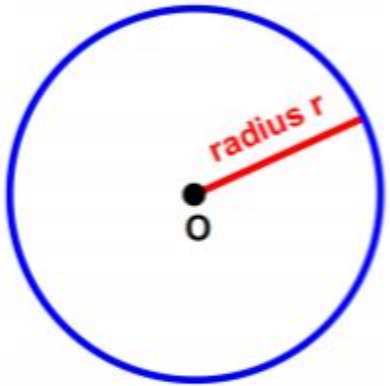
# Introduction to Circles

A **circle** with a center **O** and a radius **r** is the set of points on a plane located **r** units away from the center **O**.

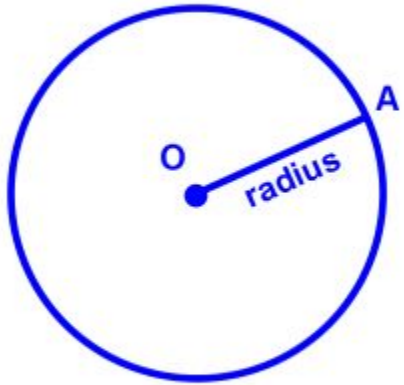



The circle is blue.

The center (point O) is black.

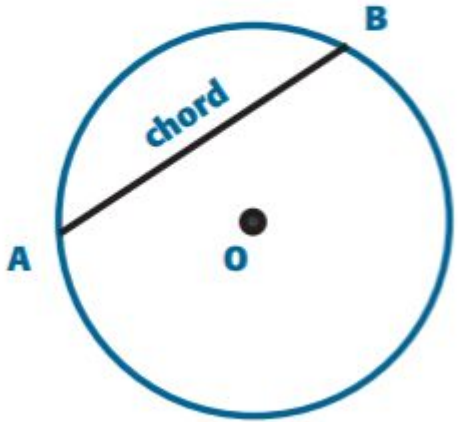
The radius (r) is red.

The **radius (r)** is any segment joining the center (O) to a point (A) on the circle.



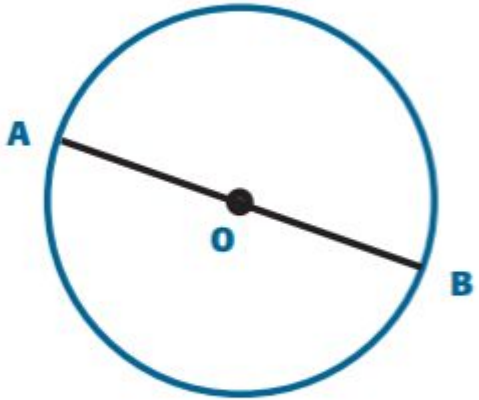

Segment OA is the radius of the circle.

Any segment that joins two points on the circle and does not pass through the center (O) is called a **chord**.




Segment AB is a chord.

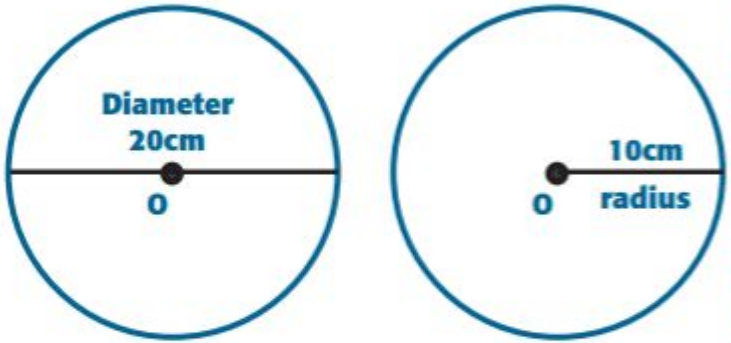
Any segment that joins two points on the circle and passes through the center (O) is called a **diameter**.




Segment AB is a diameter.

Note that all diameters are chords, but not all chords are diameters.

Also, note that the diameter is twice as long as the radius.



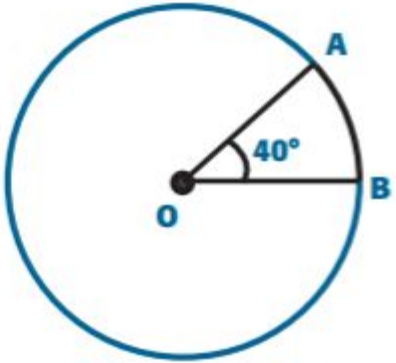

As a formula, we can write:

$$d = (2)(r)$$

where d = diameter
r = radius

## The Central Angles of a Circle

The **central angle** in a circle is an angle that is measured using the center (O) of the circle as the vertex of the angle.



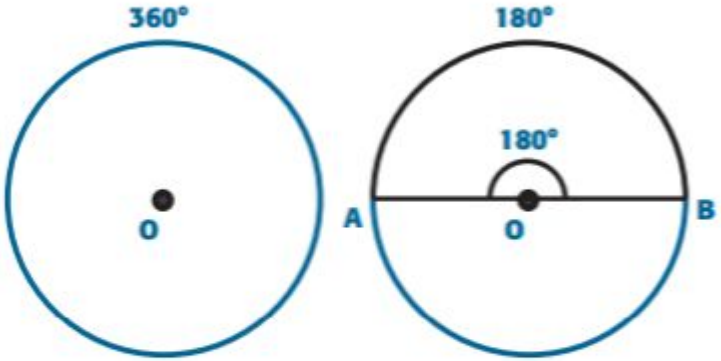

$m\angle AOB = 40°$

This is a central angle.

Note that $m\angle AOB = m\overset{\frown}{AB}$. That is, since $m\angle AOB = 40°$, $m\overset{\frown}{AB} = 40°$

One full rotation in a circle is **360°**.

One half of a circle (or a semi-circle) is **180°**, since **360° ÷ 2 = 180°**

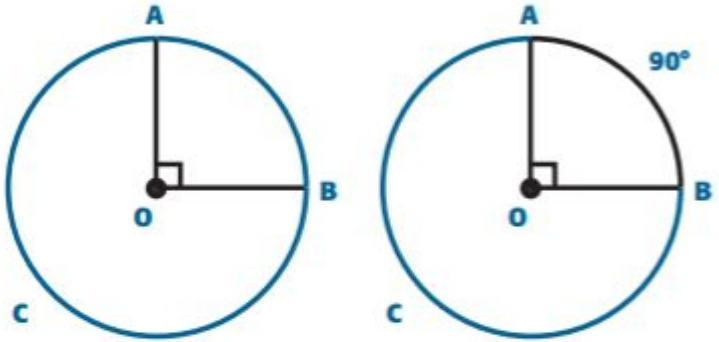



One full circle $\frac{1}{2}$ circle

$$m\angle AOB = 180°$$

$$m\overset{\frown}{AB} = 180°$$

## Minor Arc



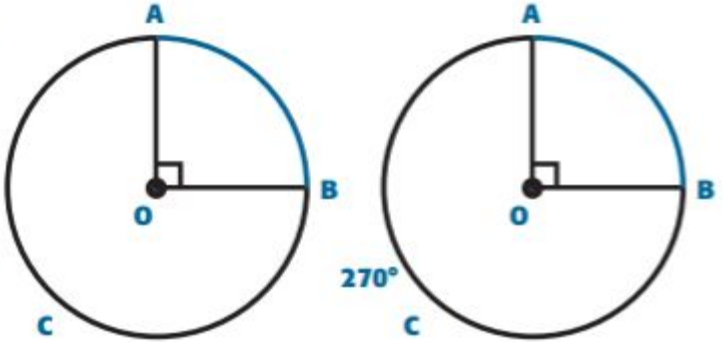

$\overset{\frown}{AB}$ *is a minor arc*

$m\angle AOB = 90°$

$m\overset{\frown}{AB} = 90°$

The following two diagrams (circles) will demonstrate the difference between major and minor arcs in a circle.

## Major Arc




$\overset{\frown}{ACB}$ *is a major arc*

*one full circle* $= 360°$

$m\overset{\frown}{AB} = 90°$

$m\overset{\frown}{ACB} = 360° - 90° = 270°$

# Homework:

Math 3000 page 166 #1, 2
Page 169 #6, 7, 8, 9

Assigment on MHS