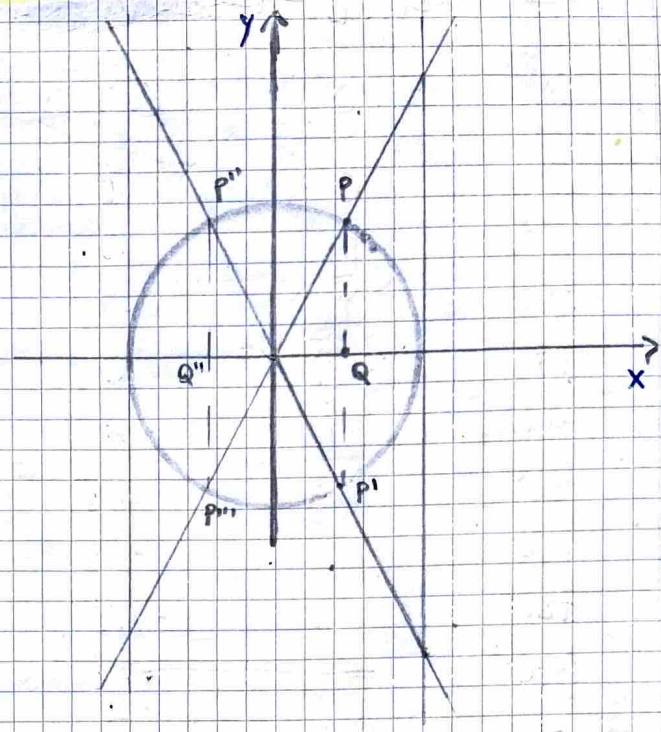
TABELLE GONIOMETRIA

$\alpha°$	$(\alpha)^{rad}$	$\cos\alpha$	$\text{sen}\,\alpha$	$\text{tg}\,\alpha$
0°	0	1	0	0
90°	$\pi/2$	0	1	n.e.
180°	π	-1	0	0
270°	$3/2\pi$	0	-1	n.e.
360°	2π	1	0	0
60°	$\pi/3$	$1/2$	$\sqrt{3}/2$	$\sqrt{3}$
240°		$-1/2$	$-\sqrt{3}/2$	$\sqrt{3}$
120°		$-1/2$	$\sqrt{3}/2$	$-\sqrt{3}$
300°		$1/2$	$-\sqrt{3}/2$	$-\sqrt{3}$
30°	$\pi/6$	$\sqrt{3}/2$	$1/2$	$\sqrt{3}/3$
210°		$-\sqrt{3}/2$	$-1/2$	$\sqrt{3}/3$
150°		$-\sqrt{3}/2$	$1/2$	$-\sqrt{3}/3$
330°		$\sqrt{3}/2$	$-1/2$	$-\sqrt{3}/3$
45°	$\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$	1
135°	$3/4\,\pi$	$-\sqrt{2}/2$	$\sqrt{2}/2$	-1
225°	$5/4\,\pi$	$-\sqrt{2}/2$	$-\sqrt{2}/2$	1
315°	$7/4\pi$	$\sqrt{2}/2$	$-\sqrt{2}/2$	-1

	$\cos\alpha$ (conoscendo)	$\text{sen}\,\alpha$ (conoscendo)	$\text{tg}\,\alpha$ (conoscendo)
$\cos\alpha$	$\cos\alpha$	$\pm\sqrt{1-\text{sen}^2\alpha}$	$\pm\dfrac{1}{\sqrt{1+\text{tg}^2\alpha}}$
$\text{sen}\,\alpha$	$\pm\sqrt{1-\cos^2\alpha}$	$\text{sen}\,\alpha$	$\pm\dfrac{\text{tg}\,\alpha}{\sqrt{1+\text{tg}^2\alpha}}$
$\text{tg}\,\alpha$	$\pm\dfrac{\sqrt{1-\cos^2\alpha}}{\cos\alpha}$	$\pm\dfrac{\text{sen}\,\alpha}{\sqrt{1-\text{sen}^2\alpha}}$	$\text{tg}\,\alpha$

FORMULE ARCHI/ANGOLI ASSOCIATI

	sen	cos	tg
α	$\sin\alpha$	$\cos\alpha$	$\operatorname{tg}\alpha$
$-\alpha$	$-\sin\alpha$	$\cos\alpha$	$-\operatorname{tg}\alpha$
$\pi-\alpha$	$\sin\alpha$	$-\cos\alpha$	$-\operatorname{tg}\alpha$
$\pi+\alpha$	$-\sin\alpha$	$-\cos\alpha$	$\operatorname{tg}\alpha$
$2\pi-\alpha$	$-\sin\alpha$	$\cos\alpha$	$-\operatorname{tg}\alpha$
$2\pi+\alpha$	$\sin\alpha$	$\cos\alpha$	$\operatorname{tg}\alpha$
$\frac{\pi}{2}-\alpha$	$\cos\alpha$	$\sin\alpha$	$\operatorname{cotg}\alpha$
$\frac{\pi}{2}+\alpha$	$\cos\alpha$	$-\sin\alpha$	$-\operatorname{cotg}\alpha$
$\frac{3}{2}\pi-\alpha$	$-\cos\alpha$	$-\sin\alpha$	$\operatorname{cotg}\alpha$
$\frac{3}{2}\pi+\alpha$	$-\cos\alpha$	$\sin\alpha$	$-\operatorname{cotg}\alpha$



FORMULE DI SOTTRAZIONE E ADDIZIONE E DUPLICAZIONE

SOTTRAZIONE:

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

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

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

ADDIZIONE:

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

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

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

DUPLICAZIONE:

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

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

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

Formule di Bisezione

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

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

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

Formule Parametriche

$$\sin\alpha = \frac{2t}{1+t^2}$$

$$\cos\alpha = \frac{1-t^2}{1+t^2}$$

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

Formule di Werner

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

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

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

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

Formule di Prostaferesi

$\alpha+\beta = p \qquad 2\alpha = p+q \rightarrow \alpha = \frac{p+q}{2}$

$\alpha-\beta = q \qquad 2\beta = p-q \rightarrow \beta = \frac{p-q}{2}$

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

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

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

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

EQUAZIONE

$\sin x = a$ → per qualunque valore di a

1° caso	se	$a > 1 \vee a < -1$	→ l'eq. è impossibile	$S = \emptyset$
2° caso	se	$a = 1$ → $\sin x = 1$	$x = \frac{\pi}{2} + 2k\pi$	$S = \{x \in \mathbb{R} : x = \frac{\pi}{2} + 2k\pi\}$
3° caso	se	$a = -1$ → $\sin x = -1$	$x = \frac{3}{2}\pi + 2k\pi$	$S = \{x \in \mathbb{R} : x = \frac{3}{2}\pi + 2k\pi\}$
4° caso	se	$a = 0$ → $\sin x = 0$	$x = k\pi$	$S = \{x \in \mathbb{R} : x = k\pi\}$
5° caso	se	$-1 < a < 1 \wedge a \neq 0$	$x = \alpha + 2k\pi$	
			$x = (\pi - \alpha) + 2k\pi$	

$\cos x = b$

1° caso	se	$b > 1 \vee b < -1$ → l'eq. è impossibile	$S \neq 0$
2° caso	se	$b = 1 \longrightarrow \cos x = 1$	$x = 2k\pi$
3° caso	se	$b = -1 \longrightarrow \cos x = -1$	$x = \pi + 2k\pi$
4° caso	se	$b = 0 \longrightarrow \cos x = 0$	$x = \frac{\pi}{2} + k\pi$
5° caso	se	$-1 < b < 1 \wedge b \neq 0$	$x = \pm\alpha + 2k\pi$

$\operatorname{tg} x = c$

se α è soluzione → $x = \alpha + k\pi$