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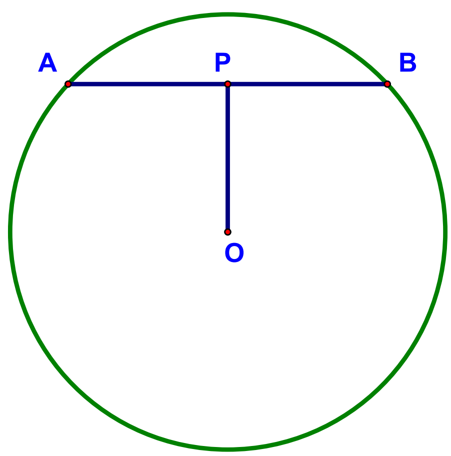
The Circle - Lesson 10-1

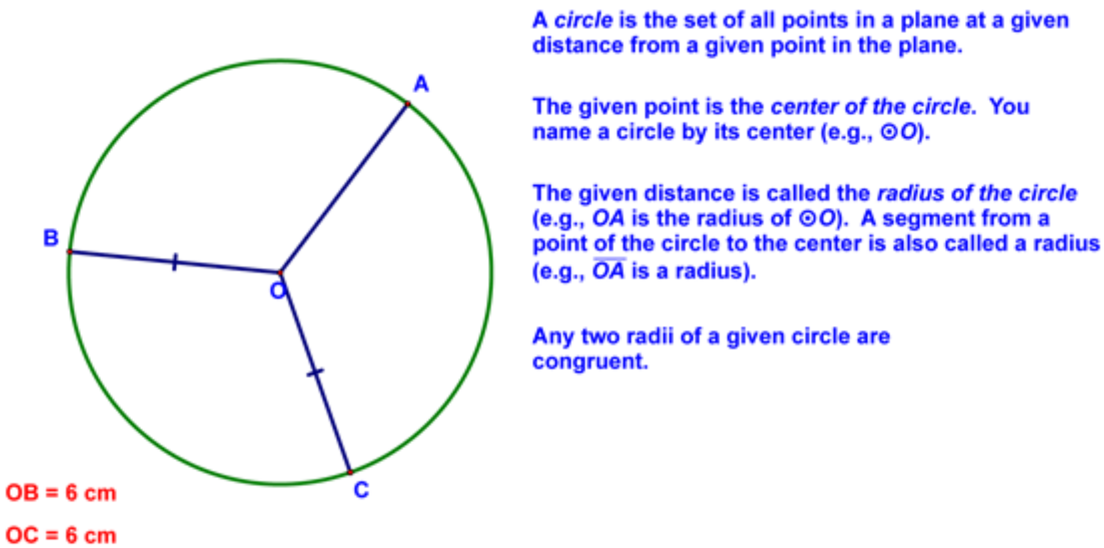
Here's the warmup!

Given: ⊙O
radius = 12
$\overline{AB} = 12$
$\overline{OP} \perp \overline{AB}$

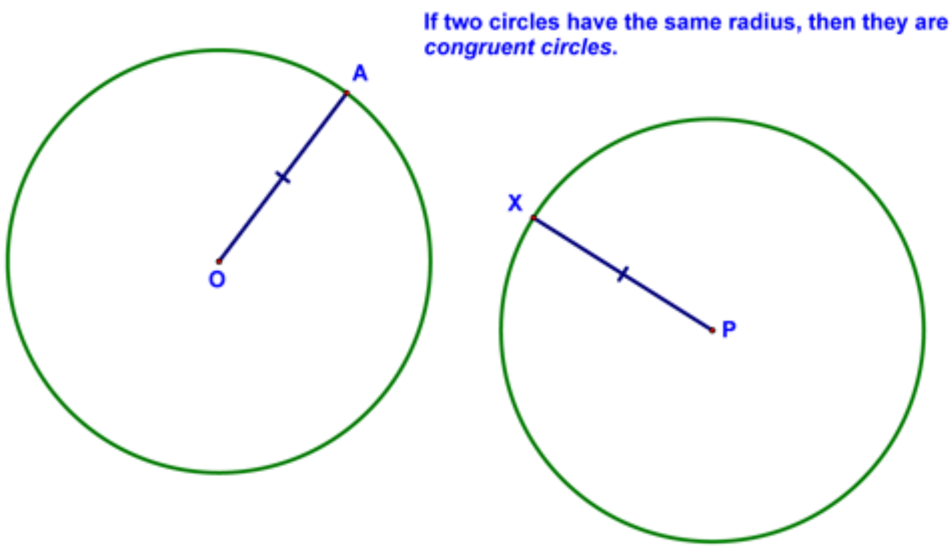
Find: OP

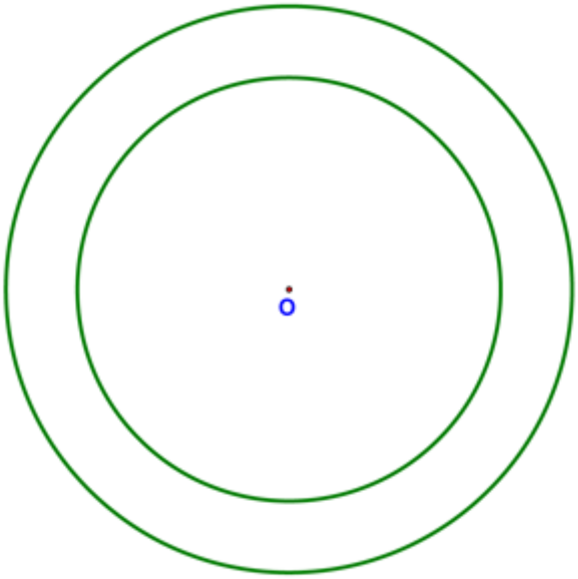


Today, we're going to go over quite a few notes about circles – lots of definitions, starting with *circle*, *the center of a circle*, and the *radius of a circle*:



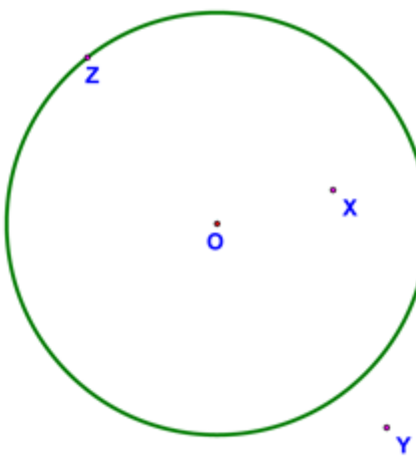
Next are *congruent* circles and *concentric* circles:





If two or more coplanar circles share the same center, then they are *concentric circles*.

Next, let's look at what *interior*, *exterior*, and *on* the circle mean:

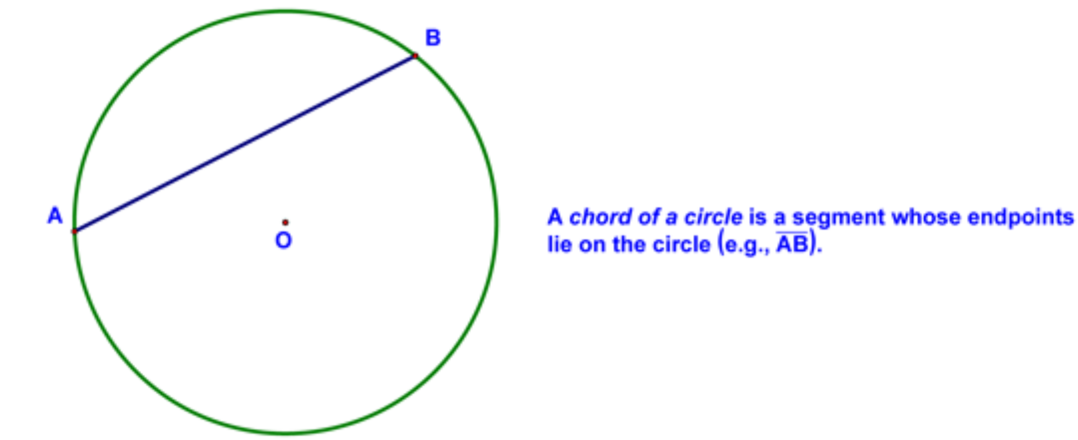


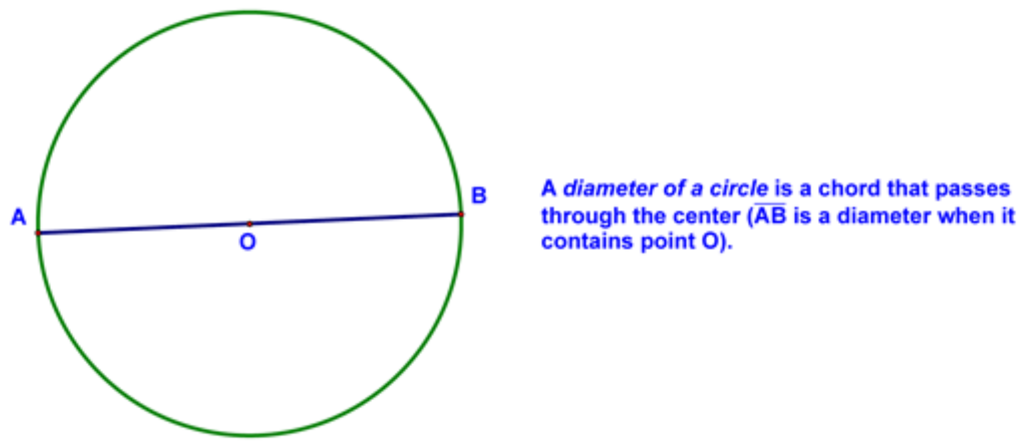
A point is *inside* (in the *interior* of) a circle if its distance from the center is less than the radius (e.g., Point X).

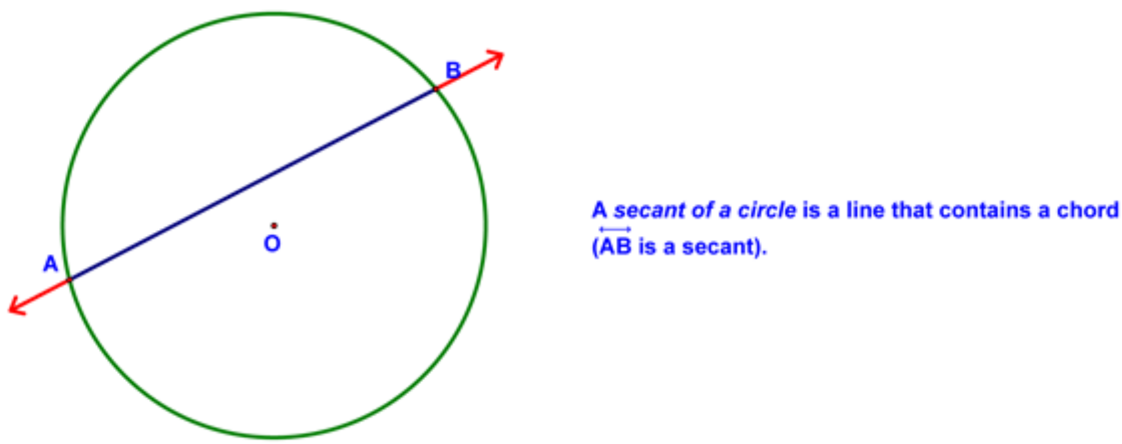
A point is *outside* (in the *exterior* of) a circle if its distance from the center is greater than the radius (e.g., Point Y).

A point is on a circle if its distance from the center is equal to the radius (e.g., Point Z).

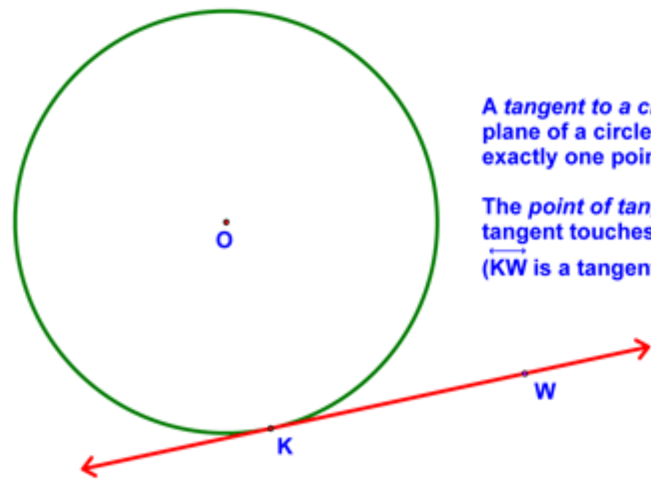
Here are *chords*, *diameters*, and *secants*:





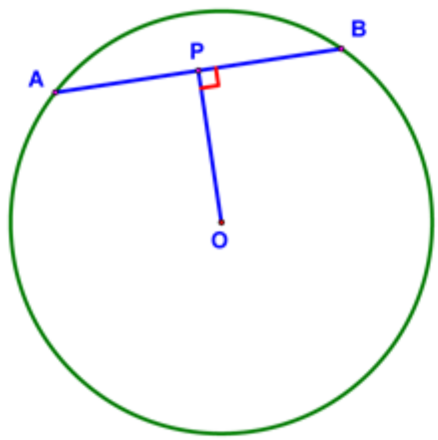


Now, let's define a *tangent to a circle* and the *distance from the center of a circle to a chord*.



A ***tangent to a circle*** is a line that lies in the plane of a circle and that intersects the circle at exactly one point.

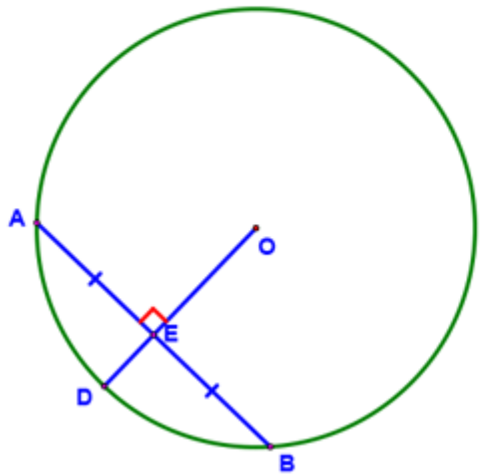
The ***point of tangency*** is the point at which the tangent touches the circle ($\overleftrightarrow{KW}$ is a tangent to ⊙O).



The distance from the center of a circle to a chord is the measure of the perpendicular segment from the center to the chord.

OP is the distance from O to chord $\overline{AB}$.

We'll wrap up by discussing three theorems related to chords:



Theorem 73

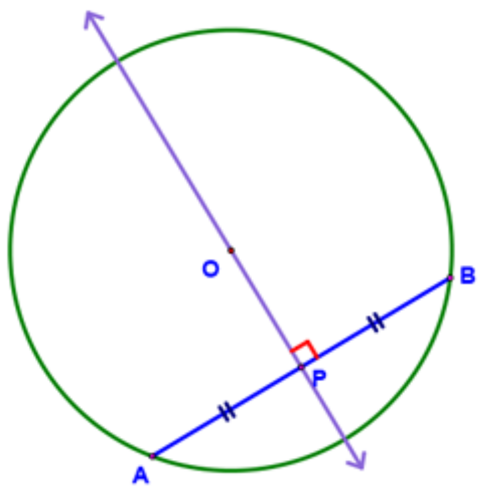
If a radius is perpendicular to a chord, then it bisects the chord.

$\overline{OD} \perp \overline{AB} \Rightarrow \overline{OD}$ **bisects** $\overline{AB}$

Theorem 74

If a radius of a circle bisects a chord that is not a diameter, then it is perpendicular to that chord.

$\overline{OD}$ **bisects** $\overline{AB} \Rightarrow \overline{OD} \perp \overline{AB}$



Theorem 75

The $\perp$ bisector of a chord passes through the center of the circle.