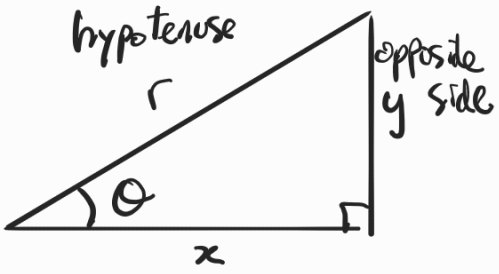
MATHS 09 - TRIGONOMETRY (三角函數)

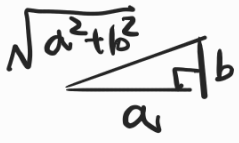
Concept Review

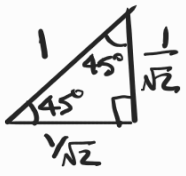


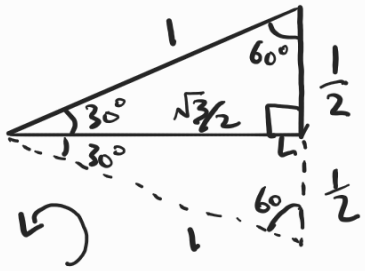
正弦	$\sin\theta = y/r$	$\sin^{-1}(y/r) = \theta$
余弦	$\cos\theta = x/r$	$\cos^{-1}(x/r) = \theta$
正切	$\tan\theta = y/x$	$\tan^{-1}(y/x) = \theta$

SPECIAL ANGLES

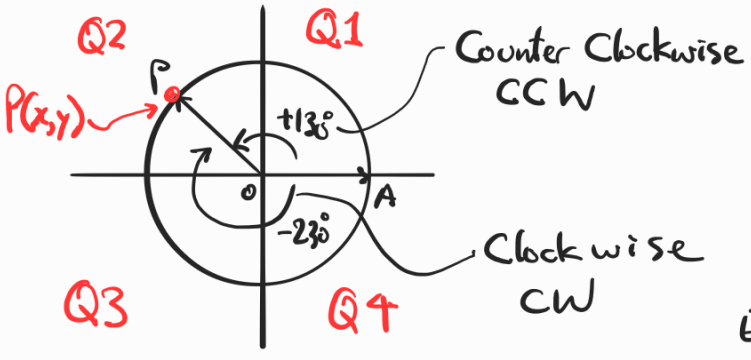
θ	$0°$	$30°$	$45°$	$60°$	$90°$
$\sin\theta$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos\theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
$\tan\theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	undefined

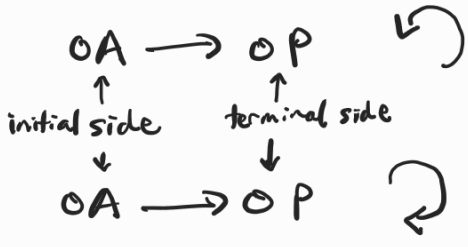






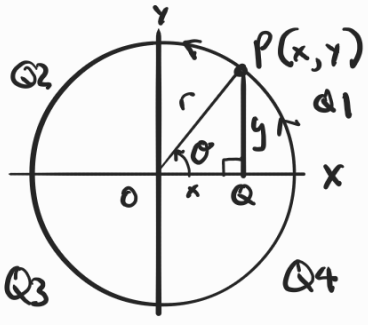
Angle of Rotation





Every turn is 360°. ∴ 390° = 360° + 30°

Q1: Quadrant 1	CCW 0° → 90°	CW 270° → 360°
Q2: Quadrant 2	CCW 90° → 180°	CW 180° → 270°
Q3: Quadrant 3	CCW 180° → 270°	CW 90° → 180°
Q4: Quadrant 4	CCW 270° → 360°	CW 0° → 90°



Q1 : A : All are +ve (positive)
Q2 : S : Sine is +ve
Q3 : T : tangent is +ve
Q4 : C : cosine is +ve

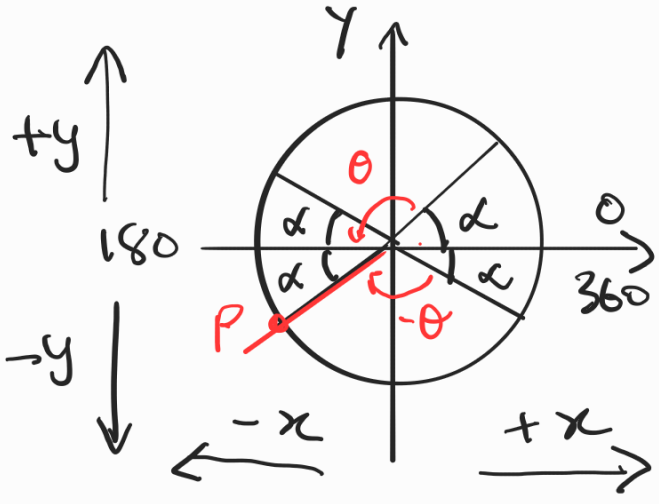
To calculate trig function >90°, Relocate  to Q1

Method: Step 1 Find the quadrant which θ lies

Step 2 Use ASTC to determine the sign

Step 3 Find the trig ratio

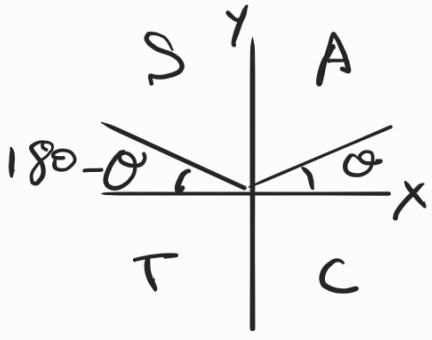
Step 4 Assign the sign to the trig ratio



CW : −ve 正

CCW : +ve 負

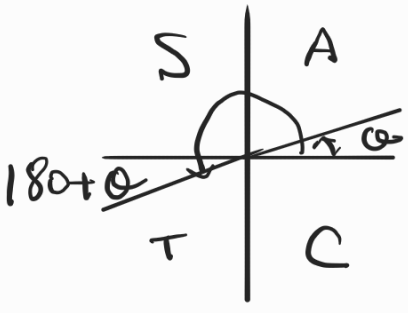
How to calculate the reference angle α from θ



$\sin(180^\circ-\theta) = \sin\theta$

$\cos(180^\circ-\theta) = -\cos\theta$

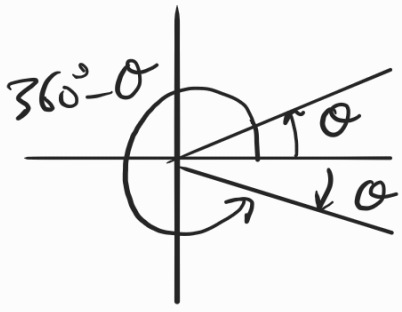
$\tan(180^\circ-\theta) = -\tan\theta$



$\sin(180^\circ+\theta) = -\sin\theta$

$\cos(180^\circ+\theta) = -\cos\theta$

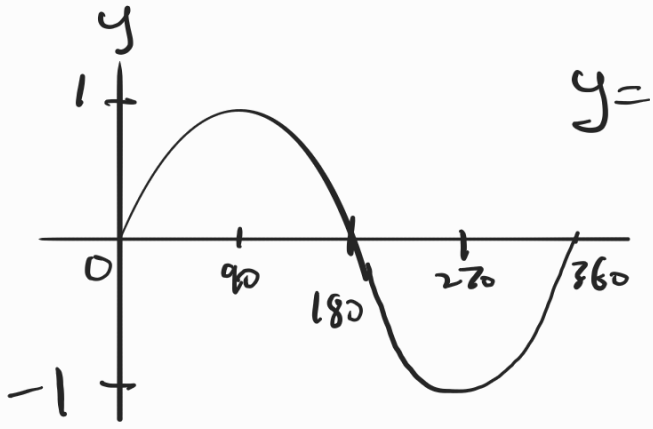
$\tan(180^\circ+\theta) = \tan\theta$



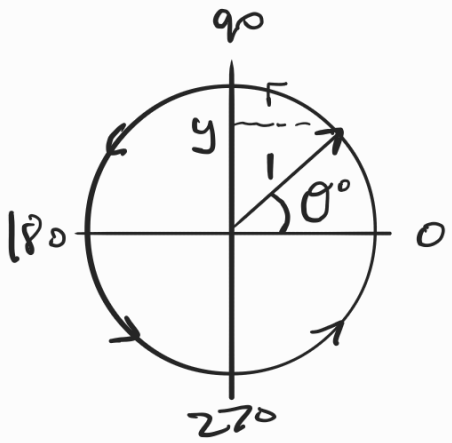
$\sin(360^\circ-\theta) = -\sin\theta$

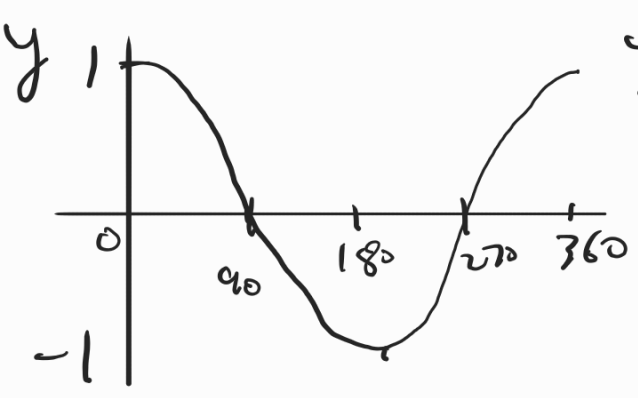
$\cos(360^\circ-\theta) = \cos\theta$

$\tan(360^\circ-\theta) = -\tan\theta$

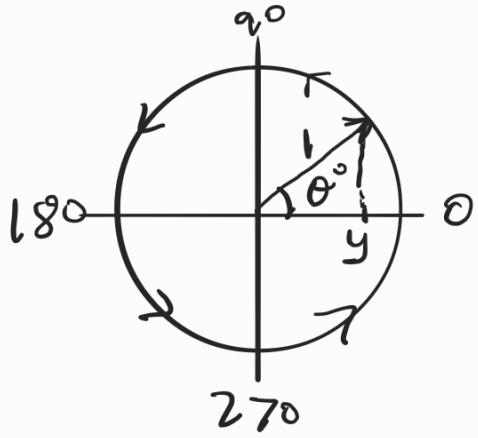


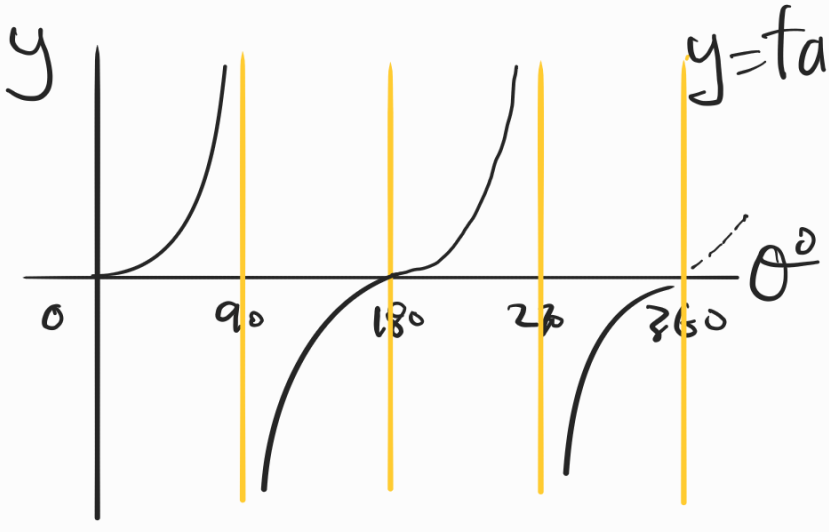
$y = \sin\theta^\circ$



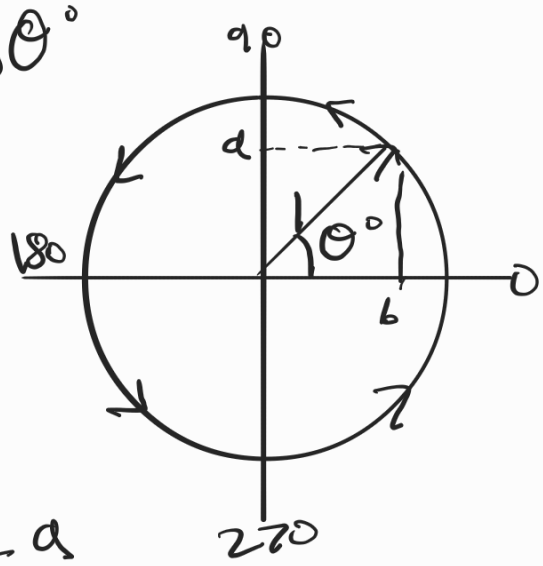


$y = \cos\theta^\circ$





$y = \tan\theta^\circ$



$y = \frac{a}{b}$

Note: Max + Min values of sin and cos are ± 1

If: $-1 \leq \cos x \leq 1$

Therefore: $-3 \leq 3\cos x \leq 3$

$-3+2 \leq 3\cos x + 2 \leq 3+2$

$\frac{y}{\pi}$