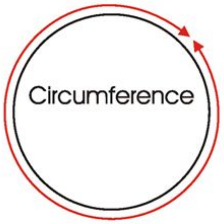
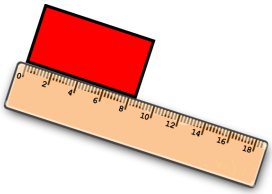
What the Heck is a Radian?

1. Each person in your group takes a circle. Measure the circumference by wrapping string around the outside.



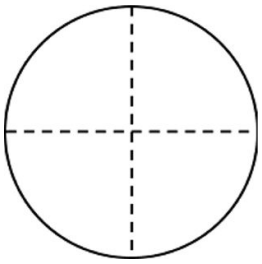


Then measure the string with a ruler; don't stretch the string too tight when measuring with the ruler. Record this length.

Circumference (cm): _____

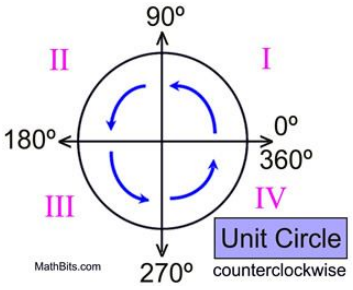
Compare the circumference of your circles with your group. What did you notice?_____

_____

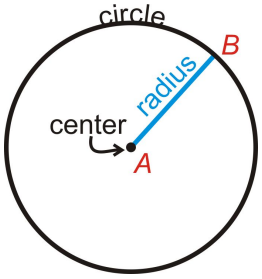


2. Fold the circle exactly in half, then in quarters. Open the circle. Use the ruler to draw line segments along the fold lines forming four quadrants.

Label the lines 0°. 90°, 180° and 270 ° counterclockwise.



3. The folding process has located the center of the circle.



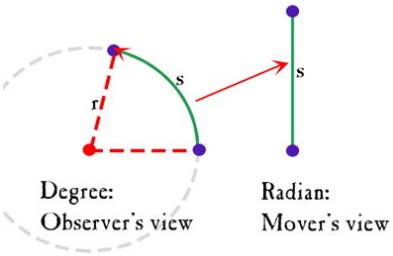
Use your pipe cleaner to measure the radius of the circle. Cut the pipe cleaner to this length. Measure the length. Record this length.

Radius (cm):_____

Compare the length of your radius with the others in your group. What did you notice?

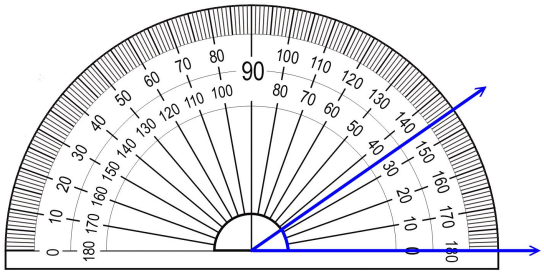
_____

_____



4. Hold one end of the radius length string at the edge of the circle at 0°. Wrap the string around the edge of the circle and mark its ending location. Connect this point to the center of the circle.

5. Using your protractor, find the number of degrees in the central angle formed from 0° to the segment you drew in step 4.

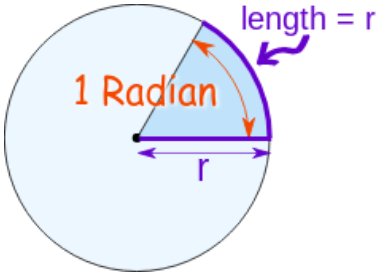


Degrees: _____

Compare the number of degrees with the other members of your group. What did you notice?_____

_____

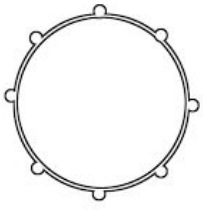
6. This angle (the one you just measured) has a measure of one radian. Record this answer.



1 radian = _____degrees

How does your answer compare to the answers of your group members?

_____

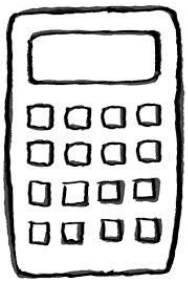


7. Using your radius length string, continue to wrap the string around the edge of the circle marking its ending locations. Record the number of radian angles that will fit in the circle.

Number of Radians in your circle:_____

Number of radians in half of your circle: _____

8. What is the decimal value of π (round to the hundredths place): _____



What do you notice about the number of radians in half of your circle and the decimal value of π?

_____

_____

_____

How does your answer compare to the answers of your group members?

_____

Based on your answer above, how many π make up a whole circle? Explain your reasoning.

_____

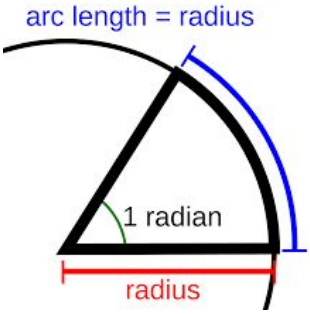
_____

_____

A. How can we define the word radian?

_____

_____.



B. Is there a way to mathematically calculate the number of degrees in a radian? What ideas can you think of? What information do you need?

_____

_____.