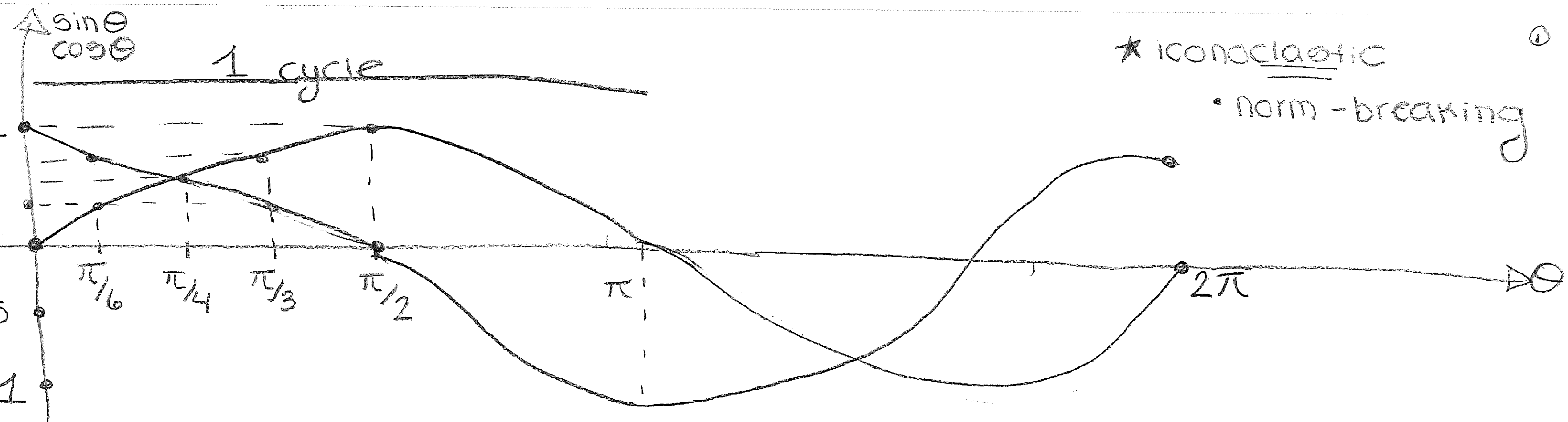
★ The "counter-clockwise" of the circle

★ iconoclastic
- norm-breaking



θ	Sine Values
0	0
π/6	.5
π/4	.707
π/3	.867
π/2	1

The "period" of a cycle of any trig fcn is the interval of θ that is covered

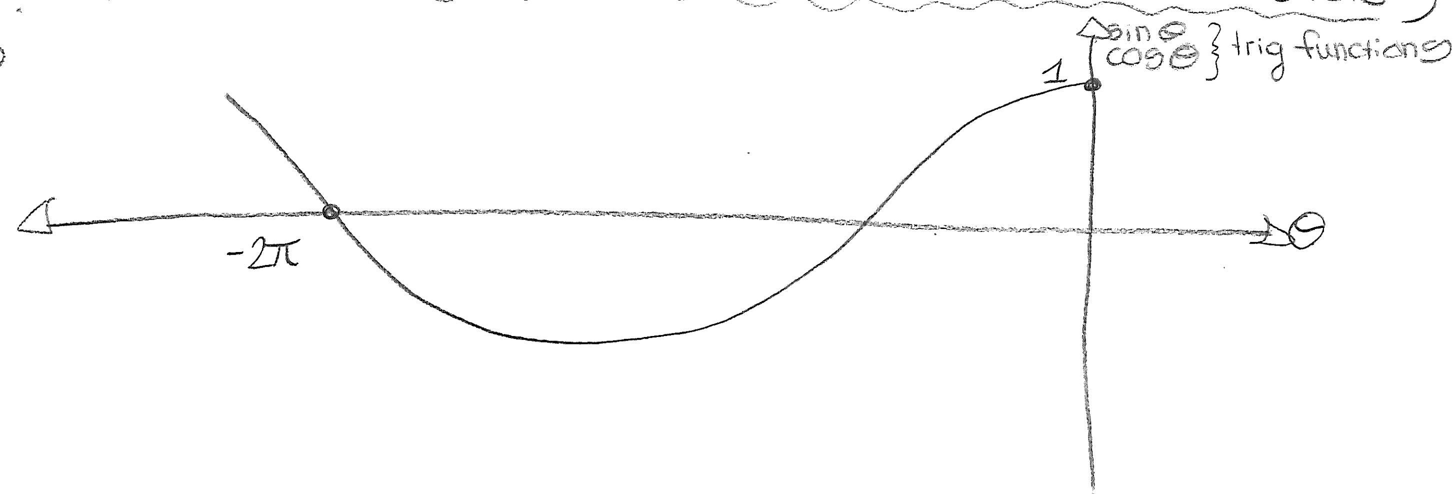
Cycle: The complete graph before it repeats

Period: The angle interval it takes to complete a cycle (for sine & cos θ per = 2π)

Amplitude: the distance from the midline (x-axis) to the "max" (A = 1 for sine & cos θ)

Other side of Y-axis the graph ends @ -2π (this is the "clockwise" of the circle)

★ Never plot your θ-axis in degrees



Last Example

$$\sum_{i=6}^{20} (i^2 + i - 2) \quad \text{Rewrite It}$$

$$\sum_{i=1}^{15} (i+5)^2 + \sum_{i=1}^{15} (i+5) - \sum_{i=1}^{15} 2$$

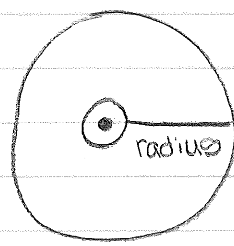
$$\sum (i^2 + 10i + 25) + \qquad - 30$$

Last Unit - Trigonometry $\qquad$ 4/9/2018

$\triangle$

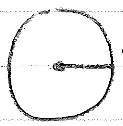
Poly - gon $\longrightarrow$ the triangle is the smallest polygon (3-gon)
many sides

Trigonometry - study of the measure of triangles



perimeter / circumference $\Rightarrow C = 2\pi r$

The circle is the starting point/constant companion throughout trig

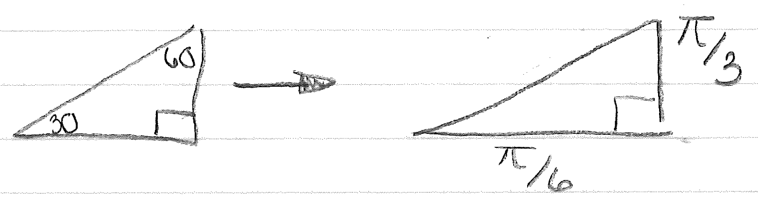


r = 1 cm $\longrightarrow C = 2\pi \cdot 1$ cm
$= 2\pi$ cm

Neumonic to Remember π

- May I have a large container of coffee
  3 . 1 4 1 5 9 2 6

$\pi = 3.14$; as a fraction it is about $22/7$



$1^r = \frac{360°}{2\pi} = \frac{180°}{\pi}$

$2\pi^r = 360$

Here is the conversion from deg → radian

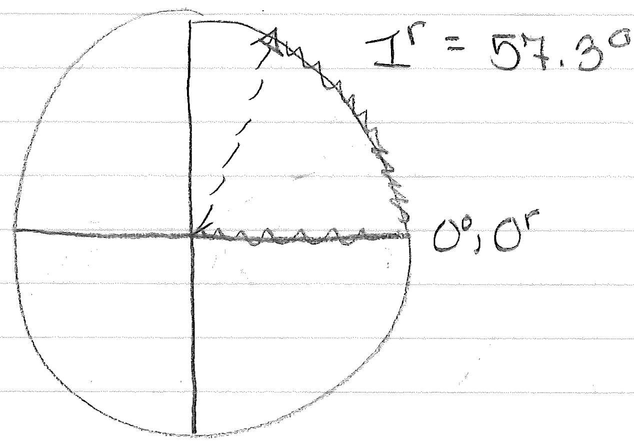
$$n \text{ deg} \cdot \frac{\pi}{180 \text{ deg}} \longrightarrow \frac{n\pi^r}{180}$$

Here is the conversion from radian → deg

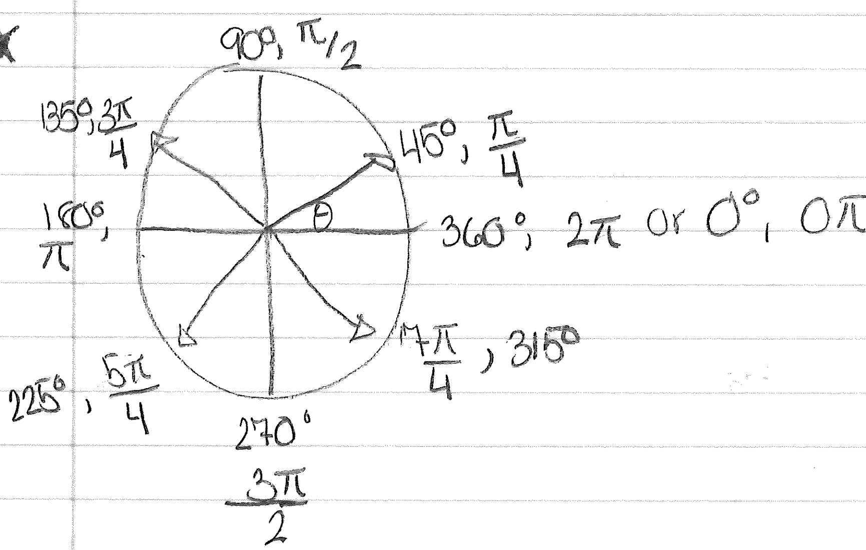
$$n^r \cdot \frac{180 \text{ deg}}{\pi^r} \longrightarrow \frac{180 \cdot n°}{\pi}$$

Ex) $45° \cdot \frac{\pi}{180°} = \frac{\pi}{4}$

Ex) $1^r \cdot \frac{180°}{\pi^r} = \frac{180°}{\pi} \approx 57.3°$

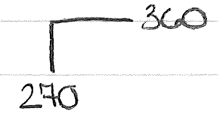


★



"Unit Circle" - circle of radius = 1

$325°$

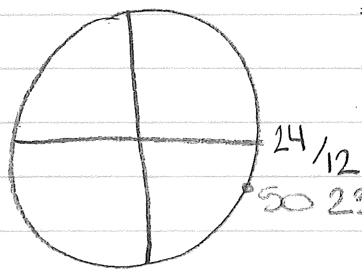


$$325 \cdot \frac{\pi}{180} = \frac{325\pi}{180} = \frac{65\pi}{36}$$

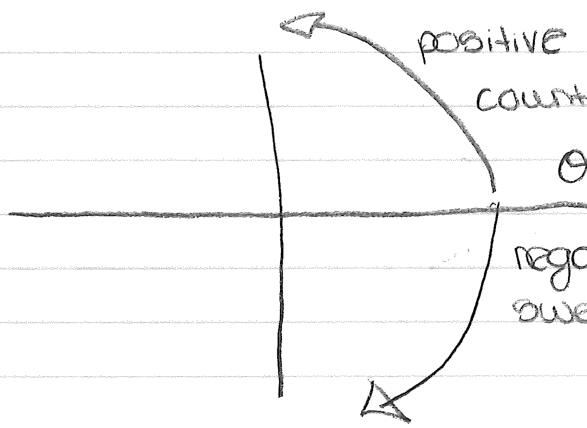
$$\frac{23\pi}{12} \cdot \frac{180}{\pi}$$

$$\begin{array}{r} 180 \\ \times\ 23 \\ \hline 540 \\ 3600 \\ \hline 4140 \end{array}$$

$$\frac{4140}{12} = 345°$$



so 23/12 would be here



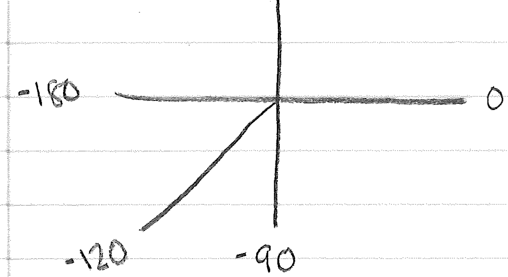
positive direction is when radius sweeps counter clockwise

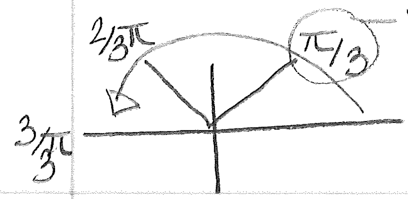
$\theta > 0$, $\theta < 0$

negative direction is when radius sweeps clockwise

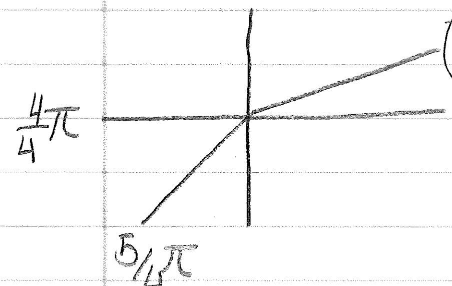
$-120°$ sweeps clockwise

-270, 90 → these are called "coterminal angles"





$\pi/3$ — reference angle for $2/3\pi$ (120°) because it is only $1/3\pi$ away from the x-axis



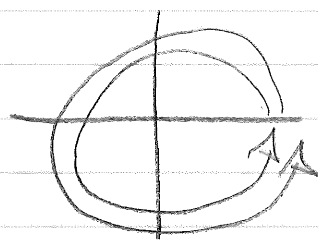
$\pi/4$ - reference angle for $5/4\pi$ (240°) because it is only $1/4\pi$ away from the x-axis ("horizon")

The reference angles are acute angles

$0 < \theta < 90$ (degree)

$0 < \theta < \pi/2$ (radian)

How big can an angle be?



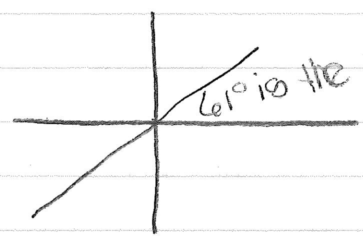
★ an angle can be as big as ∞

1. 360
2. 720
3. 1080

$$\begin{array}{r} 720 \\ -\ 90 \\ \hline 630 \end{array}$$

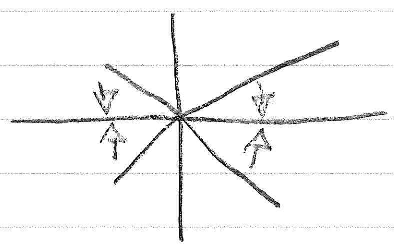
Find reference angle for $\theta = 1321°$

$$\begin{array}{r} 1321° \\ -1080° \\ \hline 241 \\ -180 \\ \hline 61 \end{array}$$



61° is the reference angle

$$\begin{array}{r} 630 \\ -\ 90 \\ \hline 540 \end{array}$$



Concerned with how far off the angles are

Convert 7 radians to degrees

2π rad ≈ 6.28 rad

"pi" "pure"

$$7\text{rad} \cdot \frac{180°}{\pi\,\text{rad}} = \frac{1260°}{\pi}$$

$s = \theta r$

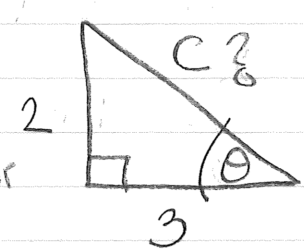
$A_{\triangledown} = \dfrac{r^2\theta}{2}$

The sum of any two sides has to exceed the length of the third side when working with triangles

4, 3, 6 ✓

1, 2, 5 X

You can rearrange P. theorem to solve for any of the sides



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

$(2)^2 + (3)^2 = c^2$

$4 + 9 = c^2$

$\sqrt{13} = \sqrt{c^2}$

$\sqrt{13} = c$

$\sin\theta = 2/\sqrt{13}$

$\cos\theta = 3/\sqrt{13}$

$\tan\theta = 2/3$

★ $\text{tangent}\,\theta = \dfrac{\text{sine}\,\theta}{\text{cosine}\,\theta}$ (trig identity)

4/13/2018

$\frac{3\pi}{5}$ to degrees $\quad \dfrac{3\cancel{\pi}}{{}_1\cancel{5}} \cdot \dfrac{\cancel{180}^{36}}{\cancel{\pi}}$ $\boxed{108°}$

$5\overline{)180}$ = 36, $\frac{15}{30}$ $\quad$ $36 \times 3 = 108$

6 radians to degrees $\quad 6\,r\cancel{a}d \cdot \dfrac{180}{\pi^r}$ $\boxed{\dfrac{1080°}{\pi}}$ $\quad$ $180 \times 6 = 1080$

170° → π radians $\quad 170° = \dfrac{17\cancel{0}\pi}{18\cancel{0}}$ $\boxed{\dfrac{17\pi}{18}}$

100° → radians $\quad 100\cancel{°} \times \dfrac{1\,\text{rad}}{57\cancel{°}}$ $\quad \dfrac{100^r}{57}$

★ $\dfrac{180}{\pi} \approx 57°$ conversion factor for pure radians

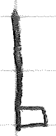
6 radians $\times \dfrac{57}{\text{rad}}$ or $\dfrac{180}{\pi}$ > same calculation, different looking numbers

2 ways to approach 100° to radians

(1) $100° \times \dfrac{\pi}{180} = \dfrac{10\pi}{18} \approx \dfrac{10 \times 3.14}{18} \approx \dfrac{31.4}{18} \approx \dfrac{314}{180}$ radians

(2) $100\cancel{°} \times \dfrac{1\,\text{rad}}{57\cancel{°}}$ $\quad \dfrac{100}{57}$ rad.

for a $0°$, the hyp = adj and they (sides) will both be 1
so, this triangle side wise is known as $1-1-0$
$0°-90°-90°$

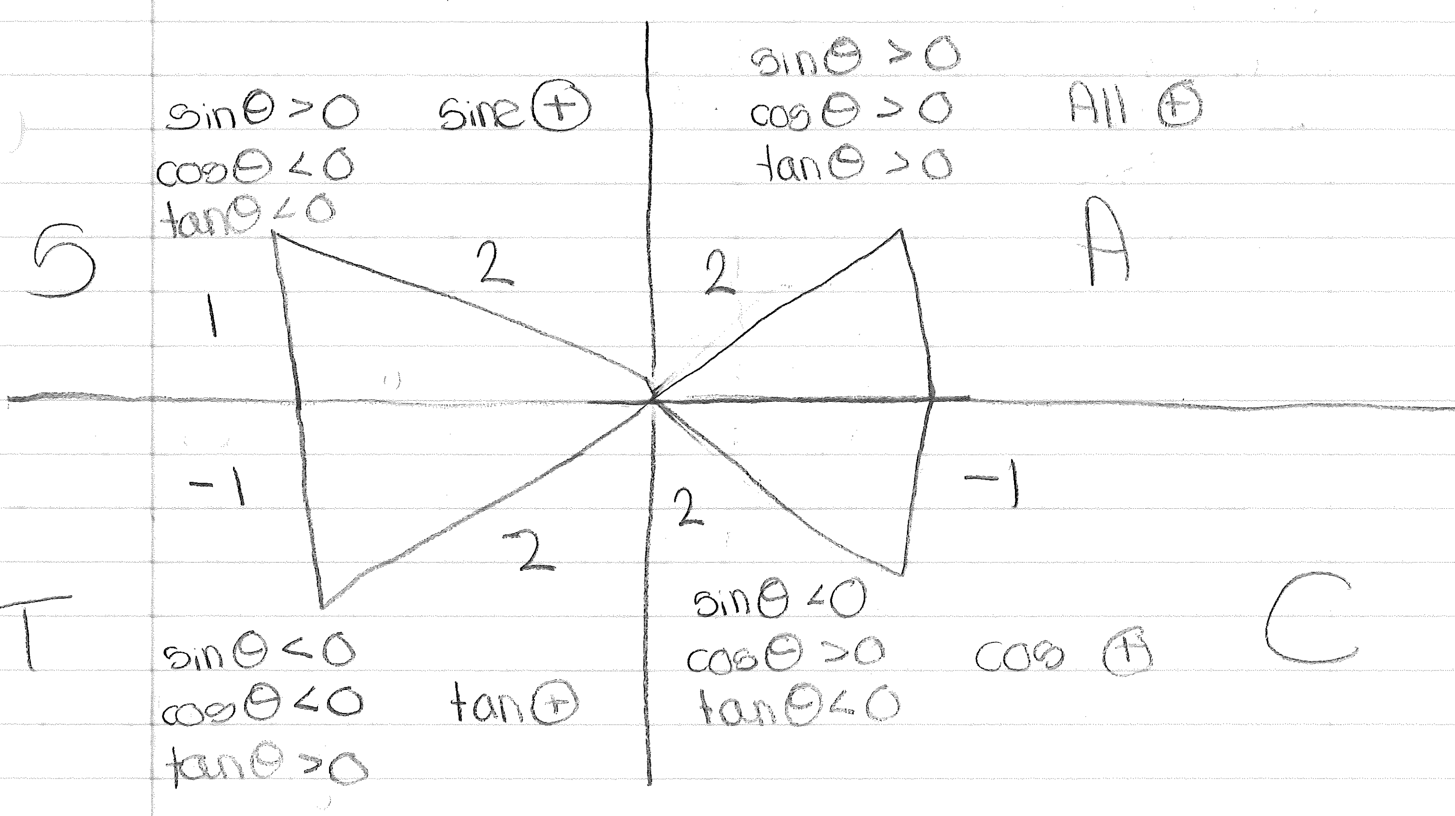


This triangle is known as the $90°-90°-0°$
This is when the oppo. & hyp come together
and equal each other (opposite = hyp)
$90°-90°-0°$
$1-0-1$

(1) way to Remember the Trig Value Table

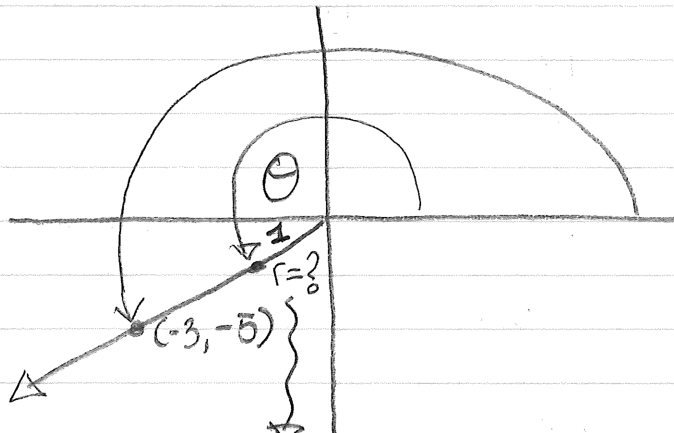
sin: $\frac{\sqrt{0}}{2}$ $\frac{\sqrt{1}}{2}$ $\frac{\sqrt{2}}{2}$ $\frac{\sqrt{3}}{2}$ $\frac{\sqrt{4}}{2}$

$\longrightarrow$ $0 \cdot 1/2 \cdot 1/\sqrt{2} \cdot \sqrt{3}/2 \cdot 1$

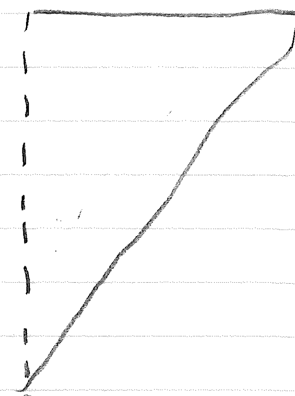


★Problem 9 on pg. 285 in the textbook

Find the point (x, y) on a circle of radius r whose terminal



$$\left(\frac{-3}{\sqrt{34}}, \frac{-5}{\sqrt{34}}\right)$$



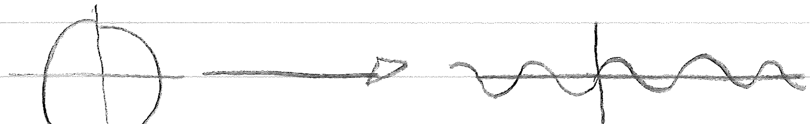
(-3, -5)

$r = \sqrt{9+25} = \sqrt{34}$

The answer will always be $\left(\frac{x}{r}, \frac{y}{r}\right)$

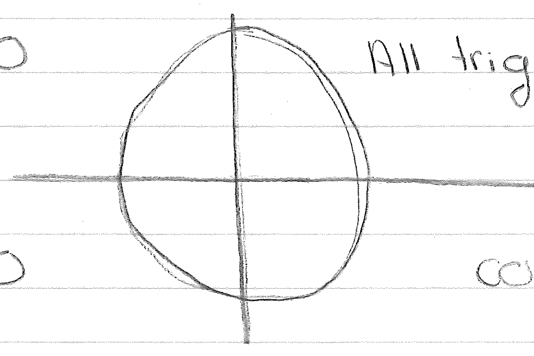
So, find the radius using Py Thag and then ÷ the x-value and the y-value by the radius for the final answer

4/17/2018



The points on this circle are related to this fcn

$\sin\theta > 0$ All trig ratios > 0



$\tan\theta > 0$ $\cos\theta > 0$

$\sin \pi/6 = 1/2$
$\sin 7\pi/6 = -1/2$
$\cos \pi/4 = 1/\sqrt{2}$
$\cos 5\pi/4 = -1/\sqrt{2}$