

FUNCIONES TRIGONOMÉTRICAS

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO SUMA

$$\operatorname{sen}(\alpha + \beta) = \operatorname{sen} \alpha \cos \beta + \cos \alpha \operatorname{sen} \beta \quad (\text{I.1})$$

$$\operatorname{cos}(\alpha + \beta) = \operatorname{cos} \alpha \cos \beta - \operatorname{sen} \alpha \operatorname{sen} \beta \quad (\text{I.2})$$

$$\operatorname{tg}(\alpha + \beta) = \frac{\operatorname{tg} \alpha + \operatorname{tg} \beta}{1 - \operatorname{tg} \alpha \operatorname{tg} \beta} \quad (\text{I.3})$$

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO DIFERENCIA

$$\operatorname{sen}(\alpha - \beta) = \operatorname{sen} \alpha \cos \beta - \cos \alpha \operatorname{sen} \beta \quad (\text{II.1})$$

$$\operatorname{cos}(\alpha - \beta) = \operatorname{cos} \alpha \cos \beta + \operatorname{sen} \alpha \operatorname{sen} \beta \quad (\text{II.2})$$

$$\operatorname{tg}(\alpha - \beta) = \frac{\operatorname{tg} \alpha - \operatorname{tg} \beta}{1 + \operatorname{tg} \alpha \operatorname{tg} \beta} \quad (\text{II.3})$$

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO DOBLE

$$\operatorname{sen} 2\alpha = 2 \operatorname{sen} \alpha \cos \alpha \quad (\text{III.1})$$

$$\operatorname{cos} 2\alpha = \operatorname{cos}^2 \alpha - \operatorname{sen}^2 \alpha \quad (\text{III.2})$$

$$\operatorname{tg} 2\alpha = \frac{2 \operatorname{tg} \alpha}{1 - \operatorname{tg}^2 \alpha} \quad (\text{III.3})$$

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO MITAD

$$\operatorname{sen} \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \operatorname{cos} \alpha}{2}} \quad (\text{IV.1})$$

$$\operatorname{cos} \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \operatorname{cos} \alpha}{2}} \quad (\text{IV.2})$$

$$\operatorname{tg} \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \operatorname{cos} \alpha}{1 + \operatorname{cos} \alpha}} \quad (\text{IV.3})$$

RAZONES TRIGONOMÉTRICAS DEL ÁNGULO DIFERENCIA

$$\operatorname{sen} A + \operatorname{sen} B = 2 \operatorname{sen} \frac{A+B}{2} \operatorname{cos} \frac{A-B}{2} \quad (\text{V.1})$$

$$\operatorname{sen} A - \operatorname{sen} B = 2 \operatorname{cos} \frac{A+B}{2} \operatorname{sen} \frac{A-B}{2} \quad (\text{V.2})$$

$$\operatorname{cos} A + \operatorname{cos} B = 2 \operatorname{cos} \frac{A+B}{2} \operatorname{cos} \frac{A-B}{2} \quad (\text{V.3})$$

$$\operatorname{cos} A - \operatorname{cos} B = -2 \operatorname{sen} \frac{A+B}{2} \operatorname{sen} \frac{A-B}{2} \quad (\text{V.4})$$