Matemáticas Bachillerato

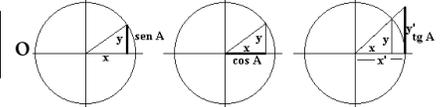# RESUMEN DE FÓRMULAS DE TRIGONOMETRÍA

Razones trigonométricas

$$\sin \alpha = \frac{cateto\ opuesto}{hipotenusa}$$

$$\cos \alpha = \frac{cateto\ contiguo}{hipotenusa}$$

$$\tan \alpha = \frac{cateto\ opuesto}{cateto\ contiguo}$$

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$cosec\ \alpha = \frac{1}{\sin \alpha}$$

$$sec\ \alpha = \frac{1}{\cos \alpha}$$

$$cotg\ \alpha = \frac{1}{tg\ \alpha}$$
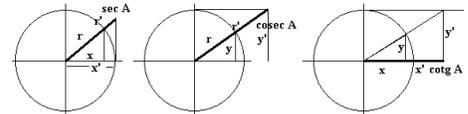
Relaciones Fundamentales

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha}$$

Relaciones Pitagóricas

$$1 + cotg^2 \alpha = cosec^2 \alpha$$

$$1 + tg^2 \alpha = sec^2 \alpha$$

Relaciones entre las razones trigonométricas

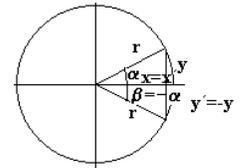#### *Ángulos opuestos*

$$\sin(-\alpha) = -\sin \alpha$$

$$\cos(-\alpha) = \cos \alpha$$

$$\tan(-\alpha) = -\tan \alpha$$

$$\sin(360 - \alpha) = -\sin \alpha$$

$$\cos(360 - \alpha) = \cos \alpha$$
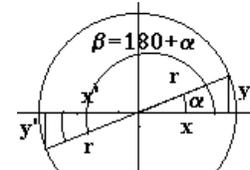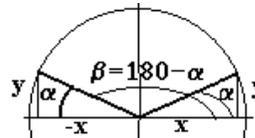
$$\tan(360 - \alpha) = -\tan \alpha$$

Ángulos suplementarios (180-α) y que difieren en 180 (180+α)

$$\sin(180 \mp \alpha) = \pm \sin \alpha$$

$$\cos(180 \mp \alpha) = -\cos \alpha$$

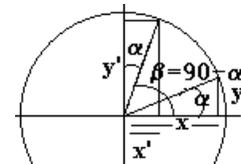$$\tan(180 \mp \alpha) = \mp \tan \alpha$$

Ángulos complementarios (90-α) y que difieren en 90 (90+α)

$$\sin(90 \mp \alpha) = \cos \alpha$$
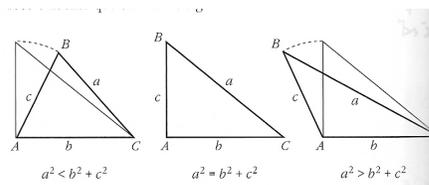
$$\cos(90 \mp \alpha) = \pm \sin \alpha$$

$$\tan(90 \mp \alpha) = \frac{\pm 1}{\tan \alpha}$$

Teorema de los senos (Sirve para cualquier tipo de triángulo)

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

Nota: *a* es el lado opuesto al ángulo A y así con el resto.

$$a^2 < b^2 + c^2 \qquad a^2 = b^2 + c^2 \qquad a^2 > b^2 + c^2$$

Teorema de los cosenos (Sirve para cualquier tipo de triángulo)

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} \qquad b^2 = a^2 + c^2 - 2ac \cos \hat{B} \qquad c^2 = a^2 + b^2 - 2ab \cos \hat{C}$$

Razones trigonométricas de suma o resta de ángulos

$$\sin(\alpha \pm \beta) = \sin \alpha \cos\beta \pm \cos\alpha \, sin\beta \qquad \cos(\alpha \pm \beta) = \cos\alpha \cos\beta \mp \sin\alpha \, sin\beta \qquad \tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha \, tan\beta}$$

Razones trigonométricas del ángulo doble

$$\sin(2\alpha) = 2 \sin\alpha \, cos\alpha \qquad \cos(2\alpha) = \cos^2\alpha - \sin^2\alpha \qquad \tan(2\alpha) = \frac{2\tan\alpha}{1 - \tan^2\alpha}$$

Razones trigonométricas del ángulo mitad

$$\sin\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1 - cos\alpha}{2}} \qquad \cos\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1 + cos\alpha}{2}} \qquad \tan\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1 - cos\alpha}{1 + cos\alpha}}$$
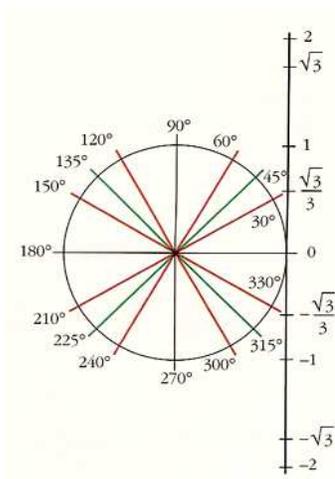
Sumas y Restas de senos y cosenos

$$\sin A + \sin B = 2 \sin\left(\frac{A+B}{2}\right) \cdot \cos\left(\frac{A-B}{2}\right) \qquad \sin A - \sin B = 2 \cos\left(\frac{A+B}{2}\right) \cdot \sin\left(\frac{A-B}{2}\right)$$

$$\cos A + \cos B = 2 \cos\left(\frac{A+B}{2}\right) \cdot \cos\left(\frac{A-B}{2}\right) \qquad \cos A - \cos B = -2 \sin\left(\frac{A+B}{2}\right) \cdot \sin\left(\frac{A-B}{2}\right)$$

Valores del sen, cos y tg usuales.

GRADOS	0°	30°	45°	60°	90°	120°	135°	150°
RADIANES	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	$2\pi/3$	$3\pi/4$	$5\pi/6$
sen	0	1/2	$\sqrt{2}/2$	$\sqrt{3}/2$	1	$\sqrt{3}/2$	$\sqrt{2}/2$	1/2
cos	1	$\sqrt{3}/2$	$\sqrt{2}/2$	1/2	0	−1/2	$-\sqrt{2}/2$	$-\sqrt{3}/2$
tg	0	$\sqrt{3}/3$	1	$\sqrt{3}$	—	$-\sqrt{3}$	−1	$-\sqrt{3}/3$

GRADOS	180°	210°	225°	240°	270°	300°	315°	330°
RADIANES	π	$7\pi/6$	$5\pi/4$	$4\pi/3$	$3\pi/2$	$5\pi/3$	$7\pi/4$	$11\pi/6$
sen	0	−1/2	$-\sqrt{2}/2$	$-\sqrt{3}/2$	−1	$-\sqrt{3}/2$	$-\sqrt{2}/2$	−1/2
cos	−1	$-\sqrt{3}/2$	$-\sqrt{2}/2$	−1/2	0	1/2	$\sqrt{2}/2$	$\sqrt{3}/2$
tg	0	$\sqrt{3}/3$	1	$\sqrt{3}$	—	$-\sqrt{3}$	−1	$-\sqrt{3}/3$