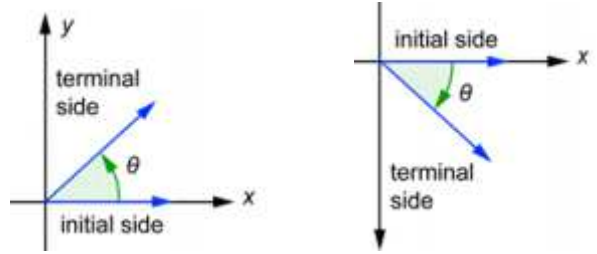


**I. Vocabulary**

**Standard Position** – An angle is in standard position if its vertex is located at the origin with one ray on the positive x-axis. The ray on the x-axis is called the **initial side** and the other ray is called the **terminal side**.



**Positive angle** – A positive angle is created by rotating counterclockwise:  $360^\circ = 1$  counterclockwise revolution

**Negative angle** – A negative angle is measured in the clockwise direction from the positive horizontal axis:  $-360^\circ = 1$  clockwise revolution

A. Draw each angle.

1.  $45^\circ$

2.  $-90^\circ$

3.  $225^\circ$

4.  $405^\circ$

B. Convert between degrees-minutes-seconds (DMS) and decimal measures for angles.

5. Convert  $50^\circ 6' 21''$  to decimal degrees.  
Round four decimal places.

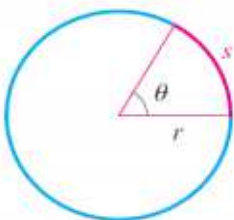
6. Convert  $21.256^\circ$  to DMS.  
Round to the nearest second.

$$1^\circ = 60'$$

$$1' = 60''$$

**II. Arc Length & Area of Sectors**

A. Length of a Circular Arc



What is the measure of the arc  $s$  in the diagram to the left?

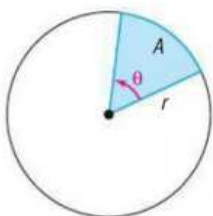
Create a proportion relating the ratio of  $\theta$  to the whole circle which is  $2\pi$  radians and the ratio of the arc length to the circumference. The proportion simplifies giving the arc length as:

$$\frac{\theta}{2\pi} = \frac{s}{2\pi r} \quad \rightarrow \quad s = \theta r \quad \text{or} \quad \theta = \frac{s}{r}$$

$\theta$  must be in radians!

1. Find the length of the arc of a circle of radius 2 meters subtended by a central angle of 0.25 radian.

B. Area of a Circular Sector



We can find the area of the "slice of pie" or sector with a central angle  $\theta$  using proportions. Once again we use the ratio of the angle  $\theta$  to the whole circle which is  $2\pi$  radians. This is set equal to the ratio of the area of the sector to the area of the circle and simplify.

$$\frac{\theta}{2\pi} = \frac{A}{\pi r^2} \quad \rightarrow \quad A = \frac{1}{2} r^2 \theta$$

$\theta$  must be in radians!

2. Find the area of the sector of a circle of radius 2 feet formed by an angle of  $30^\circ$ . Round two decimal places.