

RAZONES TRIGONOMÉTRICAS

RAZONES TRIGONOMÉTRICAS DE LA SUMA DE DOS ÁNGULOS

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

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

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

RAZONES TRIGONOMÉTRICAS DE LA DIFERENCIA DE DOS ÁNGULOS

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

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

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

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO DOBLE

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

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

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

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO MITAD

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

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

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

SUMAS Y DIFERENCIAS DE SENOS Y COSENOS

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

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

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

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