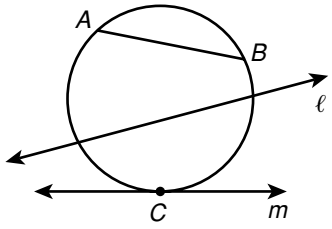
Date _____

Dear Family,

In this chapter, your child will learn about circles. In particular, your child will look at the lines, segments, and angles found inside and outside of circles.

Your child will first have to review the lines and segments that intersect circles.

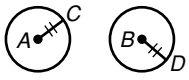


$\overline{AB}$ is a **chord.** A chord is a segment whose endpoints lie on a circle.

Line ℓ is a **secant.** A secant is a line that intersects a circle at two points.

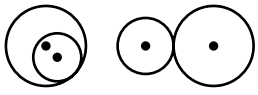
Line *m* is a **tangent.** A tangent line is in the same plane as a circle and intersects that circle at only one point. This one point is called the **point of tangency.** This is point *C* in the figure above.

There are three ways your child can talk about pairs of circles. The circles can be congruent, concentric, or tangent. These are shown in the three diagrams below.



Congruent circles

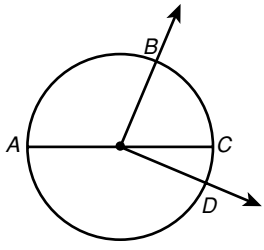
Concentric circles



Tangent circles

Your child will learn to identify different parts of a circle.

Consider the following circle:

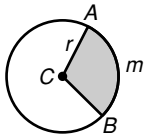
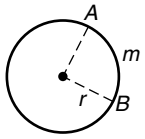
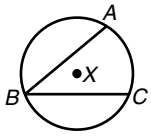


In this circle, $m\overset{\frown}{ADC} = 180°$. It is a semicircle of the circle.

A **major arc** of this circle is $\overset{\frown}{DAB}$.

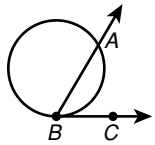
A **minor arc** of this circle is $\overset{\frown}{BD}$.

Other values of a circle that your child will be calculating are included in the table below.

Term	Name	Example	Calculation
Sector—region bounded by two radii of a circle and their intercepted arc	Sector *ACB*		$A = \pi r^2\left(\frac{m^\circ}{360^\circ}\right)$
Arc length—distance along an arc measured in linear units	*L*		$L = 2\pi r\left(\frac{m^\circ}{360^\circ}\right)$
Inscribed angle—angle whose vertex is on a circle and whose sides contain chords of the circle	$\angle ABC$		$\text{m}\angle ABC = \frac{1}{2}\text{m}\overset{\frown}{AC}$

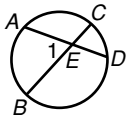
Your child will also look at angle and segment relationships in circles. There are several theorems that will help with this.

Theorem 11-5-1 If a tangent and a secant (or chord) intersect on a circle at the point of tangency, then the measure of the angle formed is half the measure of its intercepted arc.



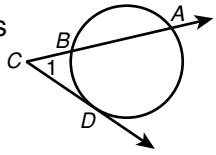
$\text{m}\angle ABC = \frac{1}{2}\text{m}\overset{\frown}{AB}$

Theorem 11-5-2 If two secants or chords intersect in the interior of a circle, then the measure of the angle formed is half the sum of the measures of its intercepted arcs.

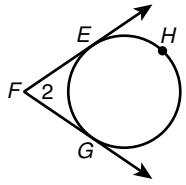


$\text{m}\angle 1 = \frac{1}{2}\left(\text{m}\overset{\frown}{AB} + \text{m}\overset{\frown}{CD}\right)$

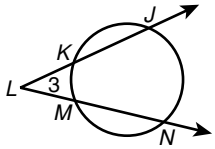
Theorem 11-5-3 If a tangent and a secant, two tangents, or two secants intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measures of its intercepted arcs.



$\text{m}\angle 1 = \frac{1}{2}\left(\text{m}\overset{\frown}{AD} - \text{m}\overset{\frown}{BD}\right)$

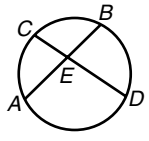


$\text{m}\angle 2 = \frac{1}{2}\left(\text{m}\overset{\frown}{EHG} - \text{m}\overset{\frown}{EG}\right)$



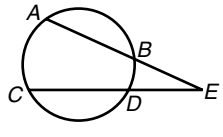
$\text{m}\angle 3 = \frac{1}{2}\left(\text{m}\overset{\frown}{JN} - \text{m}\overset{\frown}{KM}\right)$

Theorem 11-6-1 If two chords intersect in the interior of a circle, then the products of the lengths of the segments of the chords are equal.



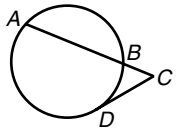
$AE \cdot EB = CE \cdot ED$

Theorem 11-6-2 If two secants intersect in the exterior of a circle, then the product of the lengths of one secant segment and its external segment equals the product of the lengths of the other secant segment and its external segment.



$AE \cdot BE = CE \cdot DE$

Theorem 11-6-3 If a secant and a tangent intersect in the exterior of a circle, then the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared.



$AC \cdot BC = DC^2$

For additional resources, visit *go.hrw.com* and enter the keyword MG7 Parent.