# FORMULARIO DI GONIOMETRIA

## FORMULE DI ADDIZIONE

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

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

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

con $\alpha, \beta, \alpha+\beta \neq \frac{\pi}{2} + k\pi$

## FORMULE DI SOTTRAZIONE

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

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

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

con $\alpha, \beta, \alpha-\beta \neq \frac{\pi}{2} + k\pi$

## FORMULE DI BISEZIONE

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

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

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

## FORMULE PARAMETRICHE

$$\operatorname{sen}\alpha = \frac{2\operatorname{tg}\alpha/2}{1+\operatorname{tg}^2\alpha/2}$$

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

## FORMULE DI DUPLICAZIONE

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

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

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

## FORMULE DI PROSTAFERESI

$$\operatorname{sen}p + \operatorname{sen}q = 2\operatorname{sen}\frac{p+q}{2} \cdot \cos\frac{p-q}{2}$$

$$\operatorname{sen}p - \operatorname{sen}q = 2\cos\frac{p+q}{2} \cdot \operatorname{sen}\frac{p-q}{2}$$

$$\cos p + \cos q = 2\cos\frac{p+q}{2} \cdot \cos\frac{p-q}{2}$$

$$\cos p - \cos q = -2\operatorname{sen}\frac{p+q}{2} \cdot \operatorname{sen}\frac{p-q}{2}$$

## FORMULE DI WERNER

$$\operatorname{sen}\alpha \cdot \operatorname{sen}\beta = 1/2\left[\cos(\alpha-\beta) - \cos(\alpha+\beta)\right]$$

$$\cos\alpha \cdot \cos\beta = 1/2\left[\cos(\alpha+\beta) + \cos(\alpha-\beta)\right]$$

$$\operatorname{sen}\alpha \cdot \cos\beta = 1/2\left[\operatorname{sen}(\alpha+\beta) + \operatorname{sen}(\alpha-\beta)\right]$$