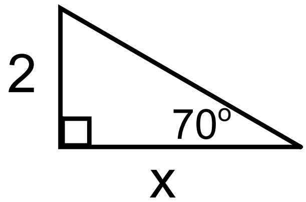
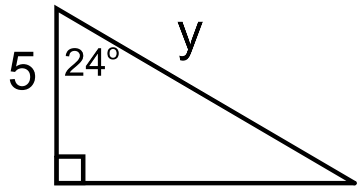
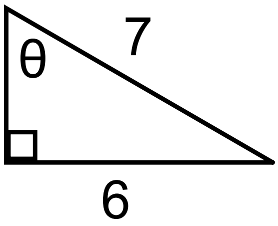
Warm up -

Use SOHCAHTOA and a calculator to find the missing side / angle

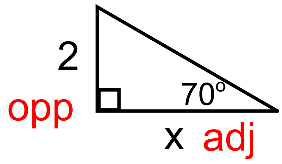






Warm up - Check your answers

Use SOHCAHTOA and a calculator to find the missing side / angle

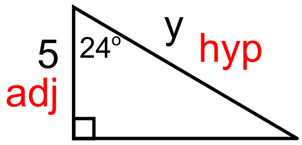


$\tan\theta = \frac{opp}{adj}$

$\tan 70 = \frac{2}{x}$

$x = \frac{2}{\tan 70^\circ}$

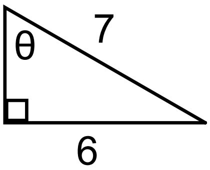
$x = 0.73$



$\cos\theta = \frac{5}{y}$

$y = \frac{5}{\cos 24^\circ}$

$y = 5.47$



$\sin\theta = \frac{6}{7}$

$\sin\theta = 0.857$

$\theta = \sin^{-1} 0.857$

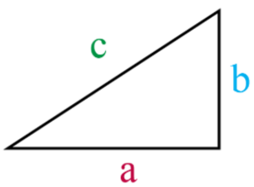
$\theta = 59^\circ$

Trigonometric Ratios for Special Angles and the Unit Circle

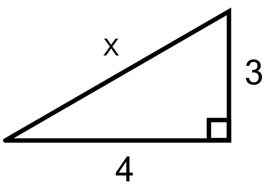
Learning Goals
- describe the unit circle
- describe and use special angles

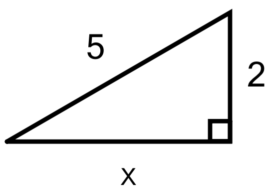
Try on your own

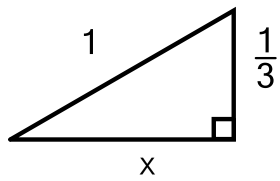
Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical $\sqrt{}$



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

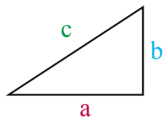




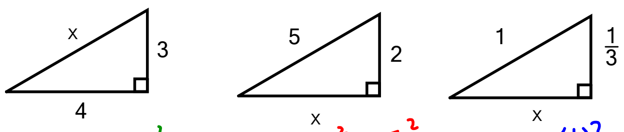


Try on your own Answers

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √‾



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



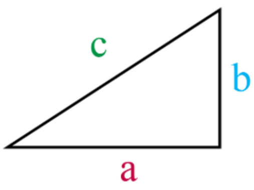
$3^2 + 4^2 = x^2$
$9 + 16 = x^2$
$25 = x^2$
$5 = x$

$x^2 + 2^2 = 5^2$
$x^2 = 25 - 4$
$x^2 = 21$
$x = \sqrt{21}$

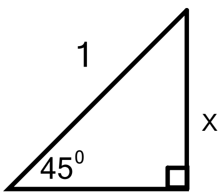
$x^2 + \left(\frac{1}{3}\right)^2 = 1^2$
$x^2 + \frac{1}{9} = 1$
$x^2 = \frac{8}{9}$
$x = \sqrt{\frac{8}{9}}$
$x = \frac{\sqrt{8}}{\sqrt{9}}$
$x = \frac{2\sqrt{2}}{3}$

Try on your own

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √‾



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

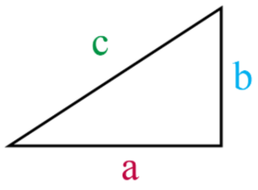


Think about this for a bit.

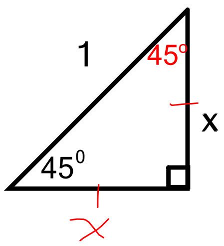
Then and only then scroll to the next page for a BIG HINT

Try on your own - A BIG HINT

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical $\sqrt{\ }$



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



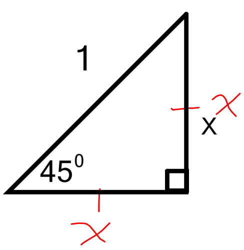
the angle at the top is 45°

both sides are the same

now use Pythareoan Theorem

Try on your own - The Answer Part One

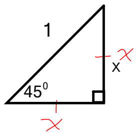
Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical $\sqrt{\ }$



$$a^2 + b^2 = c^2$$
$$x^2 + x^2 = 1^2$$
$$\frac{2x^2}{2} = \frac{1}{2}$$
$$x^2 = \frac{1}{2}$$
$$x = \sqrt{\frac{1}{2}}$$
$$x = \frac{1}{\sqrt{2}}$$

Try on your own - The Answer - Part Two

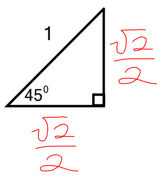
Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √‾



$$a^2+b^2=c^2$$
$$x^2+x^2=1^2$$
$$\frac{2x^2}{2}=\frac{1}{2}$$
$$x^2=\frac{1}{2}$$
$$x=\sqrt{\frac{1}{2}}$$
$$x=\frac{1}{\sqrt{2}}$$

Math Rules do not allow for a radical in the denominator. So we have to "Rationalize the Denominator". We will cover this concept in later in the course. For now just watch as I multiply the top and bottom of the fraction by "root two" and the radical 'disappears'.

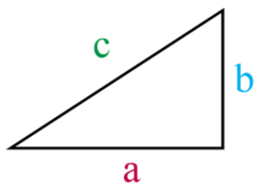
$$x=\frac{1}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}$$
$$\boxed{x=\frac{\sqrt{2}}{2}}$$



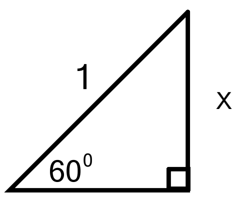
The Special Triangle for 45°

Try on your own

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √‾



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

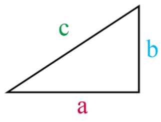


Think about this for a bit.

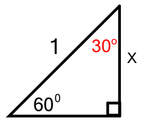
Then and only then scroll to the next page for a BIG HINT

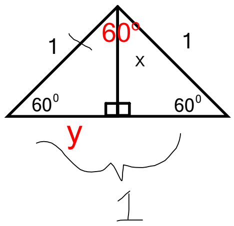
Try on your own - A BIG HINT

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical $\sqrt{\ }$



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





Draw a second triangle

The angle at the top is 60°

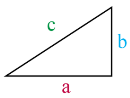
We have an equilateral ALL sides are the same

Determine y

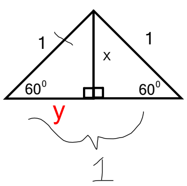
Now use Pythagoreas

Try on your own - The Answer

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical $\sqrt{\ }$

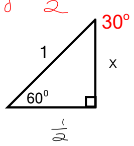


$a^2 + b^2 = c^2$

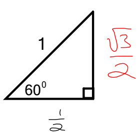


Equilateral △

$\therefore y = \frac{1}{2}$



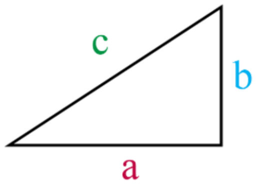
$$a^2 + b^2 = c^2$$
$$\left(\tfrac{1}{2}\right)^2 + x^2 = 1^2$$
$$\tfrac{1}{4} + x^2 = 1$$
$$x^2 = \tfrac{3}{4}$$
$$x = \sqrt{\tfrac{3}{4}}$$
$$= \frac{\sqrt{3}}{2}$$



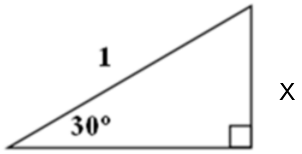
The Special Triangle for 60°

Try on your own

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √

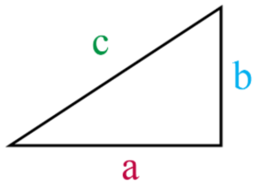


$a^2 + b^2 = c^2$

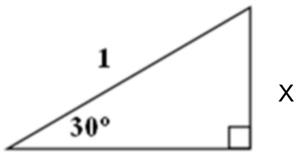


Try on your own - A BIG HINT

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √



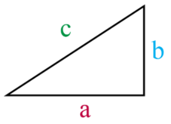
$a^2 + b^2 = c^2$



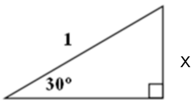
It's the same triangle
on it's side

Try on your own - The Answer

Diagrams are not to scale determine the exact value of x
Pythagorean Theorem is ALL that is required
Leave your answer as a Radical √

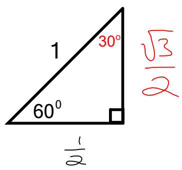


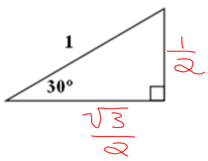
$a^2 + b^2 = c^2$



It's the same triangle as the previous , the 30° angle is at the top

So turn the triangle sideways



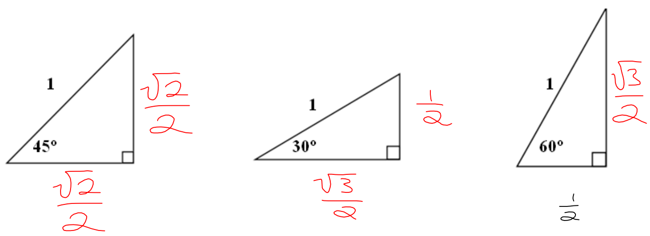


The Special Triangle for 30°

These are called "Special Triangles" .

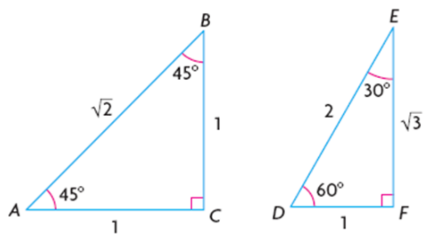
We will use these to develop the unit circle later in the Lesson.

Copy these onto a Clean Sheet of Paper you will need these later.



These are the Special Triangles from the text book, **don't panic** they look a little different, they are "Similar Triangles" to ours. BUT ours have a hypotenuse of one and that allows us to place them on the unit circle later in the lesson.

Special Triangles



Does an angle of 235 degrees make sense in trigonometry?

If so what does it look like?

Sketch it on a scrap piece of paper.

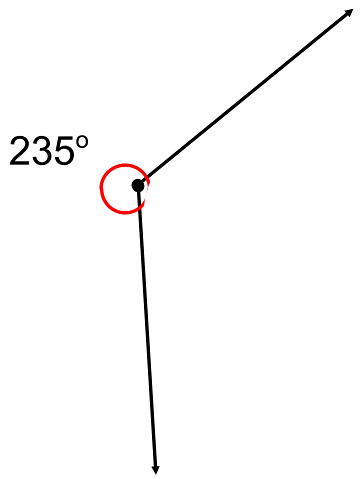
Does an angle of 235 degrees make sense in trigonometry?

If so what does it look like?

Sketch it on a scrap piece of paper.

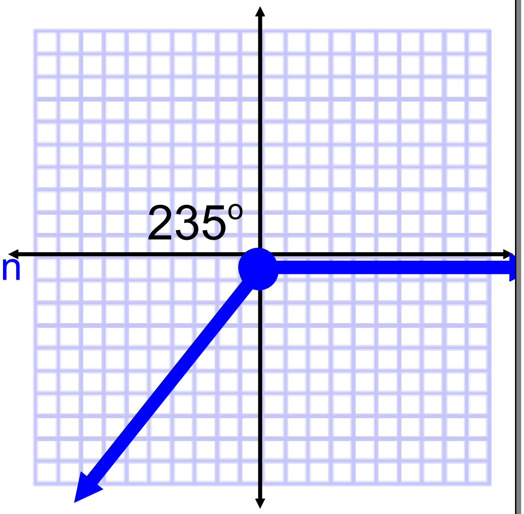
235° does not fit in a triangle.

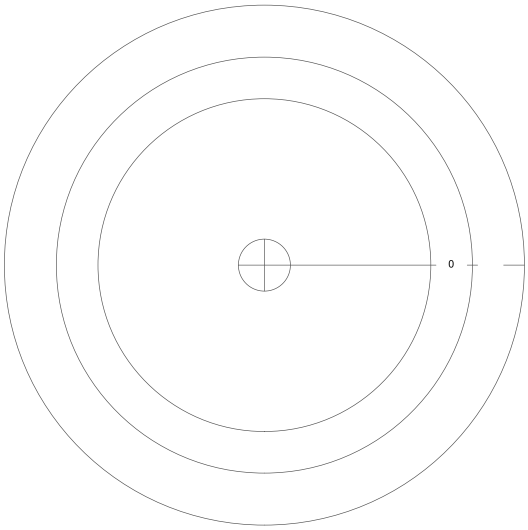
BUT it can be the angle between two rays.



Angles in Standard Position

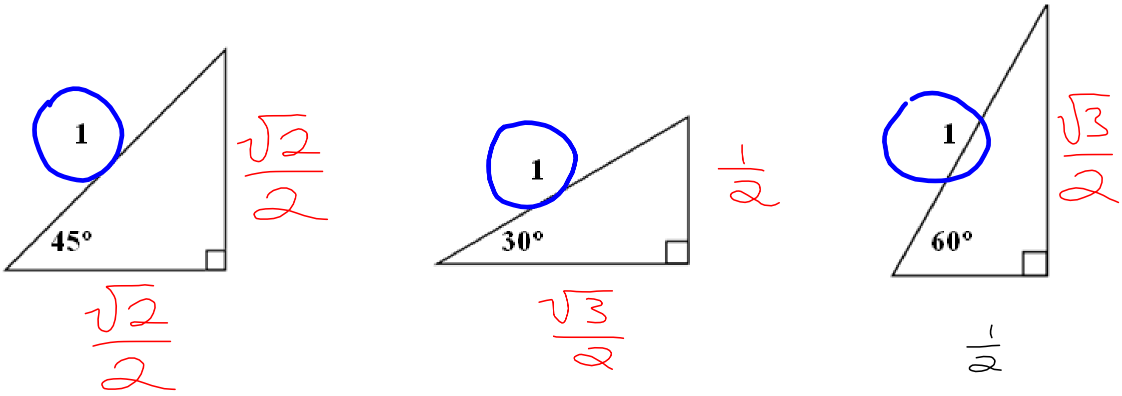
1. Always start on the x axis.
2. Go counter clockwise direction



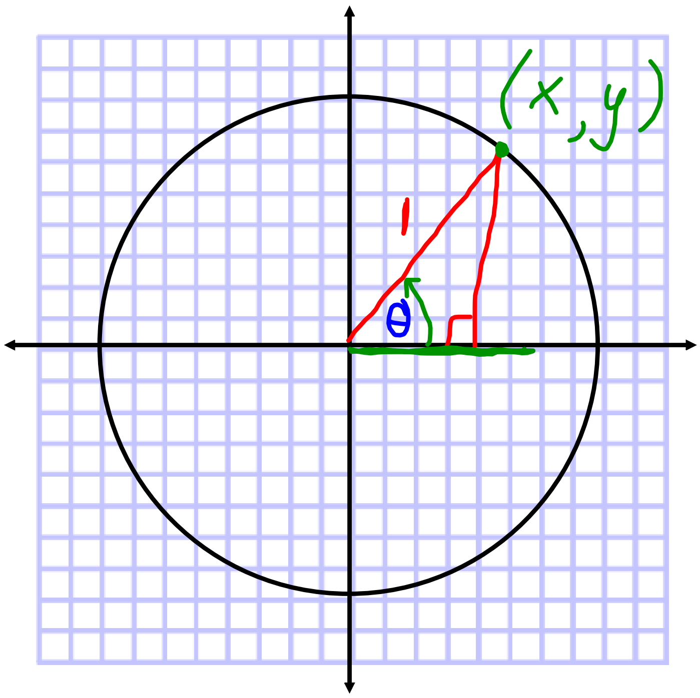


If you have access to a printer then Print "The Unit Circle" pdf from the website BEFORE going on.

Turn on the Video now



The Unit Circle - Radius is ONE

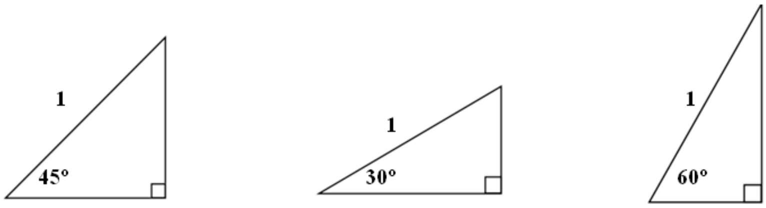


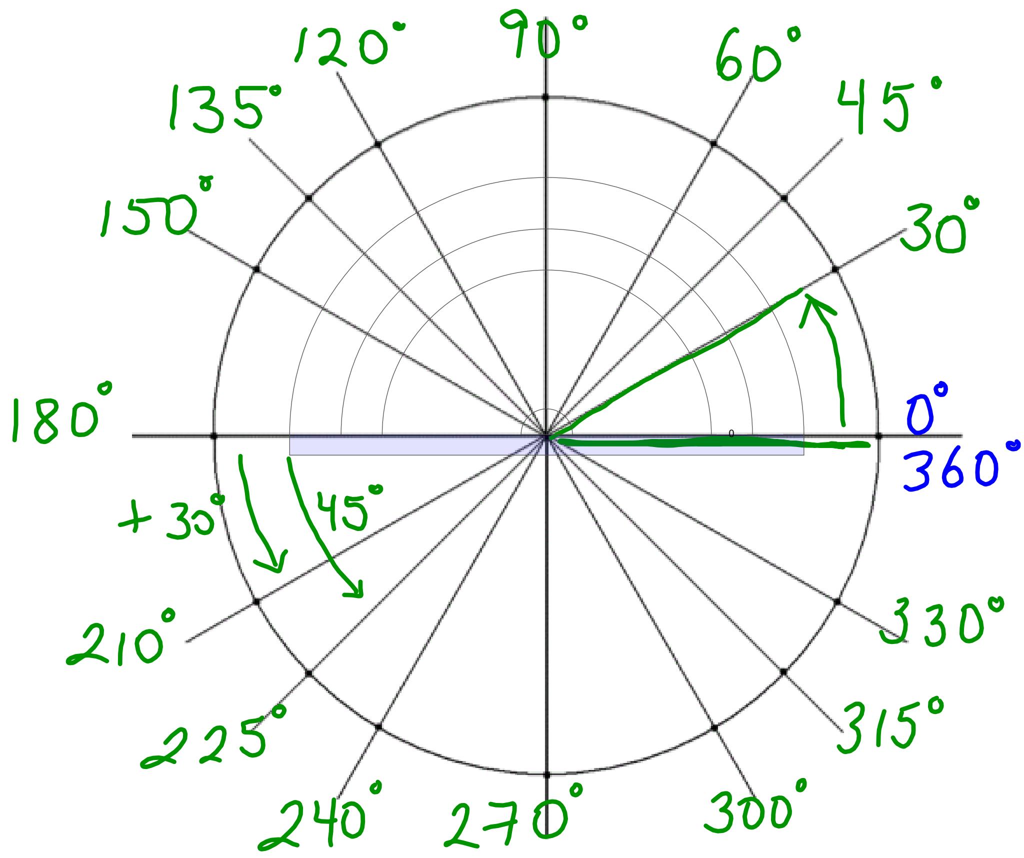
To fill out the unit circle

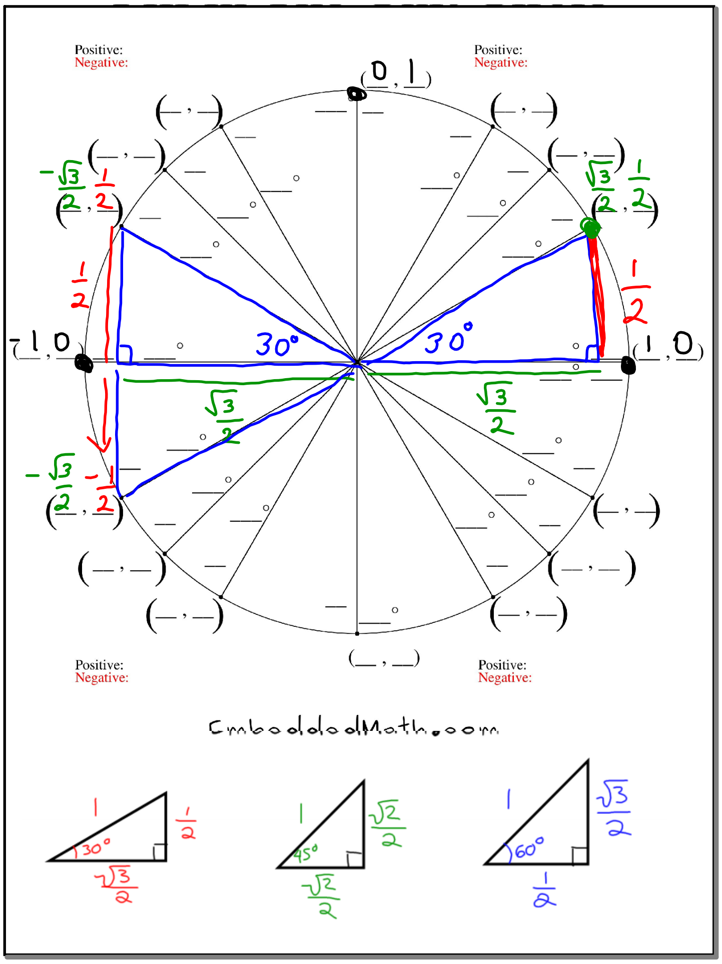
1. Measure and mark all angles.
2. Plot the points you know

   Use your special triangles to help you
3. Use symmetry to fill in the remaining circle

   Be careful with the negative signs



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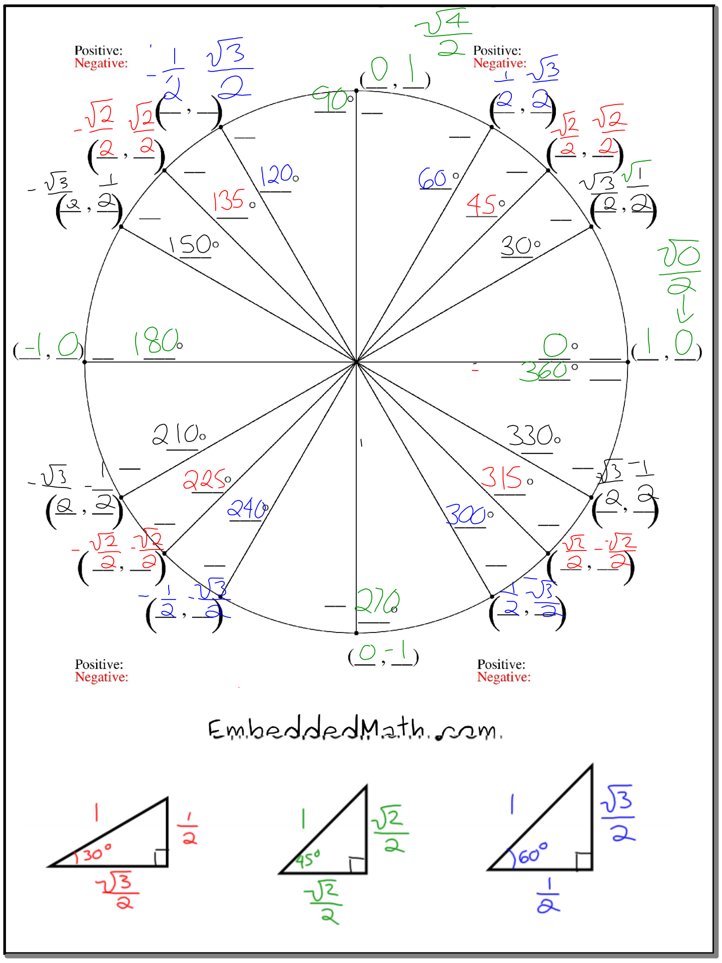
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Now that you have a complete Unit Circle look at all the patterns.

Could you recreate this on your own?

How would you go about memorizing the Unit Circle?