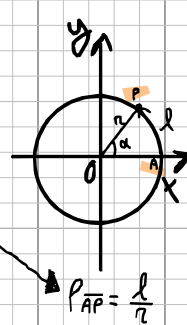
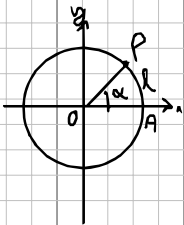


# GONIOMETRIA

- LA CIRCONFERENZA GONIOMETRICA HA MISURA  $2\pi$
- UN PUNTO SULLA CIRCONFERENZA POSSO DESCRIVERLO TRAMITE L'ANGOLO  $\alpha$  RISPETTO ALLE ASCISSE, OPPURE TRAMITE I RADIANTI.



ESEMPIO:



$\alpha = 45^\circ$  → PERCHÉ  $45^\circ$  È  $\frac{1}{8}$  DELLA CIRCONFERENZA

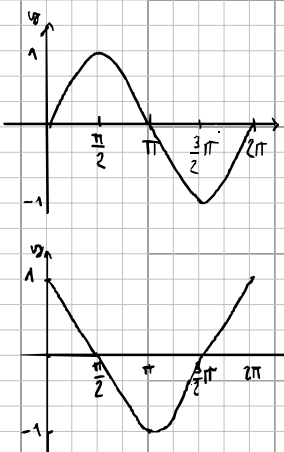
$P = \frac{l}{r} = \frac{1}{8} \cdot \frac{2\pi}{1} = \frac{1}{4}\pi$

L'ANGOLO IN  $\alpha$  OPPURE I RADIANTI SONO LA STESSA INFO!

## CONVERSIONE $\alpha$ IN RADIANTI

$\alpha_{RAD} : \alpha_{GRADI} = 2\pi : 360^\circ$

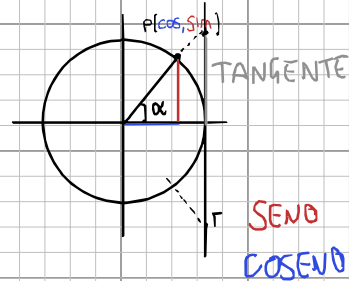
## SIN, COS, TAN



SIN

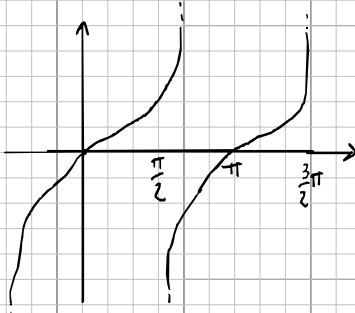
COS

FUNZIONI PERIODICHE IN  $2\pi$



SENO

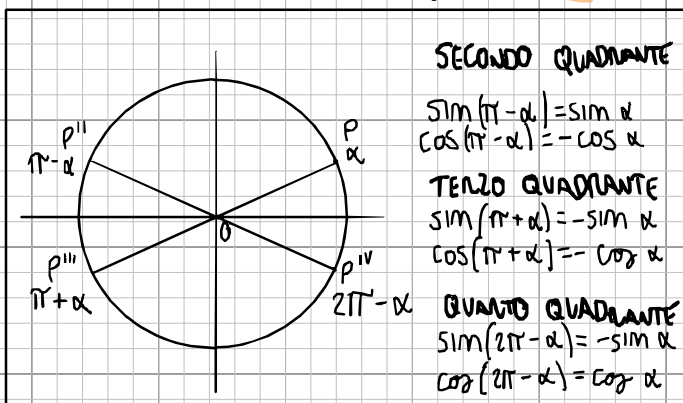
COSENO



TAN

PERIODICA IN  $\pi$   
NON DEFINITA IN  $\frac{\pi}{2}, \frac{3\pi}{2}$  ( $\cos=0$ )

## ANGOLI ASSOCIATI E RIDUZIONE AL PRIMO QUADRANTE



### SECONDO QUADRANTE

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

### TERZO QUADRANTE

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

### QUARTO QUADRANTE

$\sin(2\pi - \alpha) = -\sin \alpha$   
 $\cos(2\pi - \alpha) = \cos \alpha$

$\alpha$ [RAD]	SIN $\alpha$	COS $\alpha$
0 (0°)	0	1
$\frac{\pi}{6}$ (30°)	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\frac{\pi}{4}$ (45°)	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$
$\frac{\pi}{3}$ (60°)	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$\frac{\pi}{2}$ (90°)	1	0

## FORMULE ADDIZIONE, SOTTRAZIONE, DUPLICAZIONE

### ADDIZIONE/SOTTRAZIONE

$\sin(\alpha \pm \beta) = \sin \alpha \cdot \cos \beta \pm \sin \beta \cdot \cos \alpha$   
 $\cos(\alpha \pm \beta) = \cos \alpha \cdot \cos \beta \mp \sin \alpha \cdot \sin \beta$

ESEMPIO:  $\sin(15^\circ) = \sin(45^\circ - 30^\circ) = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$   
 $= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{6} - \sqrt{2}}{4}$

### DUPLICAZIONE

$\sin(2\alpha) = 2\sin \alpha \cdot \cos \alpha$   
 $\cos(2\alpha) = \cos^2 \alpha - \sin^2 \alpha$   
 $\cos^2 \alpha - 1 = 1 - 2\sin^2 \alpha$

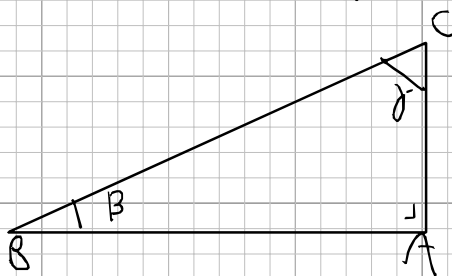
ESEMPIO:  $\sin \alpha = \frac{1}{3}$ , TROVARE  $\cos(2\alpha)$

$\cos(2\alpha) = 1 - 2\sin^2 \alpha = 1 - 2 \cdot \frac{1}{9} = 1 - \frac{2}{9} = \frac{7}{9}$

### BISEZIONE

$\sin\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 - \cos \alpha}{2}}$   
 $\cos\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$

## TRIGONOMETRIA



$\sin(\alpha) = \frac{\text{CATETO OPPOSTO AD } \alpha}{\text{IPOTENUSA}}$

$\cos(\alpha) = \frac{\text{CATETO ADIACENTE AD } \alpha}{\text{IPOTENUSA}}$

$\tan(\alpha) = \frac{\text{CATETO OPPOSTO AD } \alpha}{\text{CATETO ADIACENTE AD } \alpha}$

$\sin \alpha = \frac{\text{CAT OPP}}{\text{IPO}}$

$\cos \alpha = \frac{\text{CAT AD}}{\text{IPO}}$