

Angolo $\alpha$		sen $\alpha$	cos $\alpha$	tg $\alpha$
Gradi	Radiani			
0°	0	0	1	0
15°	$\frac{\pi}{12}$	$\frac{1}{4}(\sqrt{6}-\sqrt{2})$	$\frac{1}{4}(\sqrt{6}+\sqrt{2})$	$2-\sqrt{3}$
18°	$\frac{\pi}{10}$	$\frac{1}{4}(\sqrt{5}-1)$	$\frac{1}{4}(\sqrt{10+2\sqrt{5}})$	$\sqrt{1-\frac{2}{5}\sqrt{5}}$
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
75°	$\frac{5}{12}\pi$	$\frac{1}{4}(\sqrt{6}+\sqrt{2})$	$\frac{1}{4}(\sqrt{6}-\sqrt{2})$	$2+\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	$\infty$
120°	$\frac{2}{3}\pi$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$
135°	$\frac{3}{4}\pi$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1
150°	$\frac{5}{6}\pi$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$
180°	$\pi$	0	-1	0
210°	$\frac{7}{6}\pi$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
225°	$\frac{5}{4}\pi$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1
240°	$\frac{4}{3}\pi$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$
270°	$\frac{3}{2}\pi$	-1	0	$\infty$
300°	$\frac{5}{3}\pi$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\sqrt{3}$
315°	$\frac{7}{4}\pi$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1
330°	$\frac{11}{6}\pi$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$
360°	$2\pi$	0	1	0

## FORMULARIO

$\text{sen}^2 \alpha + \text{cos}^2 \alpha = 1$	
$\text{tg } \alpha = \frac{\text{sen } \alpha}{\text{cos } \alpha}$	$\text{sec } \alpha = \frac{1}{\text{cos } \alpha}$
$\text{ctg } \alpha = \frac{\text{cos } \alpha}{\text{sen } \alpha}$	$\text{cosec } \alpha = \frac{1}{\text{sen } \alpha}$

## ANGOLI OPPOSTI, COMPLEMENTARI E SUPPLEMENTARI

$\begin{cases} \text{sen}(-\alpha) = -\text{sen } \alpha \\ \text{cos}(-\alpha) = \text{cos } \alpha \\ \text{tg}(-\alpha) = -\text{tg } \alpha \end{cases}$	$\begin{cases} \text{sen}(90^\circ \pm \alpha) = \text{cos } \alpha \\ \text{cos}(90^\circ \pm \alpha) = \mp \text{sen } \alpha \\ \text{tg}(90^\circ \pm \alpha) = \mp \text{ctg } \alpha \end{cases}$	$\begin{cases} \text{sen}(180^\circ \pm \alpha) = \mp \text{sen } \alpha \\ \text{cos}(180^\circ \pm \alpha) = -\text{cos } \alpha \\ \text{tg}(180^\circ \pm \alpha) = \pm \text{tg } \alpha \end{cases}$
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## FORMULE DI ADDIZIONE, SOTTRAZIONE, DUPLICAZIONE E BISEZIONE

$\begin{cases} \text{sen}(\alpha \pm \beta) = \text{sen } \alpha \text{cos } \beta \pm \text{cos } \alpha \text{sen } \beta \\ \text{cos}(\alpha \pm \beta) = \text{cos } \alpha \text{cos } \beta \mp \text{sen } \alpha \text{sen } \beta \\ \text{tg}(\alpha \pm \beta) = \frac{\text{tg } \alpha \pm \text{tg } \beta}{1 \mp \text{tg } \alpha \text{tg } \beta} \end{cases}$	$\begin{cases} \text{sen}(2\alpha) = 2\text{sen } \alpha \text{cos } \alpha \\ \text{cos}(2\alpha) = \text{cos}^2 \alpha - \text{sen}^2 \alpha \\ \text{tg}(2\alpha) = \frac{2\text{tg } \alpha}{1 - \text{tg}^2 \alpha} \end{cases}$	$\begin{cases} \text{sen}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 - \text{cos } \alpha}{2}} \\ \text{cos}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 + \text{cos } \alpha}{2}} \\ \text{tg}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 - \text{cos } \alpha}{1 + \text{cos } \alpha}} \end{cases}$
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## FORMULE PARAMETRICHE

$\text{sen } \alpha = \frac{2t}{1+t^2}$	$\text{cos } \alpha = \frac{1-t^2}{1+t^2}$	$\text{tg } \alpha = \frac{2t}{1-t^2}$	dove $t = \text{tg } \frac{\alpha}{2}$
$\text{sen } \alpha = \frac{\text{tg } \alpha}{\sqrt{1+\text{tg}^2 \alpha}}$		$\text{cos } \alpha = \frac{1}{\sqrt{1+\text{tg}^2 \alpha}}$	

## FORMULE DI PROSTAFERESI

$\text{sen } p + \text{sen } q = 2\text{sen } \frac{p+q}{2} \cdot \text{cos } \frac{p-q}{2}$
$\text{sen } p - \text{sen } q = 2\text{cos } \frac{p+q}{2} \cdot \text{sen } \frac{p-q}{2}$
$\text{cos } p + \text{cos } q = 2\text{cos } \frac{p+q}{2} \cdot \text{cos } \frac{p-q}{2}$
$\text{cos } p - \text{cos } q = -2\text{sen } \frac{p+q}{2} \cdot \text{sen } \frac{p-q}{2}$
$\text{tg } p \pm \text{tg } q = \frac{\text{sen}(p \pm q)}{\text{cos } p \cdot \text{cos } q}$
$\text{ctg } p \pm \text{ctg } q = \frac{\text{sen}(q \pm p)}{\text{sen } p \cdot \text{sen } q}$

## FORMULE DI WERNER

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