Starter: Give 2 (two) differences and 2 (two) similarities of a centimeter and an inch...

Talk with your table. Be ready to share a difference and a similarity.

6-2 Angles and Radians

Objectives:

6-2a: I can draw angles in radians.

6-2b: I can find co-terminal angles in degrees & radians.

6-2c: I can find reference angles in radians.

Centimeters & Inches

Both measurements
Both on a ruler

1 cm ≠ 1 inch

inches used in the USA
cm used every where else.

~~Angles~~ & Radians...
Degrees

Degrees and radians are different types of measurements for angles.

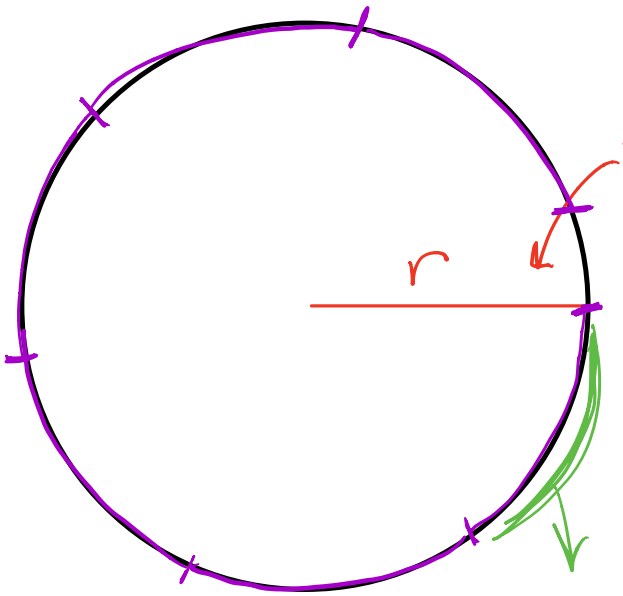
1 radian ≠ 1 degree

What are radians?

https://www.youtube.com/watch?v=FUrs9JWn_N4

https://en.wikipedia.org/wiki/Radian#mediaviewer/File:Circle_radians.gif

You may go to these websites to help you understand what a Radian is.



this is a radius. If I take the length of the radius and put it around the circle - how many will it take

this is 1 radian

So there is 6 and a little more Rudians around a circle

But in a half Circle there is 3 and a Little bit more.

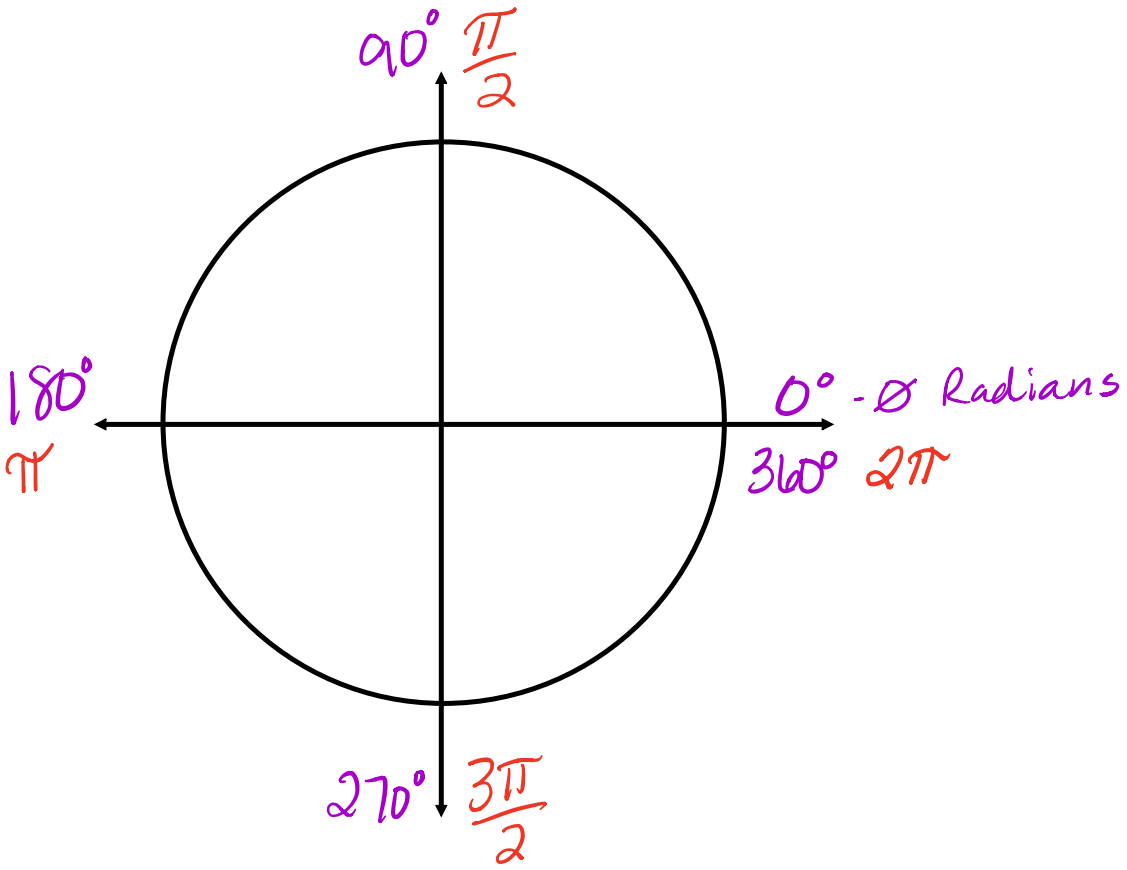
What # is 3 and a little bit?

How about π...

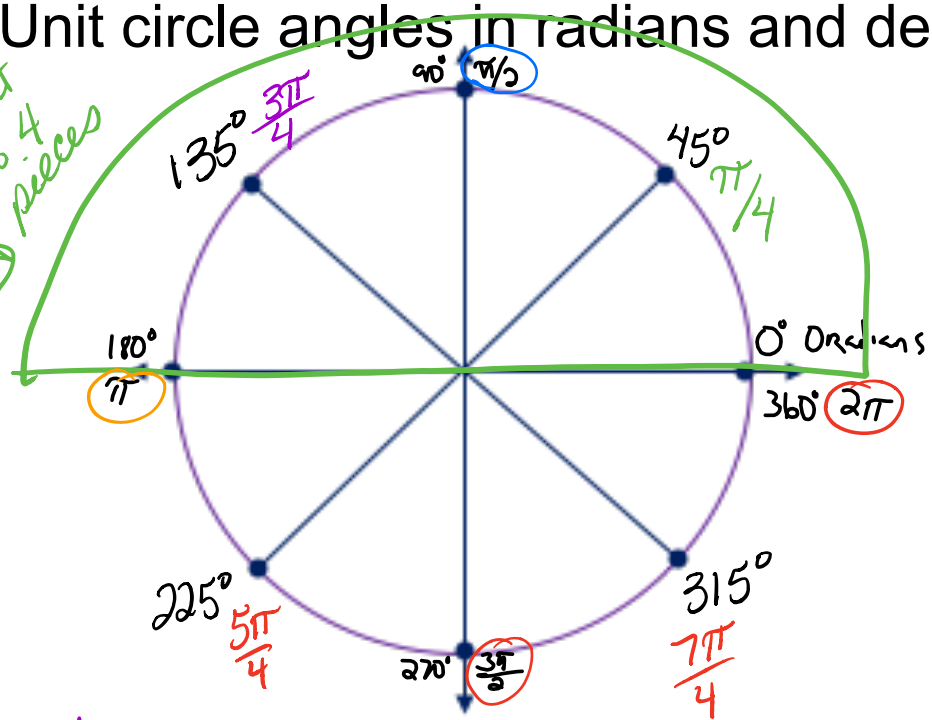
So a half circle is π Rudians...

or 180°

$90° = \frac{180°}{2}$ so $90° = \frac{\pi}{2}$



Unit circle angles in radians and degrees



π is cut into 4 pieces

Start Here

① So when we are looking for radians we can cut π into pieces.

② Then we can look at the 1st angle or 45° as $\frac{1}{4}\pi$ or $\frac{\pi}{4}$.

③ The 2nd angle of 90° is $\frac{2}{4}\pi$ or $\frac{1}{2}\pi = \frac{\pi}{2}$ which we already found.

④ The 3rd angle of 135° can be looked at as $\frac{3}{4}\pi$ or $\frac{3\pi}{4}$

⑤ The 4th angle of 180° is $\frac{4}{4}\pi$ or π.

⑥ We continue counting angles around the rest of the circle...

$225° = \frac{5\pi}{4}$

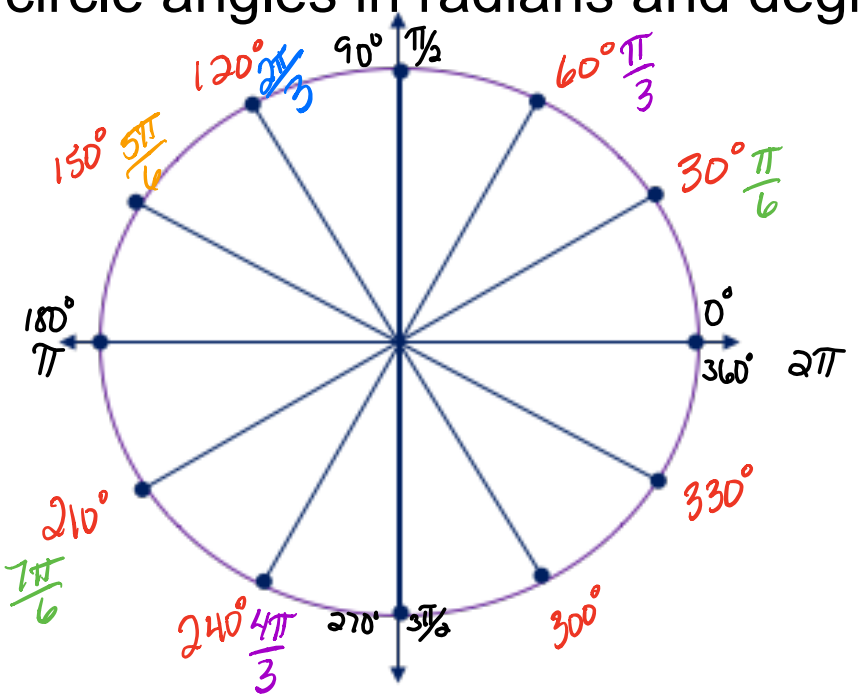
$270° = \frac{6\pi}{4}$ or $\frac{3\pi}{2}$

$315° = \frac{7\pi}{4}$

$360° = \frac{8\pi}{4} = 2\pi$

Let's try it again... 1st find the angles in degrees... $\frac{180^\circ}{6 \text{ (pieces)}} = 30^\circ$

Unit circle angles in radians and degrees



Our π is cut into 6 pieces so...

1st angle of 30° is $\frac{1\pi}{6} = \frac{\pi}{6}$

2nd angle of 60° is $\frac{2\pi}{6} = \frac{\pi}{3}$

3rd angle of 90° is $\frac{3\pi}{6} = \frac{\pi}{2}$

4th angle of 120° is $\frac{4\pi}{6} = \frac{2\pi}{3}$

5th angle of 150° is $\frac{5\pi}{6}$

6th angle of 180° is $\frac{6\pi}{6} = \pi$

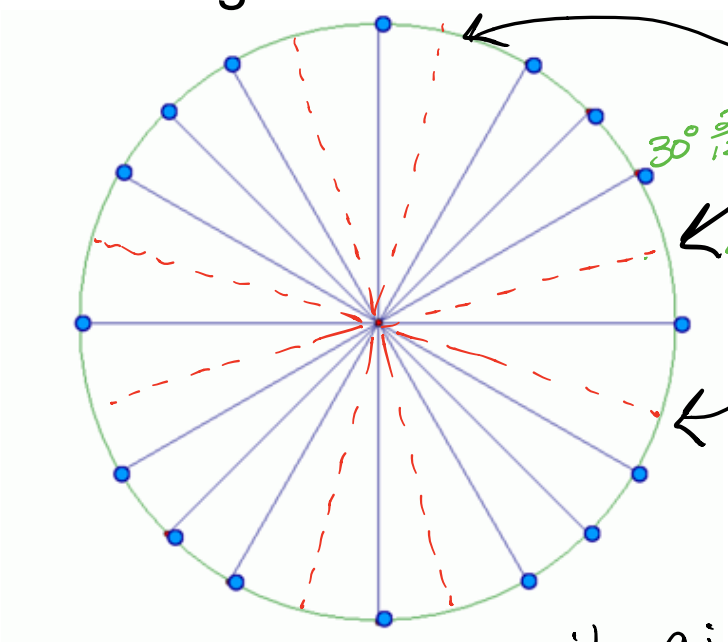
7th angle of 210° is $\frac{7\pi}{6}$

8th angle of 240° is $\frac{8\pi}{6} = \frac{4\pi}{3}$

9th angle of 270° is $\frac{9\pi}{6} = \frac{3\pi}{2}$

* Can you find the Radians for 300° and 330°?

Unit circle angles in radians and degrees (full)



This is called the unit circle. Notice all the pieces are not equal. So you can not just count pieces. You must split the larger pieces to make even pieces.

Once all the pieces are split equally then you can split π into 12 pieces... and find the radians.

Go ahead and find the angles in degrees 1st then find the radians. I started the first 2 angle for you.

* You may also notice the unit circle is our 1st circle & our 2nd circle combined.
You can check if you did it correctly by looking at the 1st 2 circles.