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www.electronics.inf
(Maths)
www.wolframalpha.com

TRIGONOMETRIC

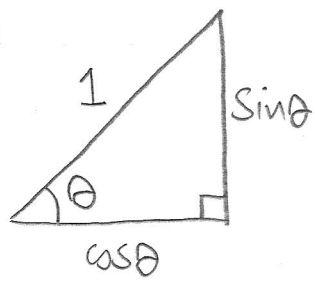
A. French. May 2013

π radians = 180°

↑
radians must be used
for calculus involving trigonometry

Fundamental definitions

$$\frac{1}{\sin \theta} = \operatorname{cosec} \theta$$
$$\frac{1}{\cos \theta} = \sec \theta$$
$$\frac{1}{\tan \theta} = \cot \theta$$



$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

{ From this figure, $0 \leq \theta \leq 180^\circ$ }

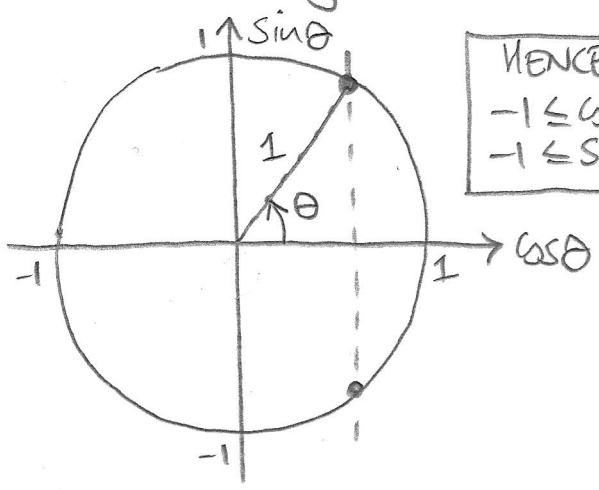
Pythagoras' theorem

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

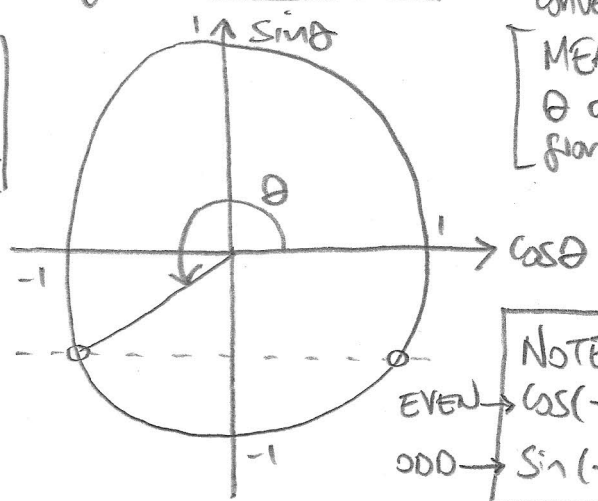
$$\tan^2 \theta + 1 = \sec^2 \theta$$

Extend definition of $\sin \theta$ and $\cos \theta$ noting $x = \cos \theta$, $y = \sin \theta$
means $x^2 + y^2 = 1$ i.e. equation of the **unit circle**



VENCE

$$-1 \leq \cos \theta \leq 1$$
$$-1 \leq \sin \theta \leq 1$$



Convention
MEASURE
 θ anticlockwise
from 'x' axis

NOTE

EVEN $\rightarrow \cos(-\theta) = \cos \theta$

ODD $\rightarrow \sin(-\theta) = -\sin \theta$

Geometric description
of $\cos \theta = k$ (eg $k = 0.6$)
i.e. two solutions in range
 $0 \leq \theta \leq 360^\circ$

Geometric description of $\sin \theta = k$
(eg $k = -0.6$) i.e. two
solutions in range $0 \leq \theta \leq 360^\circ$

Since $\tan \theta = \frac{\sin \theta}{\cos \theta}$, $\tan \theta = k$ corresponds
to a diameter of the unit circle of **gradient k**
so θ repeats every 180° .

