What is the measure of an angle?

The size of an angle
or
The amount of rotation to move from one side the other side.

Units used to measure anlges:

- Degrees
- Radians

θ Greek letter Theta

Other common variables used for angles:

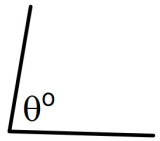
α alpha

β beta

γ gamma

Variable often used to represent an angle

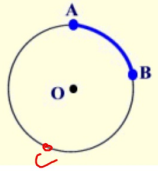
Sinθ



What is an Arc ?

What is Arc Length ?

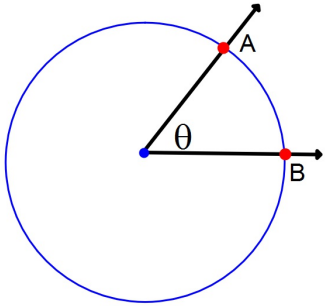
minor arc $\overset{\frown}{AB}$ major arc $\overset{\frown}{ACB}$



An **arc** of a circle is a "portion" of the circumference of the circle.

The **length of an arc** is simply the length of its "portion" of the circumference. Actually, the circumference itself can be considered an arc length.

Central Angle:
An angle whose vertex is at the center of a circle.

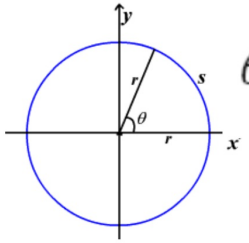


Intercepted Arc:
The portion of the circles circumference that is cut off by the sides of the central angle.

$\angle\theta$ intercepts $\overset{\frown}{AB}$

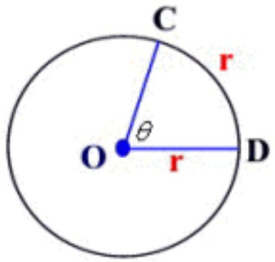
Radian Measure of an angle:

Ratio of the length of the arc intercepted by a central angle to the radius of the circle.



$$\theta = \frac{s}{r} = \frac{\text{Length of intercepted arc}}{\text{Length of radius}}$$

One radian is the measure of an angle that intercepts an arc whose length is equal to the radius of the circle.



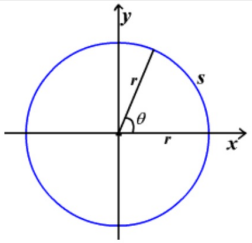
$m\angle COD$ = 1 radian

$$\theta = \frac{s}{r} = \frac{r}{r} = 1 \text{ radian}$$

Using this formula: $\theta = \frac{s}{r}$

You can write this as: $S = \theta r$

Length of an arc equals the measure of the angle, in radians, times the radius.



If the arc length equals the entire circle then S is the entire circumference $S=2\pi r$

$S = \theta r$ becomes $2\pi r = \theta r$

$2\pi = \theta$

This means a full circle is equal to 2π radians.

The relationship between degrees and radians is:

$$2\pi = 360^\circ$$

This can be simplified into: $\pi = 180^\circ$

This relationship: $\pi = 180^\circ$

can be written as the following two conversion factors:

$$\frac{\pi}{180^\circ} \quad or \quad \frac{180^\circ}{\pi}$$

Use one of these conversion factors to convert each angle into degrees.

$\frac{\pi}{180^\circ}$ $\frac{180^\circ}{\pi}$

1. $\frac{2\pi}{3} \cdot \frac{180^\circ}{\pi} = 120^\circ$

2. $-\frac{5\pi}{9} \cdot \frac{180^\circ}{\pi} = -100^\circ$

3. $\frac{23\pi}{15} \cdot \frac{180^\circ}{\pi} = 276^\circ$

Use one of these conversion factors to convert each angle into radians. Give the answer in terms of π and as a decimal.

$\frac{\pi}{180^\circ}$ $\frac{180^\circ}{\pi}$

1. $\frac{45^\circ}{1} \cdot \frac{\pi}{180^\circ} = \frac{\pi}{4}$

2. $150^\circ \cdot \frac{\pi}{180^\circ} = \frac{5\pi}{6}$

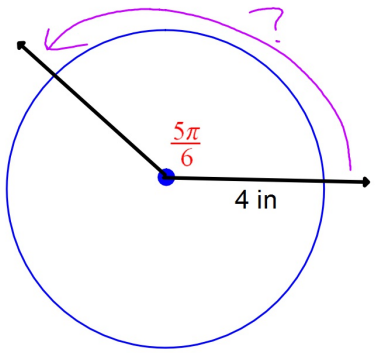
3. $210^\circ \cdot \frac{\pi}{180^\circ} = \frac{7\pi}{6}$

Convert this radian measure to degrees:

5. $\frac{180^\circ}{\pi} = 286.47$

Find the length of the intercepted arc.

1.



$S = \theta r$

$= \frac{5\pi}{6} \cdot 4 = 10.47$ in