EXACT VALUES OF TRIGONOMETRIC FUNCTIONS

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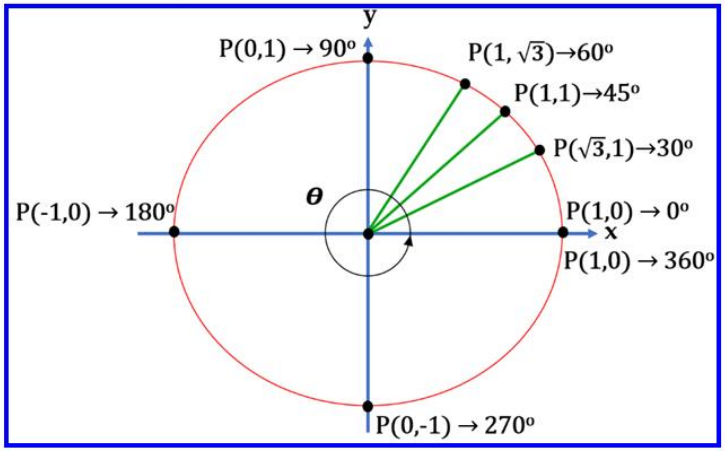
	0^o $0\ rad$	30^o $\frac{\pi}{6}\ rad$	45^o $\frac{\pi}{4}\ rad$	60^o $\frac{\pi}{3}\ rad$	90^o $\frac{\pi}{2}\ rad$	180^o $\pi\ rad$	270^o $\frac{3\pi}{2}\ rad$	360^o $2\pi\ rad$
$sen(\theta)$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
$cos(\theta)$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	-1	0	1
$tan(\theta)$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	$\nexists$	0	$\nexists$	0
$cot(\theta)$	$\nexists$	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	$\nexists$	0	$\nexists$
$sec(\theta)$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	$\nexists$	-1	$\nexists$	1
$csc(\theta)$	$\nexists$	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1	$\nexists$	-1	$\nexists$



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TRIGONOMETRIC FUNCTIONS

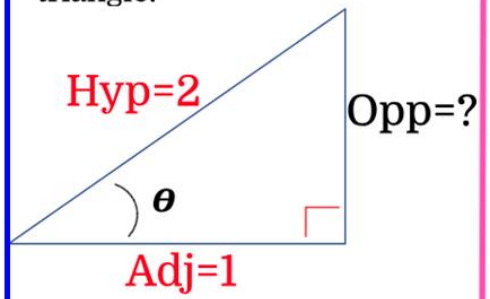
EXAMPLE: Given the trigonometric function sec(θ)=2 , find the trigonometric functions and the angle.

SOLUTION: 1) We know that:

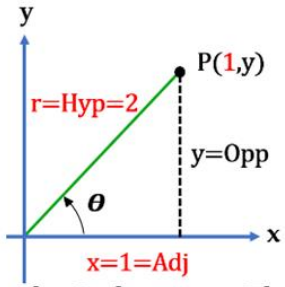
$$sec(\theta) = 2 = \frac{2}{1} = \frac{Hyp}{Adj}$$

=> Hyp=2 and Adj=1.

Drawing the right triangle:



Drawing the triangle on the plane:



2) Using the Pythagorean Theorem:

$a^2 + b^2 = c^2$

$$a^2 + (1)^2 = (2)^2$$
$$a^2 + 1 = 4$$
$$a^2 + 1 - 1 = 4 - 1$$
$$a^2 = 3$$
$$a = \sqrt{3} = Opp$$

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3) Obtaining the trigonometric functions with their ratios if Hyp=2, Adj=1 and Opp = $\sqrt{3}$.

$$sin(\theta) = \frac{Opp}{Hyp} \Rightarrow sin(\theta) = \frac{\sqrt{3}}{2}$$

$$cos(\theta) = \frac{Adj}{Hyp} \Rightarrow cos(\theta) = \frac{1}{2}$$

$$tan(\theta) = \frac{Opp}{Adj} \Rightarrow tan(\theta) = \frac{\sqrt{3}}{1}$$

$$cot(\theta) = \frac{Adj}{Opp} \Rightarrow cot(\theta) = \frac{1}{\sqrt{3}}$$

$$sec(\theta) = \frac{Hyp}{Adj} \Rightarrow sec(\theta) = \frac{2}{1}$$

$$csc(\theta) = \frac{Hyp}{Opp} \Rightarrow csc(\theta) = \frac{2}{\sqrt{3}}$$

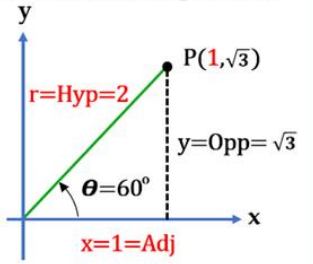
4) Calculating the angle:

$$cos(\theta) = \frac{1}{2}$$

$$\theta = arccos\left(\frac{1}{2}\right)$$

$$\theta = 60^o$$

Hence, the right triangle can be represented on the plane as:



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