

Geometry 12.2 Chords and Arcs Name \_\_\_\_\_

A line is exterior if it does not pass through any of the points on the circle.

A line is tangent if it passes through precisely one point on the circle.

A line is a secant if it passes through two points on the circle.

A line cannot pass through more than two points on a circle.

**Chord** - A chord of a circle is a line segment that connects one point on the circle with another point on the circle. (The diameter is the longest chord) AQ

**Theorem 12.4** - Within a circle or in congruent circles

- (1) Congruent central angles have congruent chords.
- (2) Congruent chords have congruent arcs.
- (3) Congruent arcs have congruent central angles.

In the diagram, radius  $\overline{OX}$  bisects  $\angle AOB$ . What can you conclude?

$\triangle AOX \cong \triangle BOX$   
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**Theorem 12.5** - Within a circle or in congruent circles

- (1) Chords equidistant from the center are congruent.
- (2) Congruent chords are equidistant from the center.

Find AB.

Find the value of  $x$  in the circle.

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**Theorem 12.6** - In a circle, a diameter that is perpendicular to a chord bisects the chord and its intercepted arc.

**Theorem 12.7** - In a circle, a diameter that is perpendicular to a chord (that is not a diameter) is perpendicular to the chord.

**Theorem 12.8** - In a circle, the perpendicular bisector of a chord contains the center of the circle.

P and Q are points on circle O. The distances from O to  $\overline{PQ}$  is 15 in., and  $PQ = 16$  in. Find the radius of circle O.

$8^2 + 15^2 = r^2$   
 $64 + 225 = r^2$   
 $\sqrt{289} = \sqrt{r^2}$   
 $17 = r$

Find the missing length to the nearest tenth.

$7^2 + 3^2 = r^2$   
 $\sqrt{58} = \sqrt{r^2}$   
 $r \approx 7.6$  cm

Find the missing length to the nearest tenth.

$11^2 + y^2 = 15^2$   
 $y^2 = 104$   
 $y \approx 10.2$  in.

Find the missing length to the nearest tenth.

$w^2 + 4^2 = 6.8^2$   
 $w^2 + 16 = 46.24$   
 $w^2 = 30.24$   
 $w \approx 5.5$   
 $x \approx 11$  in.

$\overline{XY}$  and  $\overline{YZ}$  are perpendicular chords to circle C that are also equidistant from center C. What is the most precise name for quadrilateral MYNC? Explain.

**SQUARE**

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