FUNCIONES TRIGONOMÉTRICAS

Función Seno	$sen(x)$
Función Coseno	$cos(x)$
Función Tangente	$tan(x)$
Función Cotangente	$cot(x)$
Función Secante	$sec(x)$
Función Cosecante	$csc(x)$

RAZONES TRIGONOMÉTRICAS

$$sen(x) = \frac{\text{opuesto}}{\text{hipotenusa}} \qquad csc(x) = \frac{\text{hipotenusa}}{\text{opuesto}}$$

$$cos(x) = \frac{\text{adyacente}}{\text{hipotenusa}} \qquad sec(x) = \frac{\text{hipotenusa}}{\text{adyacente}}$$

$$tan(x) = \frac{\text{opuesto}}{\text{adyacente}} \qquad cot(x) = \frac{\text{adyacente}}{\text{opuesto}}$$

IDENTIDADES TRIGONOMÉTRICAS

Identidades Recíprocas

$$sen(x) = \frac{1}{csc(x)} \qquad csc(x) = \frac{1}{sen(x)}$$

$$cos(x) = \frac{1}{sec(x)} \qquad sec(x) = \frac{1}{cos(x)}$$

$$tan(x) = \frac{1}{cot(x)} \qquad cot(x) = \frac{1}{tan(x)}$$

Identidades Cocientes

$$tan(x) = \frac{sen(x)}{cos(x)} \qquad cot(x) = \frac{cos(x)}{sen(x)}$$

Identidades Pitagóricas

$$sen^2(x) + cos^2(x) = 1 \qquad \begin{cases} sen^2(x) = 1 - cos^2(x) \\ cos^2(x) = 1 - sen^2(x) \end{cases}$$

$$tan^2(x) + 1 = sec^2(x) \qquad \begin{cases} tan^2(x) = sec^2(x) - 1 \\ sec^2(x) - tan^2(x) = 1 \end{cases}$$

$$cot^2(x) + 1 = csc^2(x) \qquad \begin{cases} cot^2(x) = csc^2(x) - 1 \\ csc^2(x) - cot^2(x) = 1 \end{cases}$$

Identidades Pares o Impares

$$sen(-x) = -sen(x) \qquad csc(-x) = -csc(x)$$

$$cos(-x) = cos(x) \qquad sec(-x) = sec(x)$$

$$tan(-x) = -tan(x) \qquad cot(-x) = -cot(x)$$

Identidades de Suma y Diferencia

$$sen(x+y) = sen(x)cos(y) + cos(x)sen(y)$$

$$sen(x-y) = sen(x)cos(y) - cos(x)sen(y)$$

$$cos(x+y) = cos(x)cos(y) - sen(x)sen(y)$$

$$cos(x-y) = cos(x)cos(y) + sen(x)sen(y)$$

$$tan(x+y) = \frac{tan(x) + tan(y)}{1 - tan(x)\,tan(y)}$$

$$tan(x-y) = \frac{tan(x) - tan(y)}{1 + tan(x)\,tan(y)}$$

$$cot(x+y) = \frac{cot(x)\,cot(y) - 1}{cot(y) + cot(x)}$$

$$cot(x-y) = \frac{cot(x)\,cot(y) + 1}{cot(y) - cot(x)}$$

Identidades de Suma a Producto

$$sen(x) + sen(y) = 2\,sen\left(\frac{x+y}{2}\right)cos\left(\frac{x-y}{2}\right)$$

$$sen(x) - sen(y) = 2\,sen\left(\frac{x-y}{2}\right)cos\left(\frac{x+y}{2}\right)$$

$$cos(x) + cos(y) = 2\,cos\left(\frac{x+y}{2}\right)cos\left(\frac{x-y}{2}\right)$$

$$cos(x) - cos(y) = -2\,sen\left(\frac{x+y}{2}\right)sen\left(\frac{x-y}{2}\right)$$

$$\frac{sen(x) + sen(y)}{sen(x) - sen(y)} = \frac{tan\left(\frac{x+y}{2}\right)}{tan\left(\frac{x-y}{2}\right)}$$

$$\frac{cos(x) + cos(y)}{cos(x) - cos(y)} = -cot\left(\frac{x+y}{2}\right)cot\left(\frac{x-y}{2}\right)$$

$$\frac{sen(x) + sen(y)}{cos(x) + cos(y)} = tan\left(\frac{x+y}{2}\right)$$

Identidades de Producto a Suma

$$sen(x)\,sen(y) = \frac{1}{2}(cos(x-y) - cos(x+y))$$

$$sen(x)\,cos(y) = \frac{1}{2}(sen(x+y) + sen(x-y))$$

$$cos(x)\,sen(y) = \frac{1}{2}(sen(x+y) - sen(x-y))$$

$$cos(x)\,cos(y) = \frac{1}{2}(cos(x+y) + cos(x-y))$$

Identidades de Ángulo Mitad

$$sen\left(\frac{x}{2}\right) = \pm\sqrt{\frac{1-cos(x)}{2}}$$

$$cos\left(\frac{x}{2}\right) = \pm\sqrt{\frac{1+cos(x)}{2}}$$

$$tan\left(\frac{x}{2}\right) = \pm\sqrt{\frac{1-cos(x)}{1+cos(x)}} = \frac{sen(x)}{1+cos(x)} = \frac{1-cos(x)}{sen(x)}$$

$$cot\left(\frac{x}{2}\right) = \pm\sqrt{\frac{1+cos(x)}{1-cos(x)}} = \frac{sen(x)}{1-cos(x)} = \frac{1+cos(x)}{sen(x)}$$

Identidades de Ángulo Doble

$$sen(2x) = 2\,sen(x)cos(x)$$

$$cos(2x) = cos^2(x) - sen^2(x)$$
$$cos(2x) = 2\,cos^2(x) - 1 = 1 - 2\,sen^2(x)$$

$$tan(2x) = \frac{2\,tan(x)}{1-tan^2(x)}$$

$$cot(2x) = \frac{cot^2(x)-1}{2\,cot(x)}$$

Identidades de Ángulo Triple

$$sen(3x) = 3\,sen(x) - 4\,sen^3(x)$$

$$cos(3x) = 4\,cos^3(x) - 3\,cos(x)$$

$$tan(3x) = \frac{3\,tan(x) - tan^3(x)}{1-3\,tan^2(x)}$$

$$cot(3x) = \frac{cot^3(x) - 3\,cot(x)}{3\,cot^2(x)-1}$$

Identidades de Potencias

$$sen^2(x) = \frac{1-cos(2x)}{2}$$

$$cos^2(x) = \frac{1+cos(2x)}{2}$$

$$tan^2(x) = \frac{1-cos(2x)}{1+cos(2x)}$$

$$cot^2(x) = \frac{1+cos(2x)}{1-cos(2x)}$$

Identidades de Cofunciones

$$sen(x) = cos\left(\frac{\pi}{2}-x\right) \qquad cos(x) = sen\left(\frac{\pi}{2}-x\right)$$

$$sec(x) = csc\left(\frac{\pi}{2}-x\right) \qquad csc(x) = sec\left(\frac{\pi}{2}-x\right)$$

$$tan(x) = cot\left(\frac{\pi}{2}-x\right) \qquad cot(x) = tan\left(\frac{\pi}{2}-x\right)$$

Otras Identidades

$$sen(x+y)\,sen(x-y) = sen^2(x) - sen^2(y)$$
$$sen(x+y)\,sen(x-y) = cos^2(y) - cos^2(x)$$

$$cos(x+y)\,cos(x-y) = cos^2(x) - sen^2(y)$$
$$cos(x+y)\,cos(x-y) = cos^2(y) - sen^2(x)$$

Ley del Seno

$$\frac{a}{sen(\mathrm{A})} = \frac{b}{sen(\mathrm{B})} \qquad \begin{cases} \frac{a}{sen(\mathrm{A})} = \frac{c}{sen(\mathrm{C})} \\ \frac{b}{sen(\mathrm{B})} = \frac{c}{sen(\mathrm{C})} \end{cases}$$

Ley del Coseno

$$a^2 = b^2 + c^2 - 2bc\,cos(\mathrm{A}) \qquad \left\{cos(\mathrm{A}) = \frac{b^2+c^2-a^2}{2bc}\right.$$

$$b^2 = a^2 + c^2 - 2ac\,cos(\mathrm{B}) \qquad \left\{cos(\mathrm{B}) = \frac{a^2+c^2-b^2}{2ac}\right.$$

$$c^2 = a^2 + b^2 - 2ab\,cos(\mathrm{C}) \qquad \left\{cos(\mathrm{C}) = \frac{a^2+b^2-c^2}{2ab}\right.$$

Ley de la Tangente

$$\frac{a+b}{a-b} = \frac{tan\left(\frac{\mathrm{A}+\mathrm{B}}{2}\right)}{tan\left(\frac{\mathrm{A}-\mathrm{B}}{2}\right)} \qquad \begin{cases} \frac{a+c}{a-c} = \frac{tan\left(\frac{\mathrm{A}+\mathrm{C}}{2}\right)}{tan\left(\frac{\mathrm{A}-\mathrm{C}}{2}\right)} \\ \frac{b+c}{b-c} = \frac{tan\left(\frac{\mathrm{B}+\mathrm{C}}{2}\right)}{tan\left(\frac{\mathrm{B}-\mathrm{C}}{2}\right)} \end{cases}$$

Teorema de Pitágoras

$$a^2 + b^2 = c^2 \qquad \begin{cases} a^2 = c^2 - b^2 \\ b^2 = c^2 - a^2 \end{cases}$$

Fórmula de Herón

$$\mathrm{A}_{\triangle} = \sqrt{s(s-a)(s-b)(s-c)} \qquad \left\{s = \frac{a+b+c}{2}\right.$$