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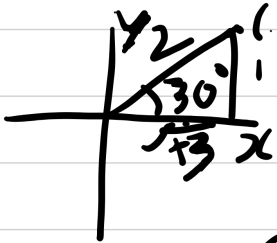
Remember

$\sin 30° = \frac{1}{2}$

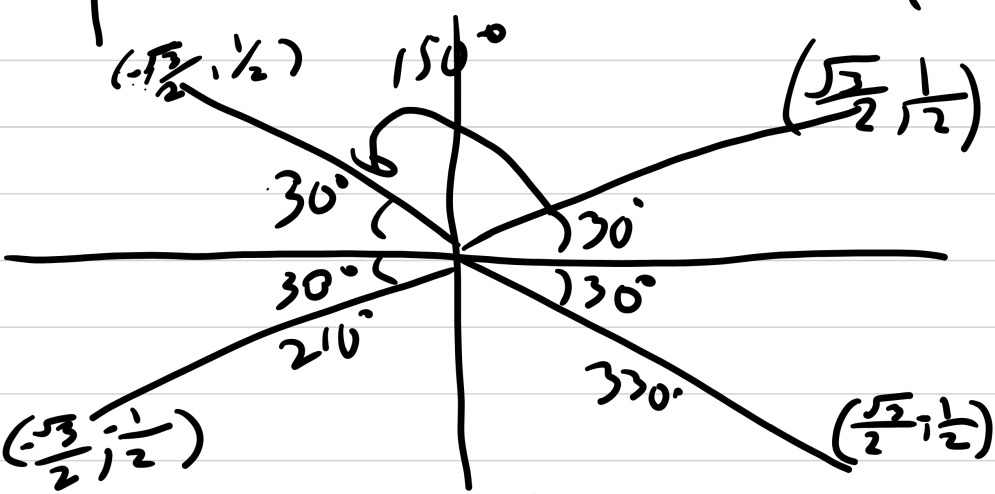


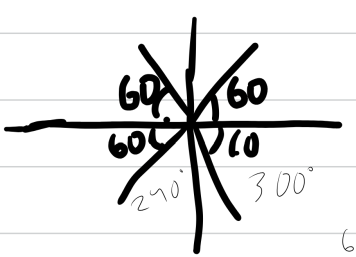
$(\sqrt{3}, 1)$

ALL	SIN
SIN is POS	
TAN	COS

$\sin 60° = \frac{\sqrt{3}}{2}$

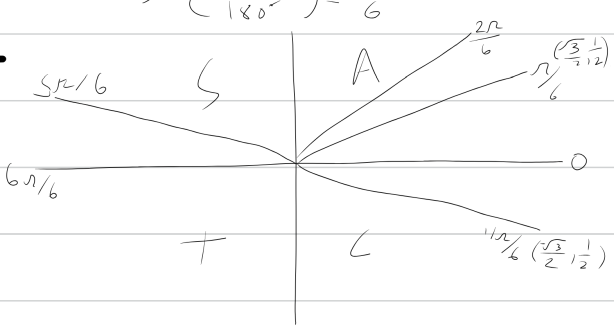
$\cos 60° = \frac{1}{2}$





$180° = \pi$ rad

$30°\left(\frac{\pi \text{ rad}}{180°}\right) = \frac{\pi}{6}$



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$180° = \pi$ rad

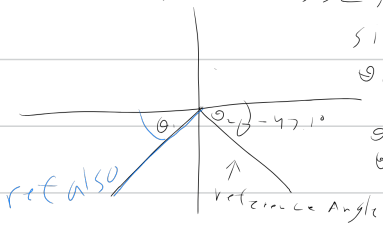
$60° = \frac{\pi}{3}$

$30° = \frac{\pi}{6}$

$45° = \frac{\pi}{4}$

Trig Function for Any Angle

ex Find θ for $\sin\theta = -0.732$, $0 \le \theta < 360°$



$\sin^{-1} 0.732 = -47.1°$

$\theta_{ref} = |-47.1°| = 47.1°$

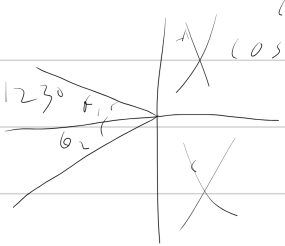
$\theta_1 = 180° + \theta_{ref} = 227.1$

$\theta_2 = 360° - \theta_{ref} = 312.9$

Ex find θ for $\sec\theta = -1.832$, $0 \le \theta < 360°$

$\cos\theta = \frac{1}{-1.832}$

$\cos^{-1}\left(\frac{1}{-1.832}\right) = 123.0829°$



$\theta_{ref} = 180° - 123° = 57°$

$\theta_1 = 180° - 57° = 123°$

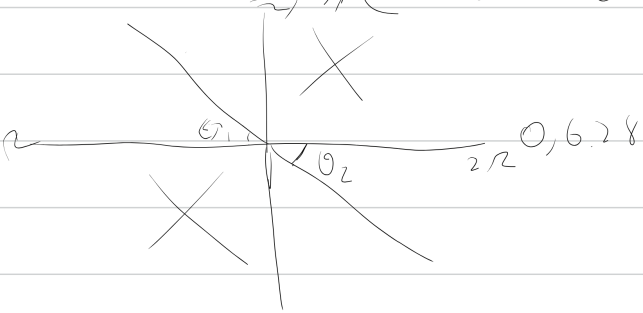
$\theta_2 = 180° + \theta_{ref} = 237°$

Ex: Find θ for $\tan\theta = -0.783$, $0 \le \theta < 2\pi$

$\tan^{-1} -0.783 = -0.664268789$ rad

$\frac{\pi}{2}, 1.57 = -38.0609°$

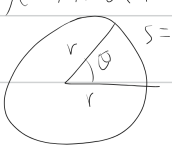
$ref\,\theta = |-0.6643|$



$\theta_1 = \pi - ref\,\theta = 2.477304$

$\theta_2 = 2\pi - ref\,\theta = 5.61889652$

Application of Trig



s = arclength

arc length $\leftarrow s = \theta r \rightarrow$ radius

in radians

unit of measure and radius

Area $\Rightarrow A = \frac{1}{2}\theta r^2$

radians

1 rev = 2π rad

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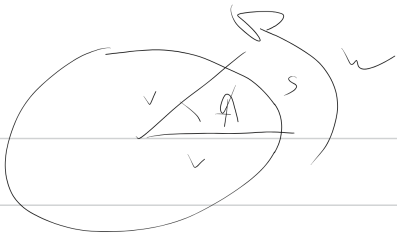

3. 2200 rev/min $\omega = \frac{2200\ \text{rev}}{\text{min}}\left(\frac{2\pi\ \text{rad}}{1\ \text{rev}}\right)\left(\frac{1\ \text{min}}{60\ \text{s}}\right)$
Angular velocity? $= 230\ \text{rad/s}$

$s = r\theta$

$A = \frac{1}{2}r^2\theta$

linear velocity $v = r\omega$ → angular velocity (rad/time)

↳ radius

$1\ \text{rev} = 2\pi\ \text{rad}$

1. $r = 1.25\ \text{cm}$ $\theta = 50°$

$A = \frac{1}{2}(1.25)^2\left(50°\left(\frac{\pi}{180°}\right)\right)$

$=$

$=$

2. $r = 1.875\ \text{cm}$ $\theta = 165.58°$

$P = s + 2r$

$= r\theta + 2r$

$= (1.875)\left(165.58\left(\frac{\pi}{180}\right)\right)$

$+ 2(1.875)$

$= 9.17\ \text{cm}$

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Trig Graphing

$y = A\sin(\omega t + \theta)$ or $y = A\cos(\omega t + \theta)$

A = Amplitude

ω = angular velocity $= 2\pi/T$

T = period - period is the time required to cycle

θ = phase angle

phase shift = $PS = -\theta/\omega$ → start pt

to graph we will use the 5 major quadpt

$0, 90^\circ, 180^\circ, 270^\circ, 360^\circ$

$0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

→ hold this (Angle)

Ex: Graph $y = 2\sin(3t - \frac{\pi}{3})$

$A = 2, \omega = 3, \theta = -\frac{\pi}{3}$, $PS = -\frac{-\pi/3}{3} = \pi/9$ ← starting point

set θ = to each quad angles and solve for time

1. $3t - \frac{\pi}{3} = 0$

$t = \frac{+\pi}{9}$

3. $3t - \frac{\pi}{3} = \pi$

$9t = 4\pi$

$t = \frac{4\pi}{9}$

2. $9t - \pi = \frac{3\pi}{2}$

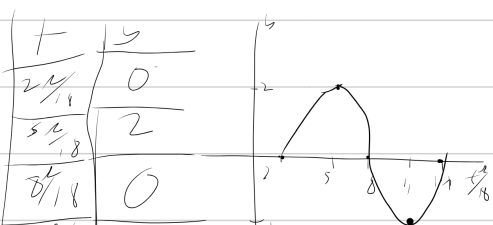
$18t - 2\pi = 3\pi$

$18t = 5\pi$

$t = \frac{5\pi}{18}$

4. $t = \frac{11\pi}{18}$

t	y
$\pi/9$	0
$5\pi/18$	2
$7\pi/18$	0
$11\pi/18$	-2
$13\pi/18$	0



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Graph $y = 3\cos\left(\frac{1}{2}t + \frac{2}{3}\right)$ (Angle)

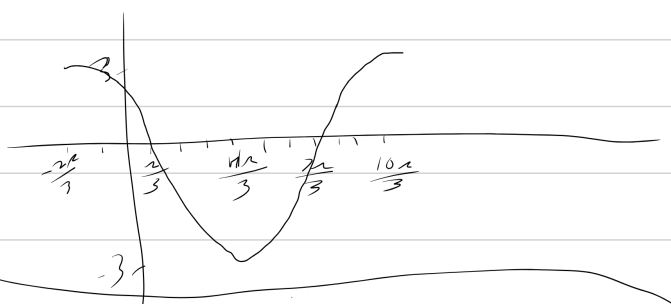
$A = 3$, $\omega = \frac{1}{2}$, $\theta = \frac{2}{3}$, $T = \frac{2\pi}{\omega} = 4\pi$

$PS = -\frac{\theta}{\omega} = -\frac{2\pi}{3} \div \frac{1}{2} = -\frac{4\pi}{3}$ → Start + PS

1. $\frac{1}{2}t + \frac{2}{3} = 0$, $t = \frac{4\pi}{3}$

2. $\frac{1}{2}t + \frac{2}{3} = \frac{\pi}{2}$, $\frac{1}{2}t = \frac{\pi}{2} - \frac{2}{3}$, $t = 2\pi/6$

3. $\frac{1}{2}t + \frac{2}{3} = \pi$, $t = 4\pi/3$



t	y
$-4\pi/3$	3
$\pi/3$	0
$4\pi/3$	-3
$7\pi/3$	0
$10\pi/3$	3

t	y
$3\pi/6$	-5
$5\pi/6$	0
$7\pi/6$	5
$9\pi/6$	0
$11\pi/6$	-5
$13\pi/6$	

$PS = -\frac{\theta}{\omega} = -\frac{3\pi}{6}$

$T = \frac{2\pi}{\omega} = 3\pi$, $\omega = 2$

$A = 5$

$3\pi/6 \cdot (-3/2) = -3\pi/4 = 0$

$y = -5\cos 2t$

Made with Goodnotes

Made with Goodnotes