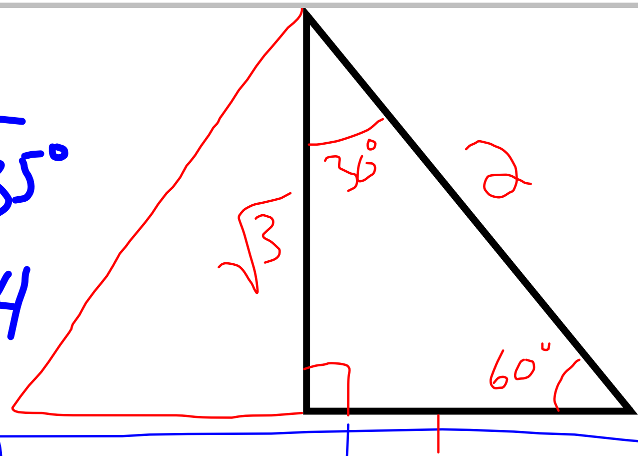
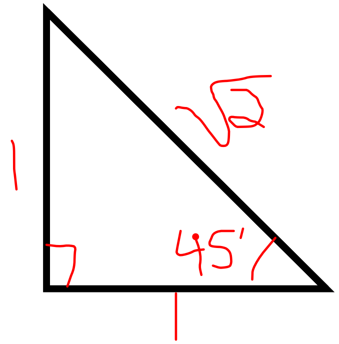
$$\csc 35^\circ = \frac{1}{\sin 35^\circ}$$

$$\doteq 1.74$$



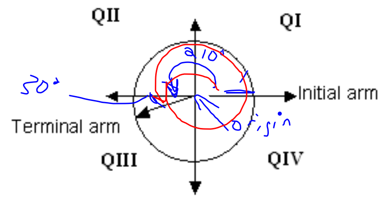


8 :

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
45°	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$

3.1.1 Angles Review

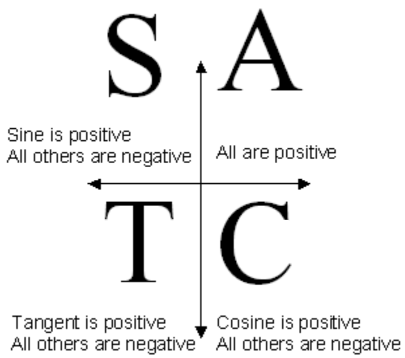
1. Initial arm	2. Terminal arm	3. Origin	4. Principal angle 210°
5. Related acute angle	6. Positive Coterminal angle	7. Negative Coterminal angle	8. CAST Rule
9. Quadrant I	10. Quadrant II	11. Quadrant III	12. Quadrant IV
13. Standard Position	14. Positive Coterminal angle	15. Negative Coterminal angle	



Principal Angle = 210°

Related Acute Angle = 30°

CAST Rule:



Positive Co-terminal Angle
210° + 360° = 570°
570° + 360° = 930°

Negative Co-terminal Angle
210° - 360° = -150°
-150° - 360°= -510°

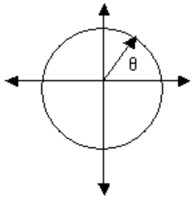
A unit circle is a circle, centred at the origin, with radius = 1 unit.

An angle is in STANDARD POSITION when it is centred at the origin, the initial arm is the positive x-axis and the terminal arm rests anywhere within the four quadrants

3.1.2 Degrees and Radians

Thus far, when you have graphed trigonometric functions or solved trigonometric equations, the domain was defined as degrees. However, there is another unit of measure used in many mathematics and physics formulas. This would be

To understand what a radian is, let's begin with a unit circle.



UNIT CIRCLE –
- Radius =
- Centre at
- Θ in
- Arc length =
- θ=

1. Calculate the circumference of this unit circle when r = 1 unit?

2. An angle representing one complete revolution of the unit circle measures 2π radians, or ______°.

3. Change the following radians to degrees if $2\pi = 360°$,

   a) π = ____________

   b) $\frac{\pi}{2}$ = ____________

   c) $\frac{\pi}{4}$ = ____________

   d) $\frac{3\pi}{4}$ = ____________

   e) $\frac{11\pi}{6}$ = ____________

4. Change the following degrees to radians if $360° = 2\pi$,

   a) 270° = __________

   b) 60° = __________

   c) 150° = __________

   d) 30° = __________

   e) 240° = __________

Rules:

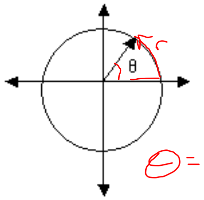
#1

#2

3.1.2 Degrees and Radians (Answers)

Thus far, when you have graphed trigonometric functions or solved trigonometric equations, the domain was defined as degrees. However, there is another unit of measure used in many mathematics and physics formulas. This would be RADIANS.

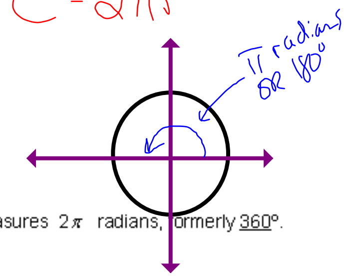
To understand what a radian is, let's begin with a unit circle.



$\theta = 1$ radian

UNIT CIRCLE –
- Radius = 1 unit
- Centre at origin
- Θ in standard position
- Arc length = 1 unit
- θ= 1radian

$C = 2\pi r$

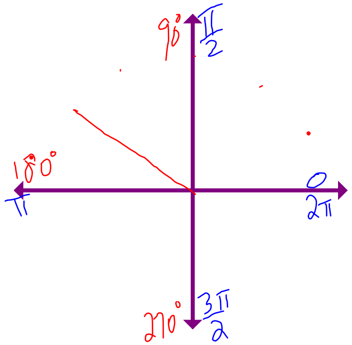


1. Calculate the circumference of this unit circle when r = 1 unit?
   C = 2π

2. An angle representing one complete revolution of the unit circle measures 2π radians, formerly 360°.

3. Change the following radians to degrees if 2π = 360°,
   a) π = 180°
   b) $\frac{\pi}{2}$ = 90°
   c) $\frac{\pi}{4}$ = 45°
   d) $\frac{3\pi}{4}$ = 135°
   e) $\frac{11\pi}{6}$ = 330°

4. Change the following degrees to radians if 360°= 2π ,
   a) 270° = $\frac{3\pi}{2}$
   b) 60° = $\frac{\pi}{3}$
   c) 150° = $\frac{5\pi}{6}$
   d) 30° = $\frac{\pi}{6}$
   e) 240° = $\frac{4\pi}{3}$



Rule:#1 To change radians to degrees, multiply by $\frac{180^\circ}{\pi}$.

#2 To change degrees to radians, multiply by $\frac{\pi}{180^\circ}$.

$\frac{3\cancel{\pi}}{4} \times \frac{180^\circ}{\cancel{\pi}}$

$= 135^\circ$

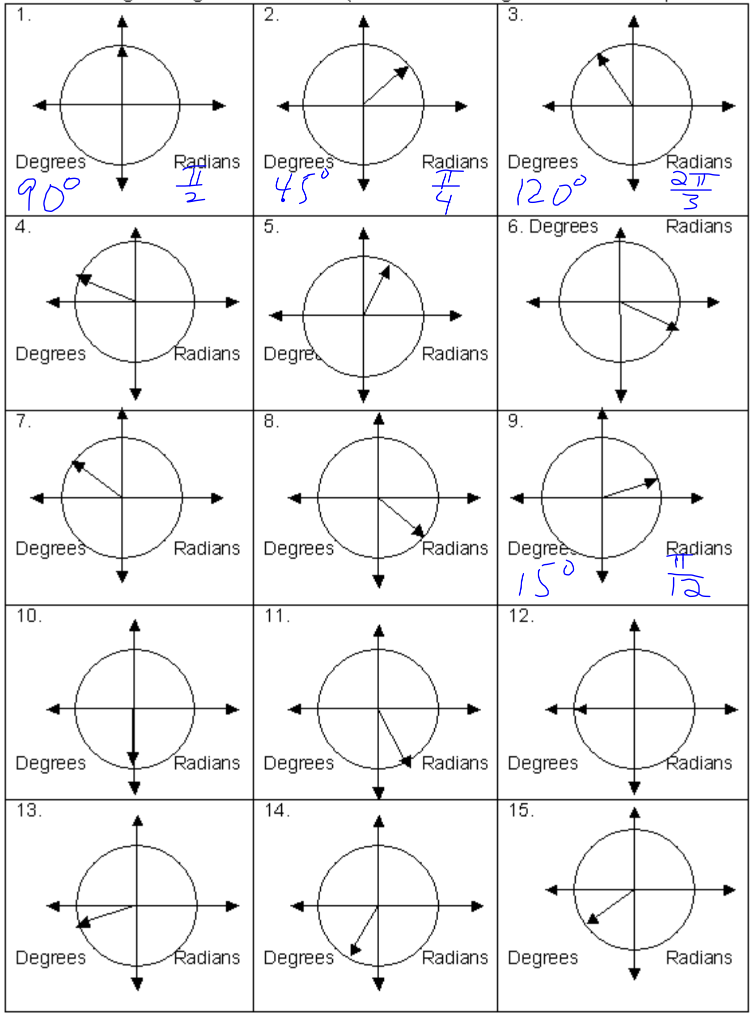
$150^\circ\left(\frac{\pi}{180^\circ}\right) = \frac{15\cancel{0}\pi}{18\cancel{0}}$

$= \frac{5\pi}{6}$

3.1.3 Measuring Angles in Radians and Degrees

$15° = \frac{\pi}{12}$ rad

Find each angle in degrees and radians (assume that all angles are drawn to represent multiples of 15°).



Example pg 208; #9, 20

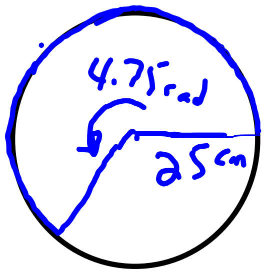
Homework: pg 208 # (5-8)odd, 10, 11, 13, 15, 16, 19, 22
Handin: pg 210; #21

#9 pg 208

$r = 2.5\,cm$

$\theta = 4.75$ radians

Find length of arc.



$$\begin{array}{c}\text{Angle measure} \\ \text{in radians}\end{array} = \frac{\text{length of arc}}{\text{radius}}$$

$$\theta = \frac{\ell}{r}$$

$$\ell = \theta r$$

$$= 4.75(25)$$

$$= 118.75\,cm$$

So the length of the arc is 118.75cm

$$4.75\,rad\left(\frac{180°}{\pi}\right)$$

$$\doteq 272°$$