

A **circle** is the set of all points in a plane that are a given distance from a given point in a plane. The given point is the _____ of the circle, and the given distance is the _____ of the circle.

Some definitions and terms you will need to know about circles...

A **chord** of a circle is _____

The **diameter** of a circle is _____

A **secant** line is _____

A **tangent** line is _____

A **point of tangency** is _____

Circles are **congruent** if _____

Concentric circles are _____

Circles can intersect in _____ points.

A point P is **inside** (in the interior of) a circle O if _____

A point P is **outside** (in the exterior of) a circle O if _____

A point P is **on** circle O if _____

The equation for **area** of a circle is _____

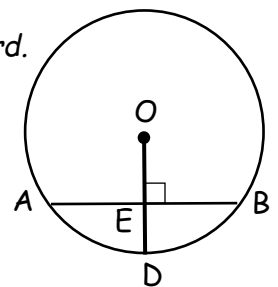
The equation for **circumference** (perimeter) of a circle is _____

Special relationships between the **radii** and **chords** of circles use the following three theorems:

THEOREM #1: *If a radius is perpendicular to a chord, then it bisects the chord.*

Given: Circle O, $\overline{OD} \perp \overline{AB}$

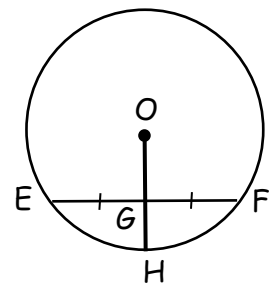
Prove: \overline{OD} bisects \overline{AB}



THEOREM #2: *If a radius of a circle bisects a chord (not the diameter), then it is perpendicular to the chord.*

Given: Circle O, \overline{OH} bisects \overline{EF}

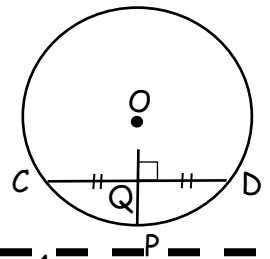
Prove: $\overline{OH} \perp \overline{EF}$



THEOREM #3: The perpendicular bisector of a chord passes through the center of the circle.

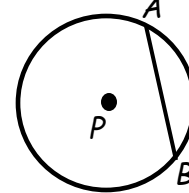
Given: \overline{PQ} is the perpendicular bisector of \overline{CD}

Prove: \overline{PQ} passes through the point O .



Problems:

- 1.) Chord \overline{AB} measures 12 mm and the radius of $\odot P$ is 10 mm.
Find the **distance** from \overline{AB} to P .



- 2.) Find the **length** of a chord that is 15 cm from the center of a circle with a radius of 17 cm.

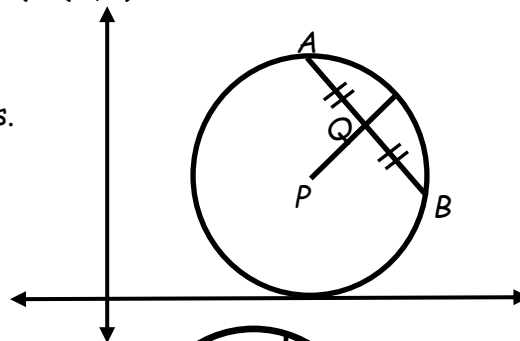
- 3.) Find the **distance** from the center of a circle to a chord 30 m long, if the diameter of the circle is 34 m.

- 4.) Find the **radius** of a circle if a 24 inch chord is 9 inches from the center.

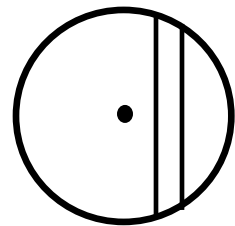
- 5.) Two circles intersect and share a common chord 24 cm long. The centers of the circles are 21 cm apart. The radius of one circle is 13 cm. Find the **radius** of the other circle.

- 6.) \overline{PQ} is a diameter of $\odot O$. $P = (-3, 17)$ and $Q = (5, 2)$. Find the **center** and the **radius** of $\odot O$.

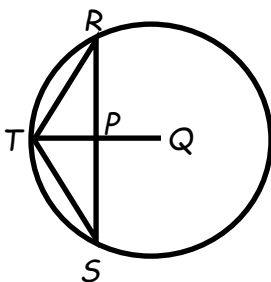
- 7.) $\odot P$ just touches (is **tangent** to) the x -axis.
 $P = (15, 13)$ and $Q = (19, 16)$.
a) Find the **radius** of $\odot P$.
b) Find PQ .
c) Find the length of \overline{AB} .



- 8.) Find the **radius** of a circle in which a 48 cm chord is 8 cm closer to the center than a 40 cm chord.



- 9.) Given: Circle Q , $\overline{QT} \perp \overline{RS}$
Prove: \overline{TQ} bisects $\angle RTS$



- 10.) Given: $PQRS$ is an isosceles trapezoid,
with $\overline{SR} \parallel \overline{PQ}$

Prove: $\odot P \cong \odot Q$

