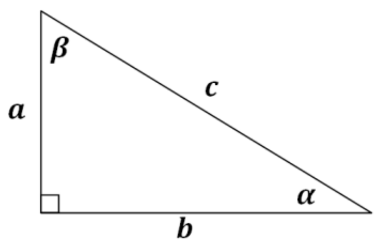
FÓRMULAS DE APOYO - EVALUACIONES

Trigonometría

Considerando el siguiente triángulo rectángulo:



$$sen(\alpha) = \frac{a}{c} \qquad cos(\alpha) = \frac{b}{c} \qquad tan(\alpha) = \frac{a}{b}$$

$$sen(\beta) = \frac{b}{c} \qquad cos(\beta) = \frac{a}{c} \qquad tan(\beta) = \frac{b}{a}$$

Identidades Recíprocas	Identidades por Cociente	Identidades Pitagóricas
$\csc(\alpha) = \frac{1}{sen(\alpha)} = \frac{c}{a}$ $\sec(\alpha) = \frac{1}{cos(\alpha)} = \frac{c}{b}$ $\cot(\alpha) = \frac{1}{tan(\alpha)} = \frac{b}{a}$	$\tan(\alpha) = \frac{sen(\alpha)}{cos(\alpha)} = \frac{\frac{a}{c}}{\frac{b}{c}} = \frac{a}{b}$ $\cot(\alpha) = \frac{\cos(\alpha)}{sen(\alpha)} = \frac{\frac{c}{a}}{\frac{c}{b}} = \frac{b}{a}$	$sen^2(\alpha) + \cos^2(\alpha) = 1$ $\sec^2(\alpha) - tan^2(\alpha) = 1$ $\csc^2(\alpha) - \cot^2(\alpha) = 1$

Teorema de Pitágoras $\quad a^2 + b^2 = c^2$

Equivalencia entre radianes y grados sexagesimales $\quad 1\pi$ rad $= 180°$

Teorema del Seno $\quad \frac{\sin(\alpha)}{a} = \frac{\sin(\beta)}{b} = \frac{\sin(\gamma)}{c}$

Teorema del Coseno

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(\alpha)$$
$$b^2 = a^2 + c^2 - 2ac \cdot \cos(\beta)$$
$$c^2 = a^2 + b^2 - 2ab \cdot \cos(\gamma)$$

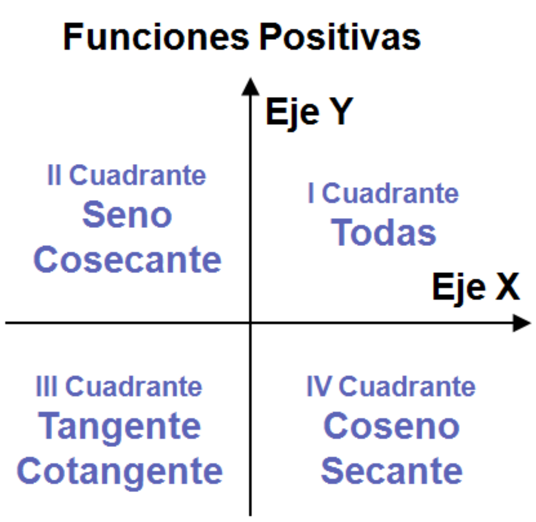
Ángulos (α)		Razones Trigonométricas		
Sexagesimales	Radianes	sen(α)	cos(α)	tan(α)
0°	0	0	1	0
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	--

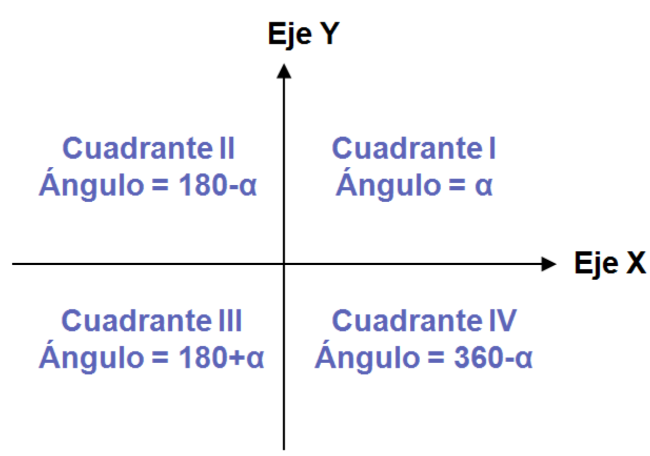
Suma y Resta de ángulos	
Seno	$\text{sen}(\alpha + \beta) = \text{sen}(\alpha) \cdot \cos(\beta) + \cos(\alpha) \cdot \text{sen}(\beta)$ $\text{sen}(\alpha - \beta) = \text{sen}(\alpha) \cdot \cos(\beta) - \cos(\alpha) \cdot \text{sen}(\beta)$
Coseno	$\cos(\alpha + \beta) = \cos(\alpha) \cdot \cos(\beta) - \text{sen}(\alpha) \cdot \text{sen}(\beta)$ $\cos(\alpha - \beta) = \cos(\alpha) \cdot \cos(\beta) + \text{sen}(\alpha) \cdot \text{sen}(\beta)$
Tangente	$\tan(\alpha + \beta) = \frac{\tan(\alpha) + \tan(\beta)}{1 - \tan(\alpha) \cdot \tan(\beta)}$ $\tan(\alpha - \beta) = \frac{\tan(\alpha) - \tan(\beta)}{1 + \tan(\alpha) \cdot \tan(\beta)}$

Ángulos Dobles	
Seno	$\operatorname{sen}(2\alpha) = 2\operatorname{sen}(\alpha)\cdot\cos(\alpha)$
Coseno	$\cos(2\alpha) = \cos^2(\alpha) - \operatorname{sen}^2(\alpha)$ $\cos(2\alpha) = 2\cos^2(\alpha) - 1$ $\cos(2\alpha) = 1 - 2\operatorname{sen}^2(\alpha)$
Tangente	$\tan(2\alpha) = \dfrac{2\tan(\alpha)}{1-\tan^2(\alpha)}$

Ángulos Medios	
Seno	$\operatorname{sen}\left(\frac{\alpha}{2}\right) = \pm\sqrt{\dfrac{1-\cos(\alpha)}{2}}$
Coseno	$\cos\left(\frac{\alpha}{2}\right) = \pm\sqrt{\dfrac{1+\cos(\alpha)}{2}}$
Tangente	$\tan\left(\frac{\alpha}{2}\right) = \sqrt{\dfrac{1-\cos(\alpha)}{1+\cos(\alpha)}}$

Reducción al Primer Cuadrante:





Solución General de una Ecuación Trigonométrica:

$\operatorname{sen}(x) = b;$ $\quad -1 \le b \le 1;$ $\quad$ solución $= \begin{cases} x^\circ + 360^\circ k \\ (180 - x)^\circ + 360^\circ k \end{cases}$

solución $= \begin{cases} x + 2\pi\cdot k \\ (\pi - x) + 2\pi\cdot k \end{cases}$

$\cos(x) = b;$ $\quad -1 \le b \le 1;$ $\quad$ solución $= \pm x^\circ + 360^\circ k$

solución $= \pm x + 2\pi\cdot k$

$\tan(x) = b;$ $\quad b \in \mathbb{R};$ $\quad$ solución $= x^\circ + 180^\circ k$

solución $= x + \pi\cdot k$