

In the **Unit Circle** there are three special angles that you can work with.

These angles are -30° , 45° , 60° .

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When using the Unit Circle you use the expression $(\cos\theta, \sin\theta)$.

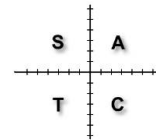
The **CAST** rule is used to help you know what is positive(+) and what is negative(-).

C stands for **COS**ine positive and **s**in, **t**an would be negative.

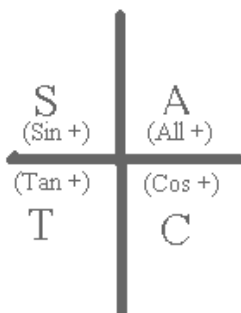
A stands for **All** positive.

S stands for **Sine** positive and **COS**, and **t**an negative.

T stands for **Tan** positive where **s**in and **COS** will be negative.



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1. In which two quadrants is $\sin\theta$ positive?
2. In which quadrant are $\sin\theta$ and $\cos\theta$ both *negative*?
3. In which quadrants is $\sin\theta$ negative?

and the answers are ...

1. 1 and 2
2. 3
3. 3 and 4

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In which quadrant is *only* $\tan \theta$ positive?

In which *two* quadrants is $\cos \theta$ positive?

In what quadrant are all the trig fractions positive?

In which quadrant is $\tan \theta$ negative and $\sin \theta$ positive?

In which quadrant are $\cos \theta$ and $\tan \theta$ both negative?

A good way to remember this chart is that ASTC stands for All Students Take Calculus.

Sine (II), **All** (I), **Tangent** (III), **Cosine** (IV)

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The 45-45-90 Triangle

In a 45-45-90 triangle the sides are in a ratio of $1-1-\sqrt{2}$

This means I can build a triangle with these lengths for sides (or any multiple of these lengths)

We can then find the six trig functions of 45° using this triangle.

$\sin 45^\circ = \frac{o}{h} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ rationalized

$\cos 45^\circ = \frac{a}{h} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan 45^\circ = \frac{o}{a} = \frac{1}{1} = 1$

Can "flip" these to get other 3 trig functions

The 30-60-90 Triangle

In a 30-60-90 triangle the sides are in a ratio of $1-\sqrt{3}-2$

This means I can build a triangle with these lengths for sides

We can then find the six trig functions of 30° or 60° using this triangle.

$\sin 30^\circ = \frac{o}{h} = \frac{1}{2}$

$\cos 60^\circ = \frac{a}{h} = \frac{1}{2}$

$\tan 30^\circ = \frac{o}{a} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

I used the triangle and did adjacent over hypotenuse of the 60° to get this but it is the cofunction of sine so this shows again that cofunctions of complementary angles are equal.

Be sure to locate the angle you want before you find opposite or adjacent

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