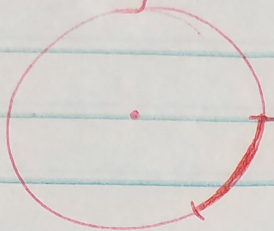


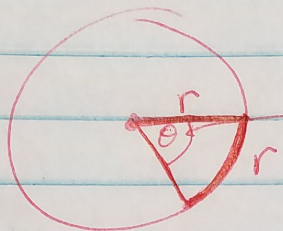
# 4.1 Angles and their Measure

## Arc length



length of arc  
 $s = r\theta$  ← angle in ~~degrees~~ <sup>radians</sup>  
 ↑ length of radius

← angle in degrees  
 $s = \frac{\pi r \theta}{180}$



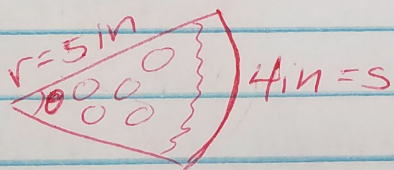
One radian

$180^\circ = \pi$  radians

$360^\circ = 2\pi$  radians

$90^\circ = \frac{\pi}{2}$  radians

EX #1 What was the central angle of a pizza slice with a radius of 5 in & a crust that is 4 in?



$s = r\theta$

$4 = 5\theta$

$\theta = \frac{4}{5}$  radians

## DMS (Degrees - Minutes - Seconds)

$60'' = 1'$  <sup>sec</sup> <sub>min</sub>  
 $60' = 1^\circ$

not time

$123^\circ 42' 16''$

fraction of a degree

EX #2 Convert  $41.732^\circ$  to DMS.

$41^\circ 43' 55.20''$

$.732^\circ \left( \frac{60'}{1^\circ} \right) = 43.92'$

$.92' \left( \frac{60''}{1'} \right) = 55.20''$

EX#3 Convert  $42^{\circ} 24' 36''$  to degrees

$$36'' \left( \frac{1'}{60''} \right) = .6'$$

$$42^{\circ} 24.6'$$

$$24.6' \left( \frac{1^{\circ}}{60'} \right) = .41^{\circ}$$

$$\boxed{42.41^{\circ}}$$

### Conversions

$$1 \text{ hr} = 60 \text{ min}$$

$$1 \text{ ft} = 12 \text{ in}$$

$$1 \text{ mi} = 5280 \text{ ft}$$

$$1 \text{ rev} = 360^{\circ} = 2\pi \text{ rad}$$

$$1^{\circ} = 60'$$

$$1' = 60''$$

$$180^{\circ} = \pi \text{ rad}$$

$$90^{\circ} = \frac{\pi}{2} \text{ rad}$$

$$\text{length of 1 radius} = 1 \text{ radian}$$

$$1 \text{ statute (land) mile} \approx 0.87 \text{ nautical miles}$$

$$1 \text{ nautical mile} \approx 1.15 \text{ statute miles}$$