

Formule di sottrazione

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \beta \sin \alpha$$

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

Formule di addizione

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \sin \beta \cos \alpha$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

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

Formule di duplicazione

$$\sin 2\alpha = 2 \sin \alpha \cdot \cos \alpha$$

$$1 - 2 \sin^2 \alpha$$

$$\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha \Rightarrow$$

$$2 \cos^2 \alpha - 1$$

$$\tan 2\alpha = \frac{2 \tan \alpha}{1 - \tan^2 \alpha}$$

Formule di bisezione

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

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

$$\tan \frac{\alpha}{2} \Rightarrow \frac{1 - \cos \alpha}{\sin \alpha}$$
$$\frac{\sin \alpha}{1 + \cos \alpha}$$

Formule parametriche

$$\sin \alpha = \frac{2 \tan \frac{\alpha}{2}}{1 + \tan^2 \frac{\alpha}{2}} \quad \text{con } \alpha \neq \pi + 2k\pi$$

$$\cos \alpha = \frac{1 - \tan^2 \frac{\alpha}{2}}{1 + \tan^2 \frac{\alpha}{2}} \quad \text{con } \alpha \neq \pi + 2k\pi$$

Formule di prostaferesi

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

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

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

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

Formule di Werner

$$\sin \alpha \cos \beta = \frac{1}{2} [\sin(\alpha + \beta) + \sin(\alpha - \beta)]$$

$$\cos \alpha \cos \beta = \frac{1}{2} [\cos(\alpha + \beta) + \cos(\alpha - \beta)]$$

$$\sin \alpha \sin \beta = \frac{1}{2} [\cos(\alpha - \beta) - \cos(\alpha + \beta)]$$

In funzione di ▶	$\sin \alpha$	$\cos \alpha$	$\tan \alpha$	$\cot \alpha$
$\sin \alpha$	$\sin \alpha$	$\pm \sqrt{1 - \cos^2 \alpha}$	$\pm \frac{\tan \alpha}{\sqrt{1 + \tan^2 \alpha}}$	$\pm \frac{1}{\sqrt{1 - \cot^2 \alpha}}$
$\cos \alpha$	$\pm \sqrt{1 - \sin^2 \alpha}$	$\cos \alpha$	$\pm \frac{1}{\sqrt{1 + \tan^2 \alpha}}$	$\pm \frac{\cot \alpha}{\sqrt{1 + \cot^2 \alpha}}$
$\tan \alpha$	$\pm \frac{\sin \alpha}{\sqrt{1 - \sin^2 \alpha}}$	$\pm \frac{\sqrt{1 - \cos^2 \alpha}}{\cos \alpha}$	$\tan \alpha$	$\frac{1}{\cot \alpha}$
$\cot \alpha$	$\pm \frac{\sqrt{1 - \sin^2 \alpha}}{\sin \alpha}$	$\pm \frac{\cos \alpha}{\sqrt{1 - \cos^2 \alpha}}$	$\frac{1}{\tan \alpha}$	$\cot \alpha$

I teorema dei tr. rett.

$$b = a \sin \beta \quad c = a \sin \gamma$$
$$b = a \cos \gamma \quad c = a \cos \beta$$

II teorema dei tr. rett.

$$b = c \tan \beta \quad c = b \tan \gamma$$
$$b = c \cot \gamma \quad c = b \cot \beta$$

Area

$$A = \frac{a \cdot c}{2} \sin \beta$$

$$A = \frac{a \cdot b}{2} \sin \gamma$$

$$A = \frac{b \cdot c}{2} \sin \alpha$$

Teorema della corda

$$\overline{AB} = 2r \sin \alpha$$

Teorema dei seni (o di Eulero)

$$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta} = \frac{c}{\sin \gamma}$$

Teorema delle proiezioni

$$a = c \cos \beta + b \cos \gamma$$

$$b = a \cos \gamma + c \cos \alpha$$

$$c = b \cos \alpha + a \cos \beta$$

Teorema del coseno (o di Carnot)

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

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

$$c^2 = a^2 + b^2 - 2abc \cos \gamma$$