

Creating a unit circle - radians

A. Distance around a circle, aka. Circumference:

What is the formula for the circumference (distance around) of a circle? _____

If a circle has a radius of 1 unit, what is the EXACT circumference of that circle? _____

If you travelled $\frac{1}{2}$ of the way around that circle, how far have you gone? _____

What if you travel $\frac{1}{4}$ of the way around the circle? _____

What if you travel $\frac{1}{8}$ of the way around the circle? _____

What if you travel $\frac{3}{4}$ of the way around the circle? _____

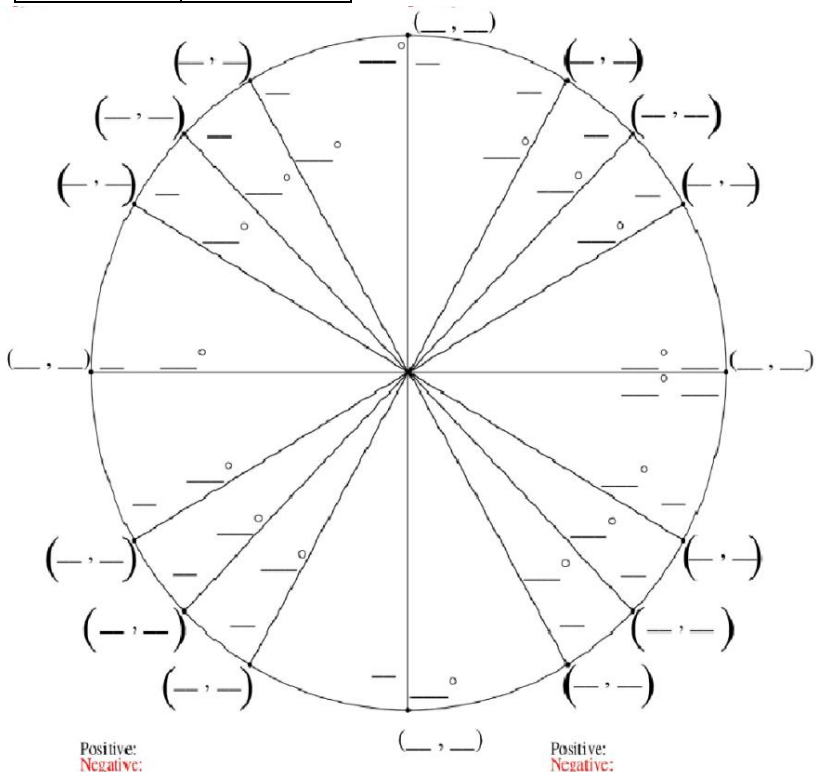
B. Radians are the connection between the central angle and the distance around the unit circle. Complete the following tables:

Radians (distance around the unit circle)	Degrees (central angle measure)
	90°
	180°
	270°
	360°
$\pi/3$	
$2\pi/3$	
$4\pi/3$	
$5\pi/3$	

Radians	Degrees
	45°
	135°
	225°
	315°
$\pi/6$	
$5\pi/6$	
$7\pi/6$	
$11\pi/6$	

Radians	Degrees
	30°
	60°
	90°
	120°
	150°

Mark all of these degrees and radian measures on the unit circle.



Positive:
Negative:

Positive:
Negative:

To convert degrees to radians:

ex. $1^\circ =$

To convert radians to degrees:

ex. 1 radian =

C. Finding 1 radian.

You may not like having to deal with π in your radian measures.

Let's look at what 1 radian looks like;

Step 1: Cut a piece of paper the same length as the radius of the unit circle.

Step 2: Position your radius at the 0° mark, then wrap it around the circumference. Mark the ending point R_1 . Move the quarter-circle to R_1 and mark another length. Label it R_2 . Continue around the circle.

How many radius lengths did you get? _____

Step 3: Highlight the circumference between 0° and R_1 . This is 1 radian.

Questions:

1. Assume the radius of the circle is 6 cm.

The circumference of the circle is _____.

How many 6-cm arcs would it take to wrap completely around the circle? _____

2. Now assume the radius of the circle is 20 cm.

The circumference of this circle is _____.

How many 20-cm arcs would it take to wrap completely around the circle? _____

3. If a circle has radius r ,

The circumference is _____,

It would take _____ radius-sized arcs to wrap completely around the circle.