Chapter 10: Properties of Circles

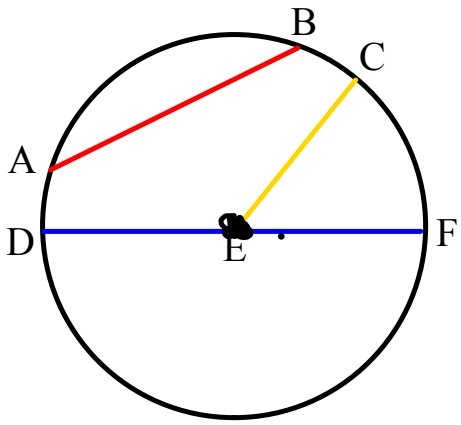
10.1: Properties of Tangents

Parts of a circle:

Chord: AB

Diameter: DF

Radius: EC

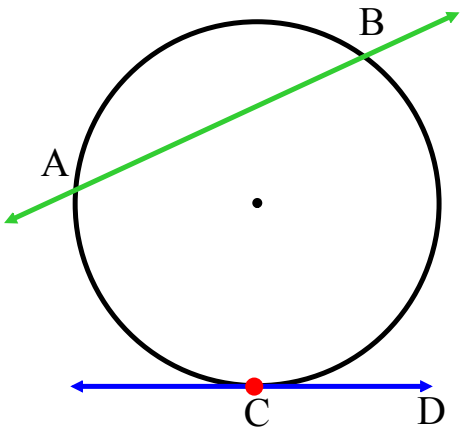


More Parts:

Secant: $\overleftrightarrow{AB}$

Tangent: $\overleftrightarrow{CD}$

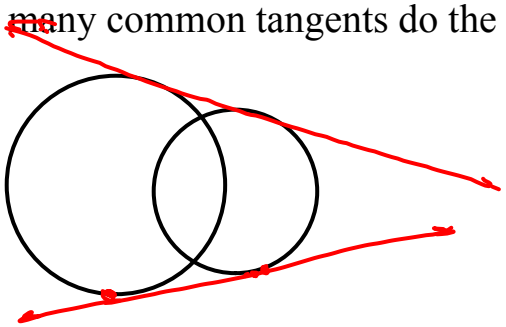
Point of tangency: pt C



Common Tangents:

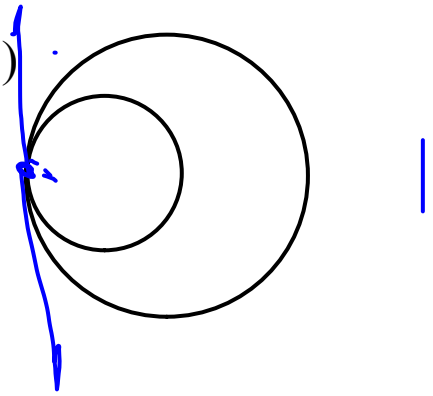
How many common tangents do the circles have:

a.)



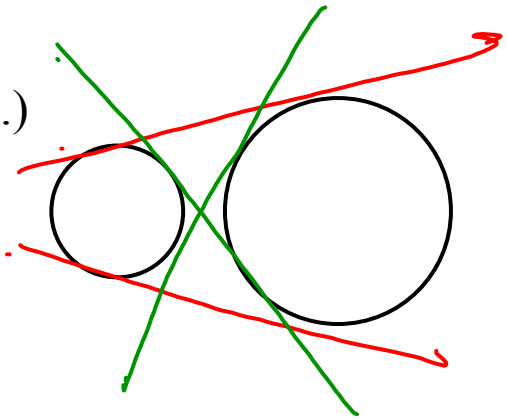
2

b.)



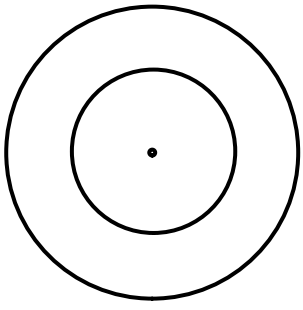
1

c.)



4

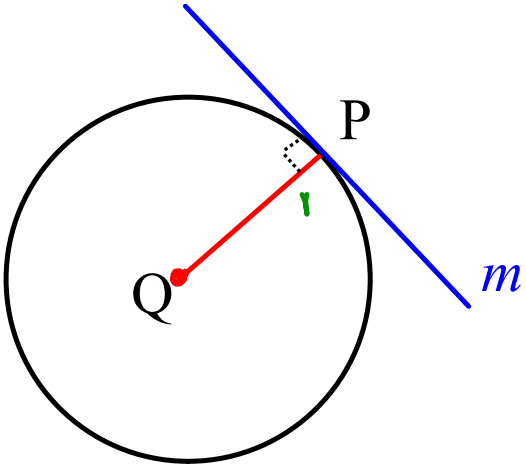
d.) 2 circles that are concentric



None

Theorem 10.1

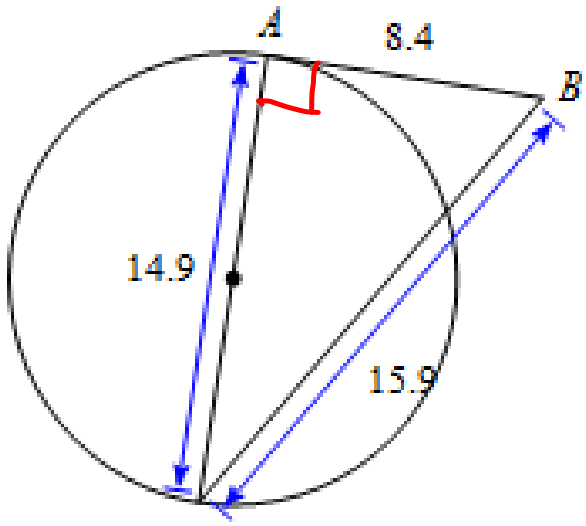
a line is tangent to a circle if it is perpendicular to a radius of that circle



if : $\overleftrightarrow{m}$ is tangent to $\odot Q$ at pt P

then : $\angle 1 = 90^\circ$

Example 1: Determine if AB is tangent to the circle



$a^2 + b^2 = c^2$

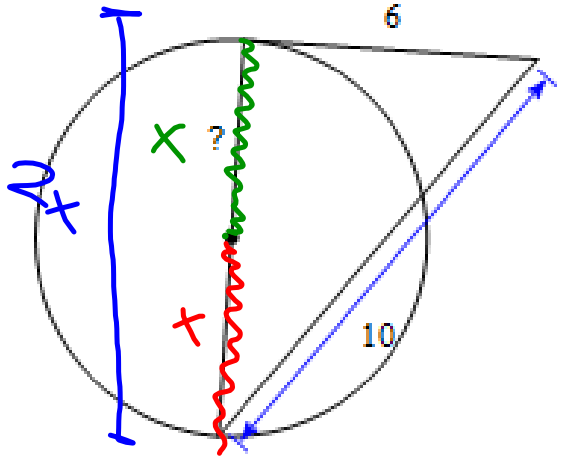
$8.4^2 + 14.9^2 = 15.9^2$

$70.56 + 222.01$

$292.57 \neq 252.81$

Not tangent

Example 2: Find the segment length, assume the lines are tangent that look tangent



$(2x)^2 + 6^2 = 10^2$

$4x^2 + 36 = 100$

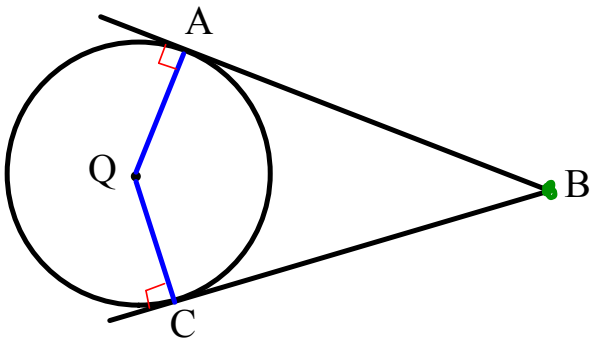
$-36 \quad -36$

$\frac{4x^2}{4} = \frac{64}{4}$

$\sqrt{x^2} = \sqrt{16}$

$x = 4$

Theorem 10.2: tangent segments from a common external point are congruent.



if: $\overline{AB}$ & $\overline{CB}$ are tangent to $\odot Q$

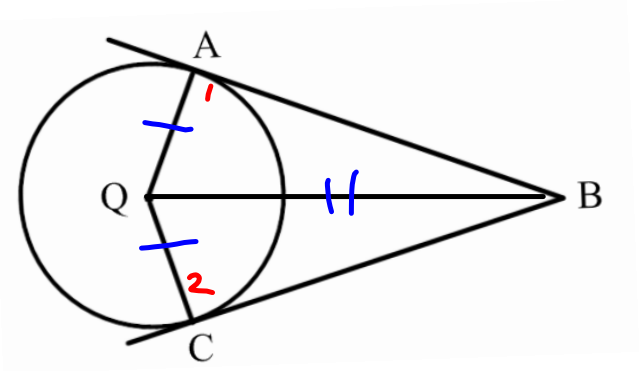
then:

$\overline{AB} \cong \overline{CB}$

Proving thrm 10.2

Given: AB and CB are tangents

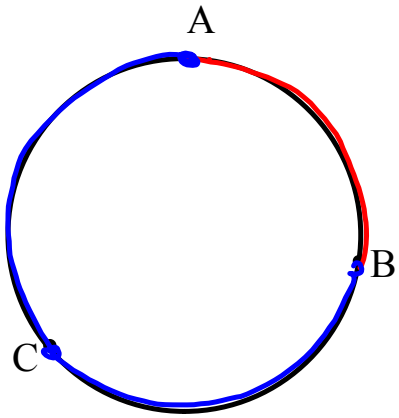
Prove: AB=CB



1) ~~~	1) Given
2) $AQ \cong CQ$	2) Def of radii
3) $QB = QB$	3) Reflexive
4) $\angle 1 = 90^\circ$ $\angle 2 = 90^\circ$	4) 10.1
5) $\triangle ABQ \cong \triangle CBQ$	5) RHL
6) $AB \cong CB$	6) CPCT

10.2: Find Arc Measures

What is an Arc?



Minor arc: less than 180

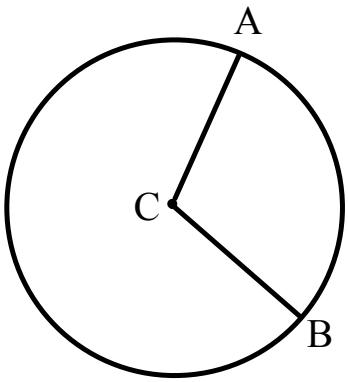
$\overset{\frown}{AB}$

Major arc: greater than 180

$\overset{\frown}{ACB}$

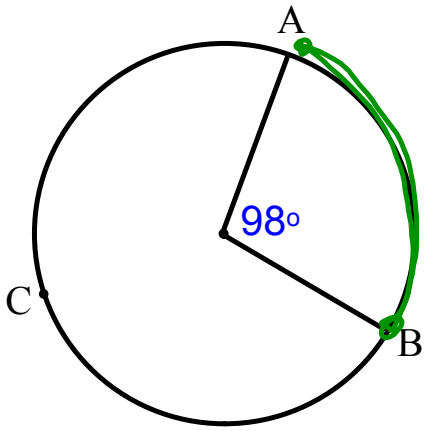
Arcs can be measured 2 ways:
- degree's
- length

Central Angle: is an angle whose vertex is the center of the circle



Semicircle: an arc with endpoints that are the endpoints of a diameter

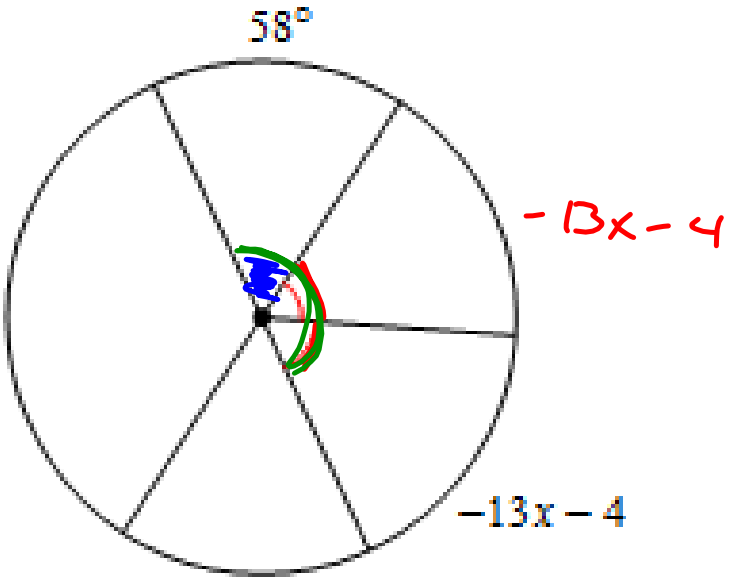
Measuring Arcs using a central angle:



$m\overset{\frown}{ARC}$ = Central Angle

$m\overset{\frown}{AB} = 98°$

Example 1: Solve for x



$-13x-4+-13x-4+58=180$

$-26x-8+58=180$

$-26x+50=180$

$-23x=130$

$x=-5$