# Chapter 6. Unit Circle Trigonometry Summary

Angle in Standard position: (degree)

— vertex is at the origin $(0,0)$ and the initial arm is at the positive x-axis

— rotate counter clockwise, θ is +'ve

— rotate clockwise, θ is −'ve.

+'ve θ

−'ve θ
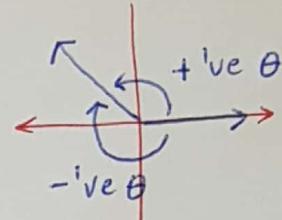
Coterminal (degree): $\theta + 360°(k)$, $k \in \mathbb{Z}$

Reference Angle: Angle created between the x-axis and terminal arm

in QI: $\theta = \theta_R$

$\theta = \theta_R$

In QII: $\theta = 180 - \theta_R$

θ_R θ

$\theta_R = 180 - \theta$

In QIII: $\theta = 180 + \theta_R$

θ

$\theta_R = \theta - 180$

In QIV: $\theta = 360 - \theta_R$

θ
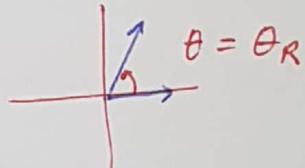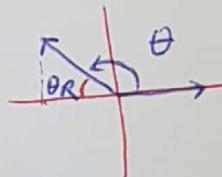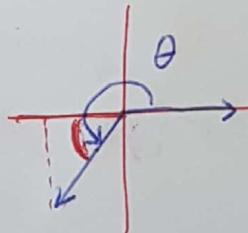
θ_R
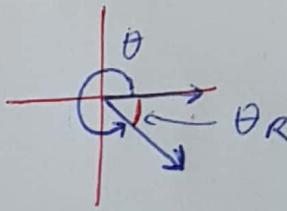
$\theta_R = 360 - \theta$

Given point (x, y), determine the 6 trig ratios (Exact values)

$$\cos \theta = \frac{x}{r} \xrightarrow{\text{reciprocal}} \sec \theta = \frac{r}{x}$$

To calculate r
use $x^2 + y^2 = r^2$

$$\sin \theta = \frac{y}{r} \qquad\qquad \csc \theta = \frac{r}{y}$$

$$\tan \theta = \frac{y}{x} \qquad\qquad \cot \theta = \frac{x}{y}$$

Given one trig ratio, determine the other <u>5 trig ratios</u>

For unit circle (means radius is 1), re-write trig ratios

$$\cos \theta = \frac{x}{1} \qquad \sec \theta = \frac{1}{x}$$

$$\sin \theta = y \qquad\qquad \csc \theta = \frac{1}{y}$$

$$\tan \theta = \frac{y}{x} \qquad\qquad \cot \theta = \frac{x}{y}$$

Special angles: (in degrees) along w/ the trig ratios
⤷ multiples of $0°, 30°, 45°, 60°$

90   $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

x   y
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

180°

30

$0°, 360° \; (1,0)$

270
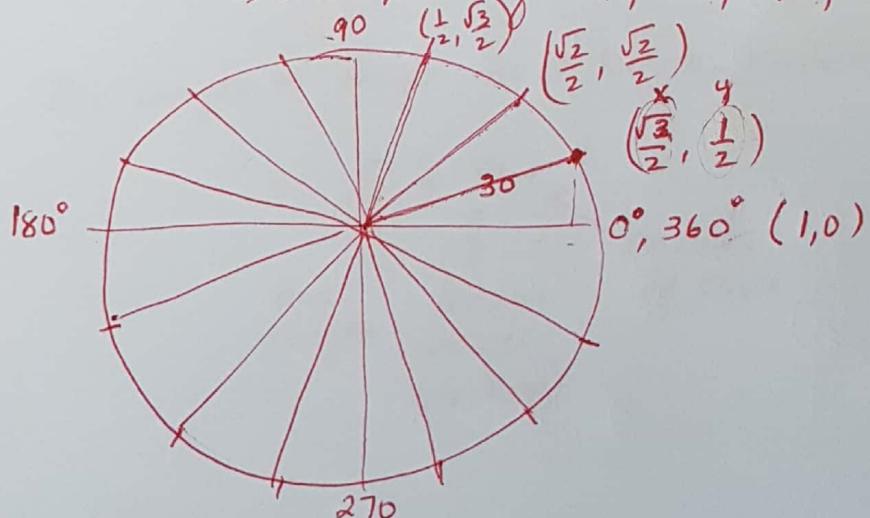
Converted From degree to radians   we know $\boxed{\pi = 180°}$

Radian.
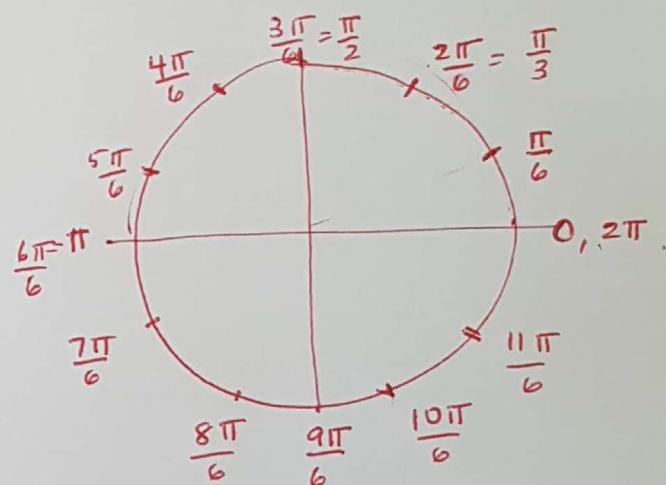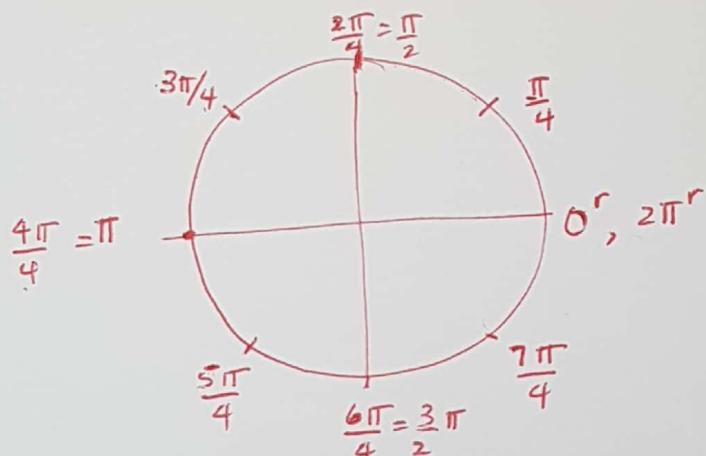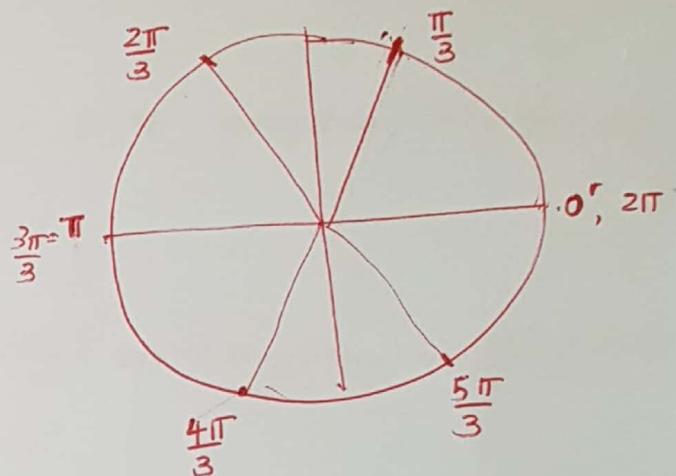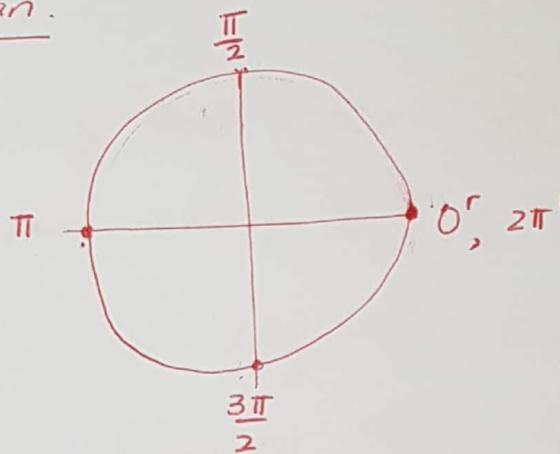
Coterminals of angles in standard position (in Radians)

$$\theta + 2\pi k, \quad k \in \mathbb{Z}$$

Arc Length → angle must be in radian measure

$$S = \theta r$$

↑ arc length ↑ central angle (in Rad) → radius of circle.

For Review   p 505 - 509   Q 1 - 12 ⎤
                p 560 - 562   Q 1 - 8 ⎦

All of these we will _connect_ with graphing trig function.
and solving trig equations.

→ Test on   May 19th (Tuesday) on everything in Booklet 6.
→ Send Questions through email.

✔ CHECKPOINT

Self-Assess
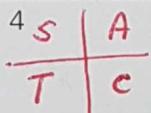
Can you...	Try *Checkpoint* question	For review, see
sketch a positive or negative angle in standard position?	1, 7	Page 468 in Lesson 6.1
determine the measures of all angles in a given domain that are coterminal with a given angle in standard position; and determine the general form of the measures? *For degree and Radian measure*	1, 7	Page 469 in Lesson 6.1 (Example 1)
determine the exact value of a trigonometric ratio for a multiple of 0°, 30°, 45°, or 60°; or for a multiple of 0, $\frac{\pi}{6}$, $\frac{\pi}{4}$, or $\frac{\pi}{3}$ radians?	2, 9	Page 471 in Lesson 6.1 (Example 2)
determine the exact values of the six trigonometric ratios for an angle, given the coordinates of a point on the terminal arm of the angle in standard position?	10	Page 472 in Lesson 6.1 (Example 3)
determine the possible measures of an angle in a specified domain, given a point on the terminal arm of the angle in standard position?	3	Page 493 in Lesson 6.3 (Example 4)
determine the exact values of the other *(FIVE)* trigonometric ratios for an angle, given the value of one trigonometric ratio in a specified domain?	4	Page 473 in Lesson 6.1 (Example 4)
determine the possible measures of an angle in a specified domain, given the value of a trigonometric ratio for the angle?	4 $\begin{array}{c|c} S & A \\ \hline T & C \end{array}$	Page 493 in Lesson 6.3 (Example 4)
convert between the degree and radian measures of an angle?	11	Page 489 in Lesson 6.3 (Example 1)
solve problems that involve an arc of a circle subtending a central angle in radians? *S = θr*	12	Page 492 in Lesson 6.3 (Example 3)