

Fórmulas trigonométricas

Razones trigonométricas de la suma de dos ángulos

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

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

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

Razones trigonométricas de la diferencia de dos ángulos

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

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

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

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

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

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

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

Sumas y diferencias de senos y cosenos: transformaciones de sumas y restas en productos

$$\operatorname{sen} A + \operatorname{sen} B = 2 \operatorname{sen} \frac{A+B}{2} \operatorname{cos} \frac{A-B}{2}$$

$$\operatorname{sen} A - \operatorname{sen} B = 2 \operatorname{cos} \frac{A+B}{2} \operatorname{sen} \frac{A-B}{2}$$

$$\operatorname{cos} A + \operatorname{cos} B = 2 \operatorname{cos} \frac{A+B}{2} \operatorname{cos} \frac{A-B}{2}$$

$$\operatorname{cos} A - \operatorname{cos} B = -2 \operatorname{sen} \frac{A+B}{2} \operatorname{sen} \frac{A-B}{2}$$