Geometry

12.2 Chords and Arcs

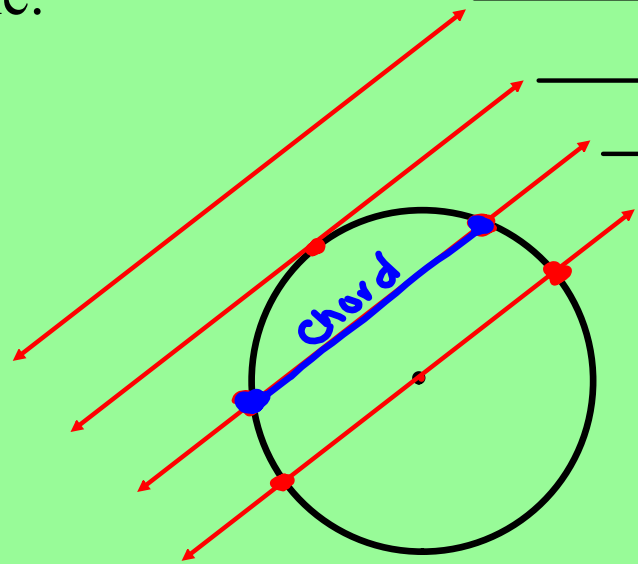
A line is tangent if it passes through precisely one point on the circle.

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

Identify each line.

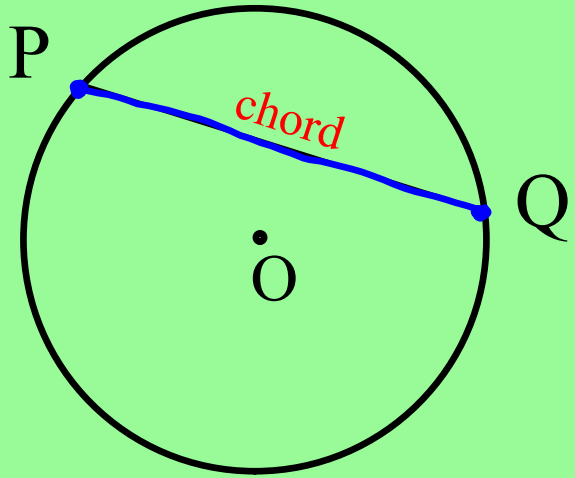


Exterior

Tangent

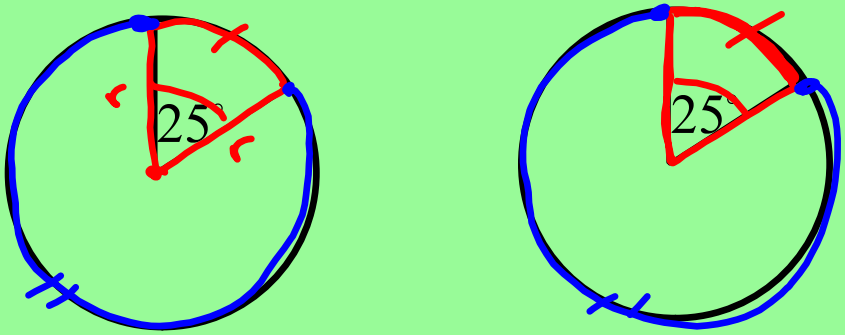
Secant

Secant through the center


P
chord
Q
O

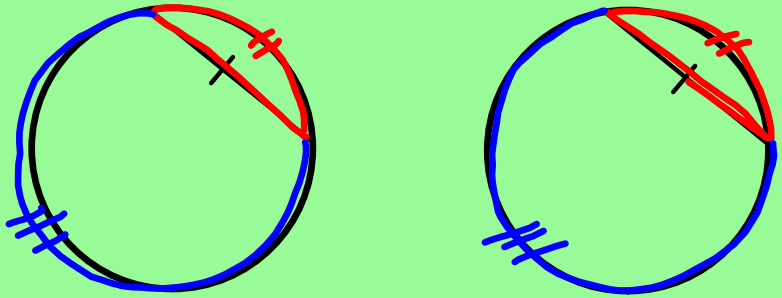
Theorem 12-4 -- Within a circle or in congruent circles

(1) Congruent central angles have $\cong$ chords



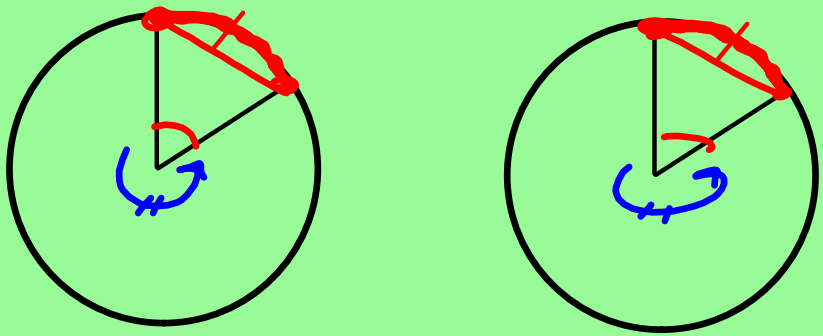
Theorem 12-4 -- Within a circle or in congruent circles

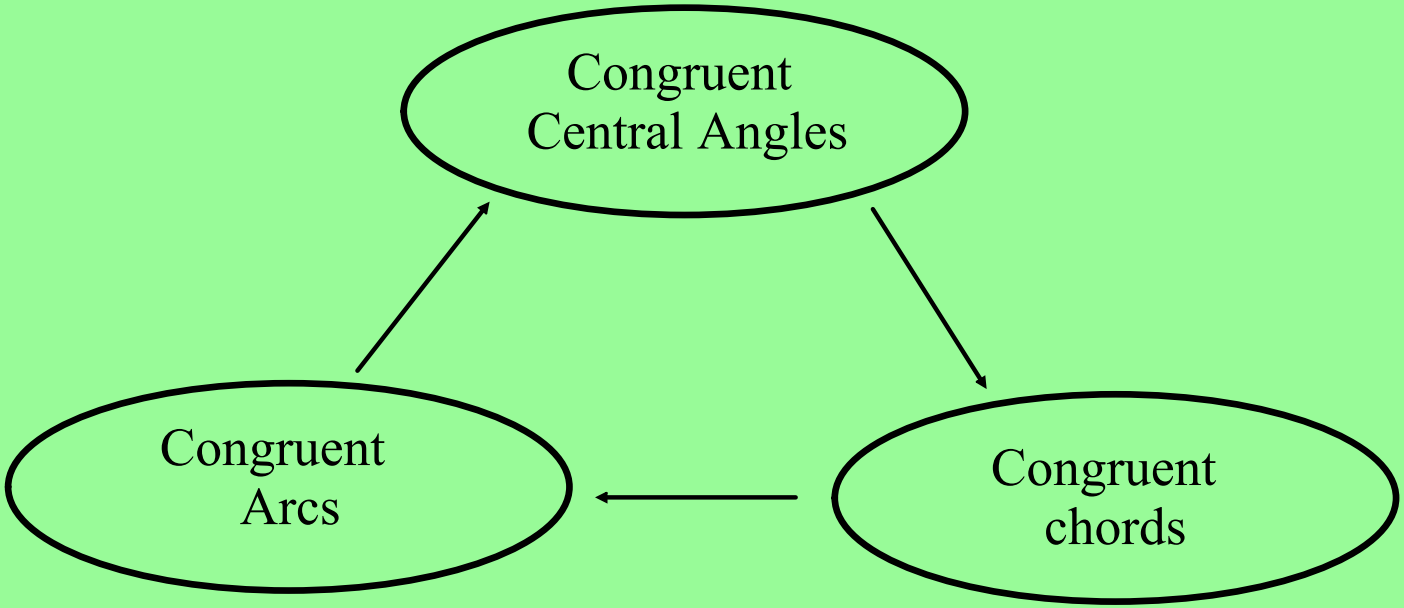
(2) Congruent chords have _____ arcs.



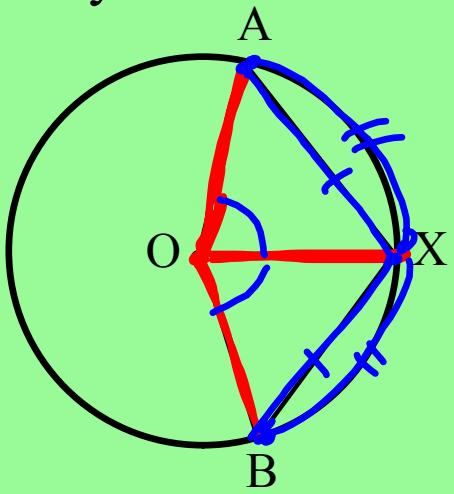
Theorem 12-4 -- Within a circle or in congruent circles

(3) Congruent arcs have $\cong$ central angles




Congruent
Central Angles
Congruent
Arcs
Congruent
chords

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



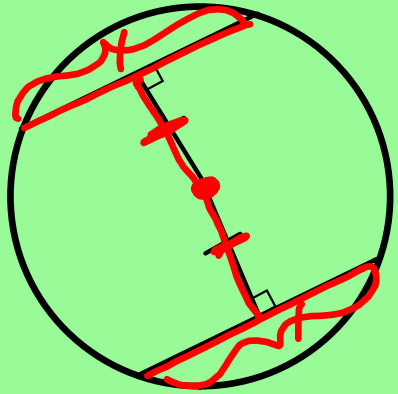
$\angle AOX \cong \angle XOB$

$\overline{AX} \cong \overline{XB}$

$\overset{\frown}{AX} \cong \overset{\frown}{XB}$

Theorem 12-5 -- Within a circle or in congruent circles

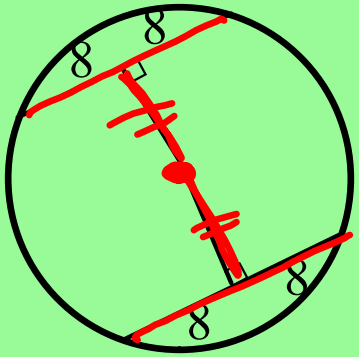
(1) Chords equidistant from the center are congruent.



Theorem 12-5 -- Within a circle or in congruent circles

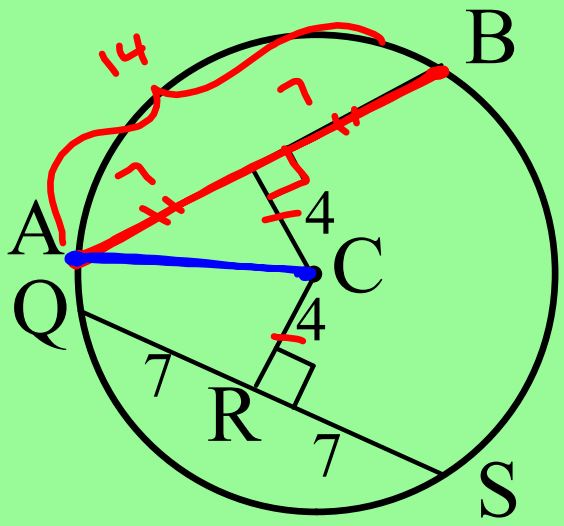
(2) Congruent chords are _____ from the center.

equidistant
~~congruent~~



Pull

Find AB and AC.



$7^2 + 4^2 = AC^2$

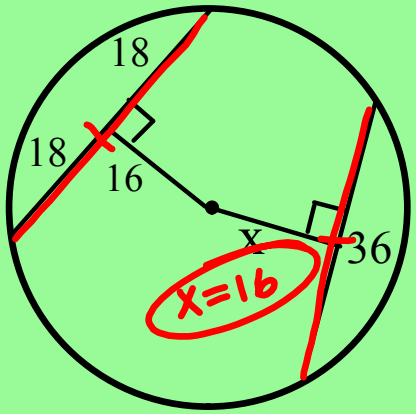
$49 + 16$

$\sqrt{65} = \sqrt{AC^2}$

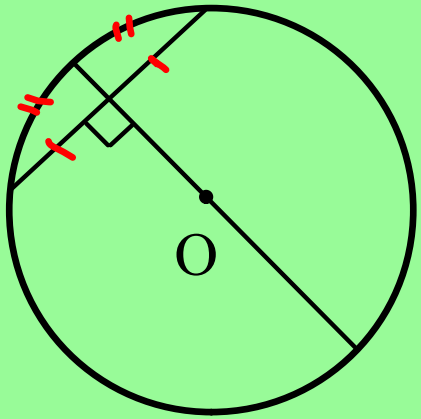
$AC = \sqrt{65}$

Find the value of x in the circle.

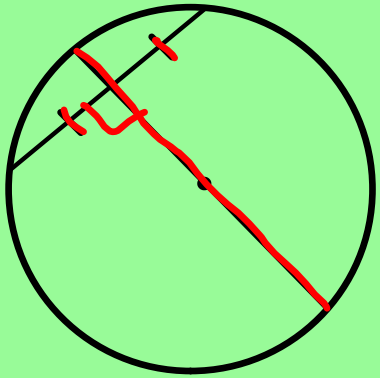
Pull



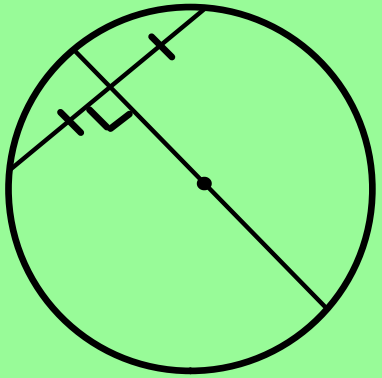
Theorem 12.6 -- In a circle, a diameter that is perpendicular to a chord bisects **the chord** and its **arcs**.



Theorem 12.7 -- In a circle, a diameter that bisects 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 distance from O to $\overline{PQ}$ is 15 in., and PQ = 16 in. Find the radius of circle O.

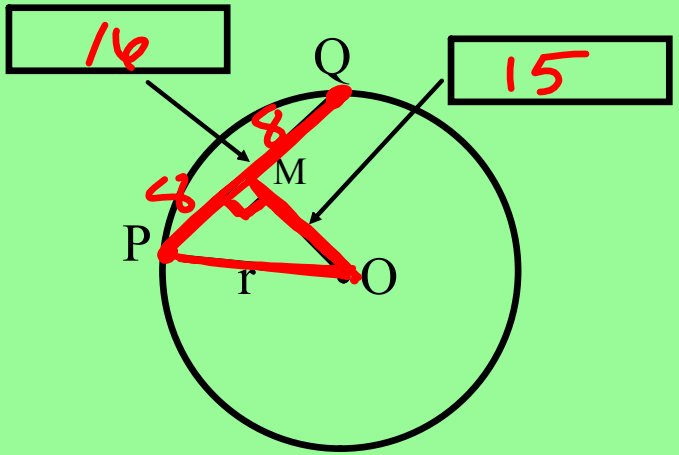
Pull

$8^2 + 15^2 = r^2$

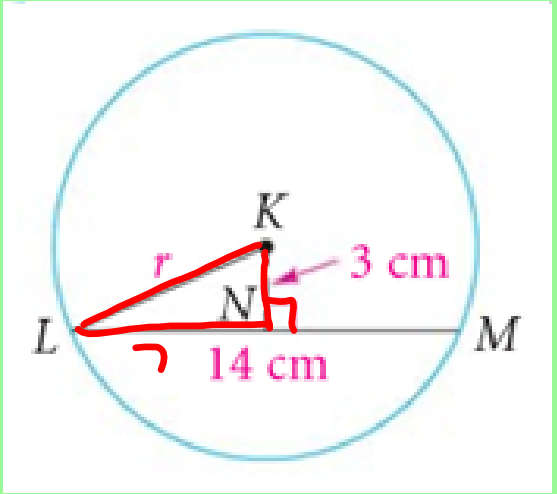
$64 + 225 = r^2$

$289 = r^2$

$r = \sqrt{289} = 17$ in



Find the missing length to the nearest tenth.



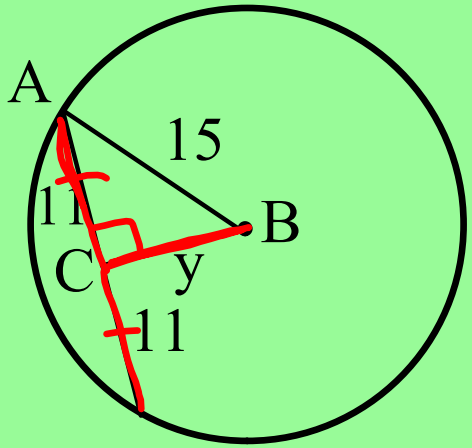
$3^2 + 7^2 = r^2$

$9 + 49 = r^2$

$\sqrt{r^2} = \sqrt{58}$

$r \approx 7.6 \text{ cm}$

Find the missing length to the nearest tenth.



$y^2 + 11^2 = 15^2$

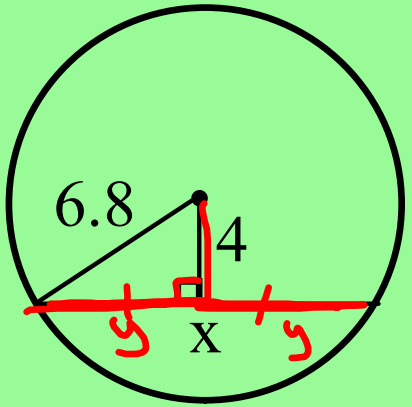
$y^2 + 121 = 225$

$-121 \quad -121$

$\sqrt{y^2} = \sqrt{104}$

$y = 2\sqrt{26} \approx 10.2$

Find the missing length to the nearest tenth.



$y^2 + 4^2 = 6.8^2$

$\sqrt{y^2} = \sqrt{30.24}$

$y \approx 5.5$ x 2

$X \approx 11$

$\overline{XY}$ 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, congruent chords are equidistant from the center and a diameter that bisects a chord is perpendicular to the chord.

Pull