOS

$$\begin{aligned}\operatorname{sen}(\alpha + \beta) &= \operatorname{sen} \alpha \cdot \cos \beta + \cos \alpha \cdot \operatorname{sen} \beta \\ \operatorname{sen}(\alpha - \beta) &= \operatorname{sen} \alpha \cdot \cos \beta - \cos \alpha \cdot \operatorname{sen} \beta \\ \cos(\alpha + \beta) &= \cos \alpha \cdot \cos \beta - \operatorname{sen} \alpha \cdot \operatorname{sen} \beta \\ \cos(\alpha - \beta) &= \cos \alpha \cdot \cos \beta + \operatorname{sen} \alpha \cdot \operatorname{sen} \beta\end{aligned}$$

$$\operatorname{tg}(\alpha + \beta) = \frac{\operatorname{tg} \alpha + \operatorname{tg} \beta}{1 - \operatorname{tg} \alpha \cdot \operatorname{tg} \beta} \quad \operatorname{tg}(\alpha - \beta) = \frac{\operatorname{tg} \alpha - \operatorname{tg} \beta}{1 + \operatorname{tg} \alpha \cdot \operatorname{tg} \beta}$$

IDENTIDADES DEL ÁNGULO DOBLE

$$\begin{aligned}\operatorname{sen} 2\alpha &= 2 \operatorname{sen} \alpha \cos \alpha & \operatorname{tg}(2\alpha) &= \frac{2 \operatorname{tg} \alpha}{1 - \operatorname{tg}^2 \alpha} \\ \cos 2\alpha &= \cos^2 \alpha - \operatorname{sen}^2 \alpha\end{aligned}$$

IDENTIDADES DEL ÁNGULO MEDIO

$$\begin{aligned}\operatorname{sen}\left(\frac{\alpha}{2}\right) &= \pm \sqrt{\frac{1 - \cos \alpha}{2}} & \cos\left(\frac{\alpha}{2}\right) &= \pm \sqrt{\frac{1 + \cos \alpha}{2}} \\ \operatorname{tg}\left(\frac{\alpha}{2}\right) &= \pm \sqrt{\frac{1 - \cos \alpha}{1 + \cos \alpha}}\end{aligned}$$

FUNCIONES TRIGONOMÉTRICAS DE ÁNGULOS OPUESTOS

$$\begin{aligned}\cos(-\alpha) &= \cos \alpha & \sec(-\alpha) &= \sec \alpha \\ \operatorname{sen}(-\alpha) &= -\operatorname{sen} \alpha & \csc(-\alpha) &= -\csc \alpha \\ \operatorname{tg}(-\alpha) &= -\operatorname{tg} \alpha & \operatorname{ctg}(-\alpha) &= -\operatorname{ctg} \alpha\end{aligned}$$

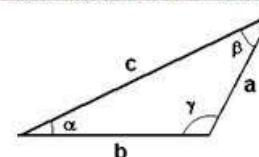
FÓRMULAS DE REDUCCIÓN AL PRIMER CUADRANTE ($\beta \in [0, \pi/2]$)

$$\begin{aligned}\text{II CUADRANTE } (90^\circ < \alpha < 180^\circ) & \quad \beta = 180^\circ - \alpha \\ \text{III CUADRANTE } (180^\circ < \alpha < 270^\circ) & \quad \beta = \alpha - 180^\circ \\ \text{IV CUADRANTE } (270^\circ < \alpha < 360^\circ) & \quad \beta = 360^\circ - \alpha\end{aligned}$$

TRANSFORMACIÓN EN PRODUCTO DE LA SUMA O DIFERENCIA DE CO SENOS Y SENOS

$$\begin{aligned}\operatorname{sen} A + \operatorname{sen} B &= 2 \operatorname{sen}\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right) \\ \operatorname{sen} A - \operatorname{sen} B &= 2 \cos\left(\frac{A+B}{2}\right) \operatorname{sen}\left(\frac{A-B}{2}\right) \\ \cos A + \cos B &= 2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right) \\ \cos A - \cos B &= -2 \operatorname{sen}\left(\frac{A+B}{2}\right) \operatorname{sen}\left(\frac{A-B}{2}\right)\end{aligned}$$

TEOREMAS DEL SENO Y CO SENO



TEOREMA DEL SENO

$$\frac{a}{\operatorname{sen} \alpha} = \frac{b}{\operatorname{sen} \beta} = \frac{c}{\operatorname{sen} \gamma}$$

TEOREMA DEL CO SENO

$$\begin{aligned}a^2 &= b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos \alpha \\ b^2 &= a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos \beta \\ c^2 &= a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos \gamma\end{aligned}$$