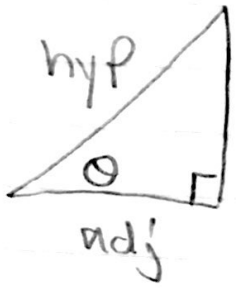
Trig Review

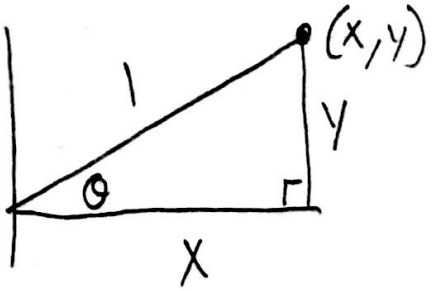


$\sin\theta = \frac{O}{H}$ $\quad \csc\theta = \frac{H}{O}$

$\cos\theta = \frac{A}{H}$ $\quad \sec\theta = \frac{H}{A}$

$\tan\theta = \frac{O}{A}$ $\quad \cot\theta = \frac{A}{O}$

unit circle - radius/hyp = 1



* Must Know

$\sin\theta = y$ $\quad \csc\theta =$ Flip y

$\cos\theta = x$ $\quad \sec\theta =$ Flip x

$\tan\theta = y/x$ $\quad \cot\theta = x/y$

Arc = Inverse = $f^{-1}(x)$ = "The angle whose"

Ex 1) Find $\tan\left(\frac{5\pi}{6}\right)$, since tan is y/x at $5\pi/6$ we have $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

refer to $\frac{\pi}{6}$

$$\frac{\frac{1}{2}}{\frac{-\sqrt{3}}{2}} = \frac{1}{2} \cdot \frac{-2}{\sqrt{3}} = \boxed{\frac{-1}{\sqrt{3}} \text{ or } -\frac{\sqrt{3}}{3}}$$

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Ex 2) Find the $\sec(7\pi/4)$

refer to $\pi/4$

Since sec is flip x we have at $7\pi/6$ $(\sqrt{2}/2, -\sqrt{2}/2)$ we flip x

$$\frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

Ex 3) Find $\arctan(\sqrt{3})$ or $\tan^{-1}(\sqrt{3})$

this means "the angle whose" tan is $\sqrt{3}$

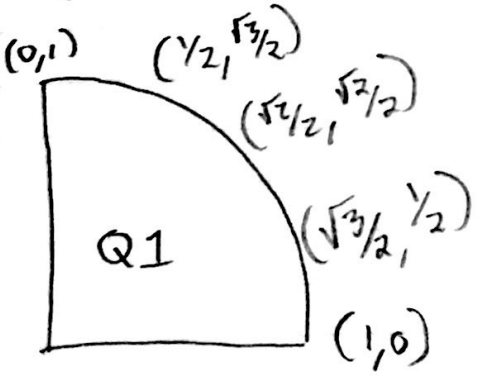
since tan is y/x we get $(1/2, \sqrt{3}/2)$ and $(-1/2, -\sqrt{3}/2)$

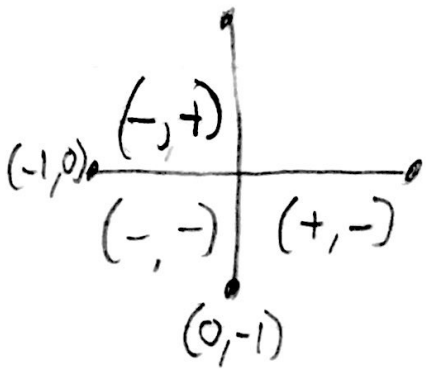
$\pi/3$ $\quad$ $4\pi/3$

so $\frac{\sqrt{3}/2}{1/2} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$ verified

$$\therefore \arctan(\sqrt{3}) = \frac{\pi}{3} \text{ and } \frac{4\pi}{3}$$

If you learn quadrant 1 and the 4 poles you may use symmetry for the others





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Trig Equations - Substitute a variable for the identity and solve algebraically

Ex 1 $0 \le x \le 2\pi$

Solve $\cos^2 x + 2\cos x + 1 = 0$

use $x^2 + 2x + 1 = 0$

$(x+1)(x+1) = 0$

So $x + 1 = 0$

$\cos x + 1 = 0$

$-1 \quad -1$

$\cos x = -1$

$\arccos(\cos x) = \arccos(-1)$

or

$\cos^{-1}(\cos x) = \cos^{-1}(-1)$

$\boxed{\text{So } x = \pi}$

Ex 2

Solve $2\cos(3x) = 1$

so $2x = 1$

$x = 1/2$

$\cos(3x) = 1/2$

$\arccos(\cos(3x)) = \arccos(\cos(1/2))$

$3x = \pi/3$

$\boxed{x = \pi/9}$

$3x = 5\pi/3$

$\boxed{x = 5\pi/9}$

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Non-Right triangles

Law of Sines - $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin(B)}$

use when you have 1 set and 1 other

so given $\underbrace{B, b}_{\text{set}}$ and a

Law of Cosines

$$b^2 = a^2 + c^2 - 2ac\cos(B)$$

use with SSS or SAS

Graphing $y = a\sin(bx - c) + d$

amplitude $= |a|$

period $= \frac{2\pi}{b}$

phase shift $bx - c = 0$

vertical shift d

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