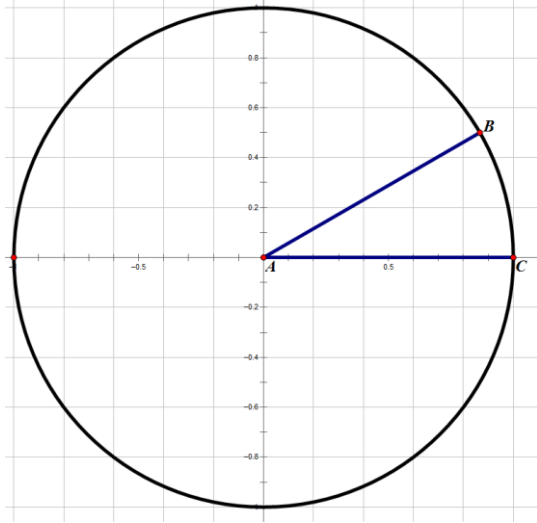
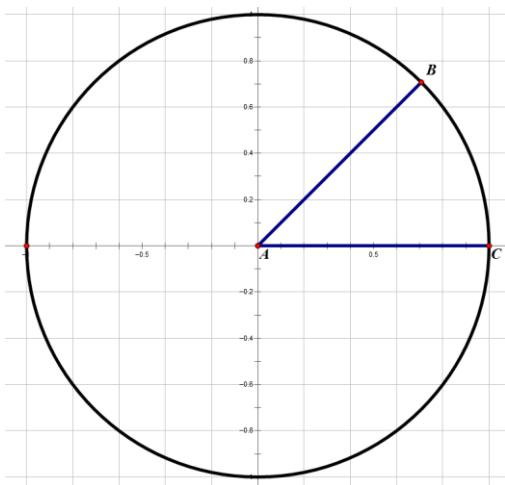


## Are you cold? Stand in the corner, it's $90^\circ$ !

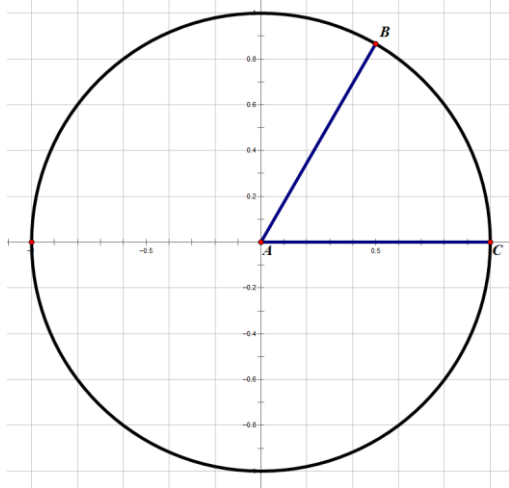
1. Find the length of  $\widehat{BC}$  given  $m\angle BAC = 30^\circ$  and  $\odot A$  has  $r = 1$  cm.



2. Find the length of  $\widehat{BC}$  given  $m\angle BAC = 45^\circ$  and  $\odot A$  has  $r = 1$  cm.



3. Find the length of  $\widehat{BC}$  given  $m\angle BAC = 60^\circ$  and  $\odot A$  has  $r = 1$  cm.



4. Do you notice any patterns between the angle measure and the length of the arc?
5. If you were an “alien” from another galaxy, would you understand the notion of degrees? Where do you think degrees came from? Do a quick Google search if you must!

A more mathematically sound approach that even an “alien” would understand is to find the amount of rotation based on the length of the circles radius.

Follow me...

Consider the following drawings:

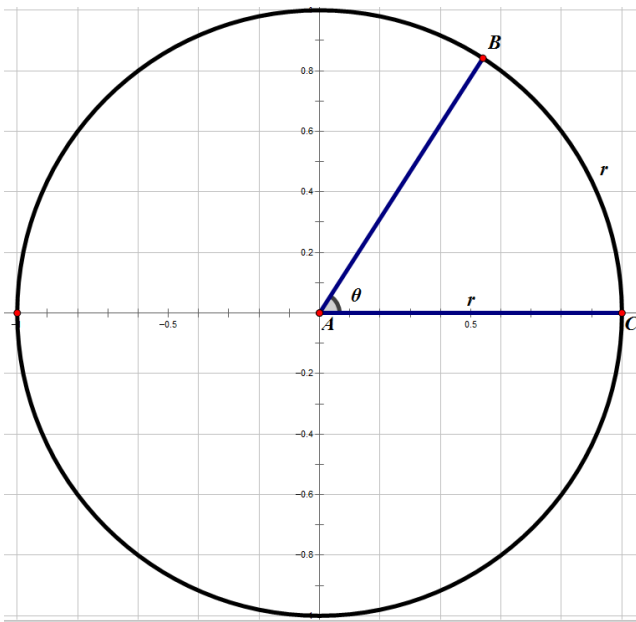


Diagram #1

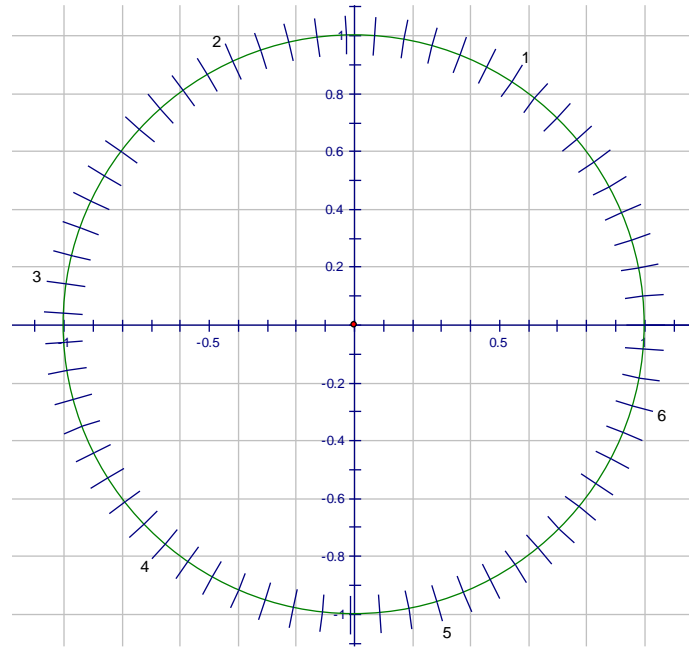


Diagram #2

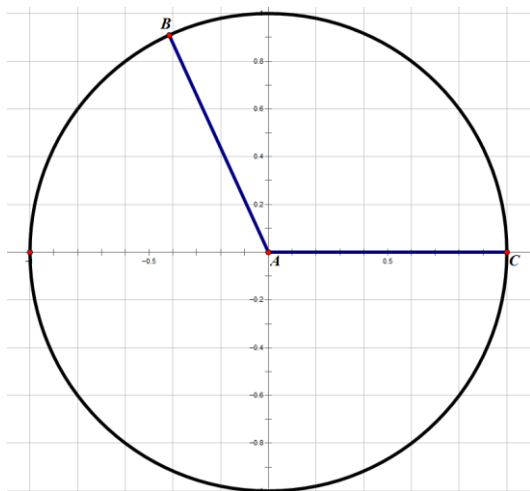
**Definition of Radian:**

A unit of angle measure, equal to an angle at the center of a circle whose subtended (fancy for where the central angle intersects the circle) arc is equal in length to the radius.

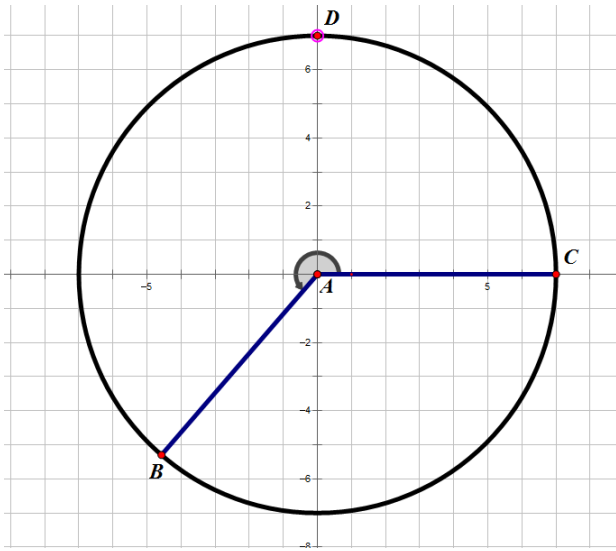
For the diagrams above, the radius of the circle is 1 (the Unit Circle). This means that the measure of 1 radian is equal to the length of one radius placed along the arc of the circle. Even an “alien” would understand this measurement! Let’s try this again, but with a more logical approach!

**Are you cold? Stand in the corner, its  $\frac{\pi}{2}$  radians...wait, that doesn’t make as much sense now.**

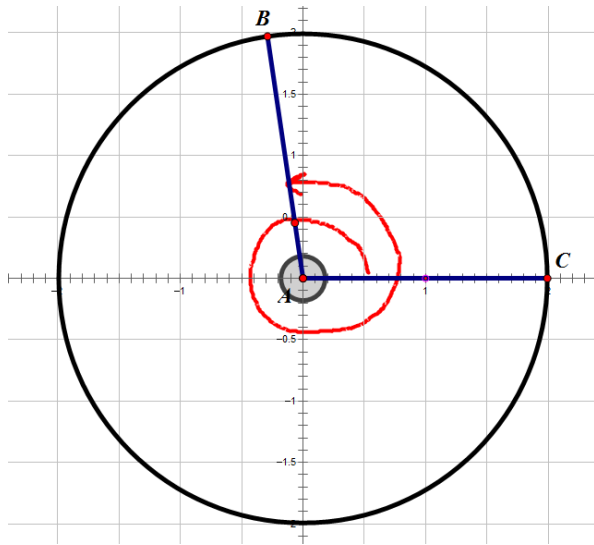
1. Find the length of  $\widehat{BC}$  given  $m\angle BAC = 2 \text{ rad}$  (we usually don’t label radians with a unit) and  $\odot A$  has  $r = 1 \text{ cm}$ .



2. Find the length of  $\widehat{BDC}$  given  $m\angle BAC = 4 \text{ rad}$  and  $\odot A$  has  $r = 7 \text{ cm}$ . (Hint: how long would 1 rad be?)



3. Find the length of  $\widehat{BC}$  given  $m\angle BAC = 8 \text{ rad}$  (more than one full rotation) and  $\odot A$  has  $r = 2 \text{ cm}$ .



4. How many Radians are there in one complete rotation of a circle?
5. How are angle measure in degrees & radians related? Simply, how would someone convert from a degree measure (not very mathematical to “aliens”) to radians (more purely related to a circle)?