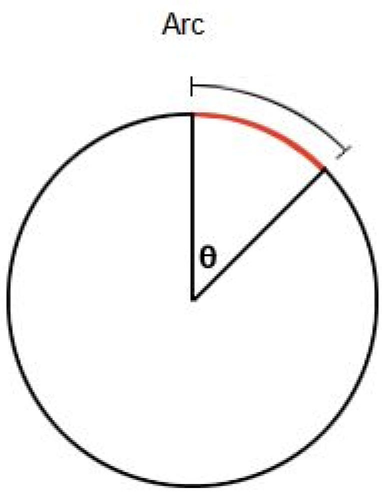
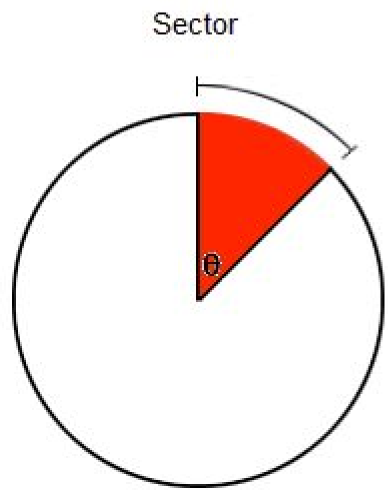
PRECALCULUS

Classwork #_____: Parts of Circles

Recall: The *circumference* is the distance around the outside of the circle. It's equal to $2\pi r$ (or πd).
The *area* is the space of everything inside the circle. It's equal to πr^2.

Suppose we look at only a segment of the circle, marked by some angle θ.





How can we find the length of the arc or the area of the sector? Discuss with a partner for a few minutes and see if you can come up with some ideas. Space for notes below. Make sure you record the formulas you are able to generate through this process.

	θ in radians	θ in degrees
arc length		
sector area		

An explanation Jessica found in the textbook that she likes:

The input variable in trigonometric function is an angle measure; the output is a real number. Believe it or not, this poses an immediate problem for us if we choose to measure our angles in degrees (as most of us did in our geometry courses).

The problem is that degree units have no mathematical relationship whatsoever to linear units.

The idea of dividing a circle into 360 equal pieces dates back to the sexagesimal (60-based) counting system of the ancient Sumerians. The appeal of 60 was that it was evenly divisible by so many numbers (2, 3, 4, 5, 6, 10, 12, 15, 20, and 30). Early astronomical calculations wedded the sexegesimal system to circles, and the rest is history.

However, over time it because natural to think of an angle as being determined by an arc length, rather than the arc being determined by the angle, and that led to radian measure.