

# FÓRMULAS TRIGONOMÉTRICAS.

## 1. Igualdad fundamental.

$$\text{sen}^2 \alpha + \text{cos}^2 \alpha = 1$$

$$1 + \text{tag}^2 \alpha = \frac{1}{\text{cos}^2 \alpha} = \text{sec}^2 \alpha$$

$$1 + \text{ctag}^2 \alpha = \frac{1}{\text{sen}^2 \alpha} = \text{cosec}^2 \alpha$$

## 2. Cambios de cuadrante.

a. Complementarios.

$$\text{sen}(90 - \alpha) = \text{cos} \alpha$$

$$\text{cos}(90 - \alpha) = \text{sen} \alpha$$

$$\text{tag}(90 - \alpha) = \text{ctag} \alpha$$

b. Suplementarios.

$$\text{sen}(180 - \alpha) = \text{sen} \alpha$$

$$\text{cos}(180 - \alpha) = -\text{cos} \alpha$$

$$\text{tag}(180 - \alpha) = -\text{tag} \alpha$$

c. Se diferencian en 180º

$$\text{sen}(180 + \alpha) = -\text{sen} \alpha$$

$$\text{cos}(180 + \alpha) = -\text{cos} \alpha$$

$$\text{tag}(180 + \alpha) = \text{tag} \alpha$$

d. Opuestos y suman 360º.

$$\text{sen}(-\alpha) = \text{sen}(360 - \alpha) = -\text{sen} \alpha$$

$$\text{cos}(-\alpha) = \text{cos}(360 - \alpha) = \text{cos} \alpha$$

$$\text{tag}(-\alpha) = \text{tag}(360 - \alpha) = -\text{tag} \alpha$$

## 3. Teoremas

$$\frac{a}{\text{sen} \hat{A}} = \frac{b}{\text{sen} \hat{B}} = \frac{c}{\text{sen} \hat{C}}$$

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A}$$

$$b^2 = a^2 + c^2 - 2ac \cos \hat{B}$$

$$c^2 = a^2 + b^2 - 2ab \cos \hat{C}$$

## 4. Ángulo suma.

$$\text{sen}(\alpha + \beta) = \text{sen} \alpha \cdot \text{cos} \beta + \text{cos} \alpha \cdot \text{sen} \beta$$

$$\text{cos}(\alpha + \beta) = \text{cos} \alpha \cdot \text{cos} \beta - \text{sen} \alpha \cdot \text{sen} \beta$$

$$\text{tag}(\alpha + \beta) = \frac{\text{tag} \alpha + \text{tag} \beta}{1 - \text{tag} \alpha \cdot \text{tag} \beta}$$

## 5. Ángulo diferencia

$$\text{sen}(\alpha - \beta) = \text{sen} \alpha \cdot \text{cos} \beta - \text{cos} \alpha \cdot \text{sen} \beta$$

$$\text{cos}(\alpha - \beta) = \text{cos} \alpha \cdot \text{cos} \beta + \text{sen} \alpha \cdot \text{sen} \beta$$

$$\text{tag}(\alpha - \beta) = \frac{\text{tag} \alpha - \text{tag} \beta}{1 + \text{tag} \alpha \cdot \text{tag} \beta}$$

## 6. Ángulo doble.

$$\text{sen} 2\alpha = 2 \cdot \text{sen} \alpha \cdot \text{cos} \alpha$$

$$\text{cos} 2\alpha = \text{cos}^2 \alpha - \text{sen}^2 \alpha$$

$$\text{tag} 2\alpha = \frac{2 \text{tag} \alpha}{1 + \text{tag}^2 \alpha}$$

## 7. Ángulo mitad.

$$\text{sen} \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \text{cos} \alpha}{2}}$$

$$\text{cos} \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \text{cos} \alpha}{2}}$$

$$\text{tag} \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \text{cos} \alpha}{1 + \text{cos} \alpha}}$$

## 8. T. de sumas en productos.

$$\text{sen} \alpha + \text{sen} \beta = 2 \cdot \text{sen} \frac{\alpha + \beta}{2} \cdot \text{cos} \frac{\alpha - \beta}{2}$$

$$\text{sen} \alpha - \text{sen} \beta = 2 \cdot \text{cos} \frac{\alpha + \beta}{2} \cdot \text{sen} \frac{\alpha - \beta}{2}$$

$$\text{cos} \alpha + \text{cos} \beta = 2 \cdot \text{cos} \frac{\alpha + \beta}{2} \cdot \text{cos} \frac{\alpha - \beta}{2}$$

$$\text{cos} \alpha - \text{cos} \beta = -2 \cdot \text{sen} \frac{\alpha + \beta}{2} \cdot \text{sen} \frac{\alpha - \beta}{2}$$

cotangent e	$\mathbb{R}(\pm\infty)$	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0
secante	1	$\frac{2\sqrt{3}}{3}$	$\sqrt{2}$	2	$\mathbb{R}(\pm\infty)$
cosecant e	$\mathbb{R}(\pm\infty)$	2	$\sqrt{2}$	$\frac{2\sqrt{3}}{3}$	1
tangente	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\mathbb{R}(\pm\infty)$
coseno	$\frac{\sqrt{4}}{2} = 1$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{0}}{2} = 0$
seno	$\frac{\sqrt{0}}{2} = 0$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2} = 1$
Grado s sexag.	0º	30º	45º	60º	90º
Radiane s	0	$\frac{1}{6}\pi$	$\frac{1}{4}\pi$	$\frac{1}{3}\pi$	$\frac{1}{2}\pi$

**FUNCIONES TRIGONOMÉTRICAS**

