TRIGONOMETRÍA

Fórmulas trigonométricas

Ecuación fundamental: $\text{sen}^2\,\alpha + \cos^2\alpha = 1$

Definiciones:

$$\text{tg}\,\alpha = \frac{\text{sen}\,\alpha}{\cos\alpha} \qquad \text{cosec}\,\alpha = \frac{1}{\text{sen}\,\alpha} \qquad \sec\alpha = \frac{1}{\cos\alpha} \qquad \text{cotg}\,\alpha = \frac{1}{\text{tg}\,\alpha} = \frac{\cos\alpha}{\text{sen}\,\alpha}$$

Otras relaciones: $1 + \text{tg}^2\,\alpha = \sec^2\alpha$ $\qquad 1 + \text{cotg}^2\,\alpha = \text{cosec}^2\,\alpha$

Razones trigonométricas de la suma de ángulos:

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

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

$$\text{tg}\,(\alpha+\beta) = \frac{\text{tg}\,\alpha + \text{tg}\,\beta}{1 - \text{tg}\,\alpha\,\text{tg}\,\beta}$$

Razones trigonométricas de la diferencia de ángulos:

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

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

$$\text{tg}\,(\alpha-\beta) = \frac{\text{tg}\,\alpha - \text{tg}\,\beta}{1 + \text{tg}\,\alpha\,\text{tg}\,\beta}$$

Razones trigonométricas del ángulo doble:

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

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

$$\text{tg}\,2\alpha = \frac{2\,\text{tg}\,\alpha}{1 - \text{tg}^2\,\alpha}$$

Razones trigonométricas del ángulo mitad:

$$\text{sen}\,\frac{\alpha}{2} = \pm\sqrt{\frac{1-\cos\alpha}{2}} \qquad \text{tg}\,\frac{\alpha}{2} = \pm\sqrt{\frac{1-\cos\alpha}{1+\cos\alpha}}$$

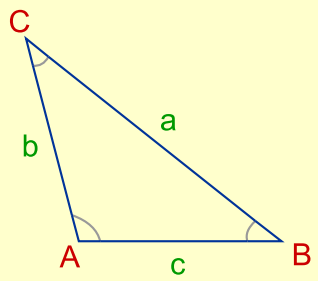
$$\cos\frac{\alpha}{2} = \pm\sqrt{\frac{1+\cos\alpha}{2}}$$

Conversión de sumas y diferencias en productos:

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

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

Resolución de triángulos:



$$\hat{A} + \hat{B} + \hat{C} = 180^\circ$$

Teorema del seno:

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

Teorema del coseno:

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

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

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