

**FORMULARIO DE LA ASIGNATURA AMPLIACIÓN DE
MATEMÁTICAS
Ingeniería Técnica en Topografía**

Tema I: Trigonometría Plana

Teorema del seno

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

Teorema del coseno

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

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

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

Suma de dos ángulos

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

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

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

Diferencia de dos ángulos

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

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

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

Ángulo doble

$$\operatorname{sen}(2\alpha) = 2\operatorname{sen} \alpha \cos \alpha$$

$$\cos(2\alpha) = \cos^2 \alpha - \operatorname{sen}^2 \alpha$$

$$\operatorname{tg}(2\alpha) = \frac{2\operatorname{tg} \alpha}{1 - \operatorname{tg}^2 \alpha}$$

Ángulo mitad

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

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

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

Suma y diferencia de senos

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

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

Suma y diferencia de cosenos

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

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

Suma y diferencia de tangentes

$$\operatorname{tg} \alpha + \operatorname{tg} \beta = \frac{\operatorname{sen}(\alpha + \beta)}{\operatorname{cos} \alpha \operatorname{cos} \beta}$$

$$\operatorname{tg} \alpha - \operatorname{tg} \beta = \frac{\operatorname{sen}(\alpha - \beta)}{\operatorname{cos} \alpha \operatorname{cos} \beta}$$