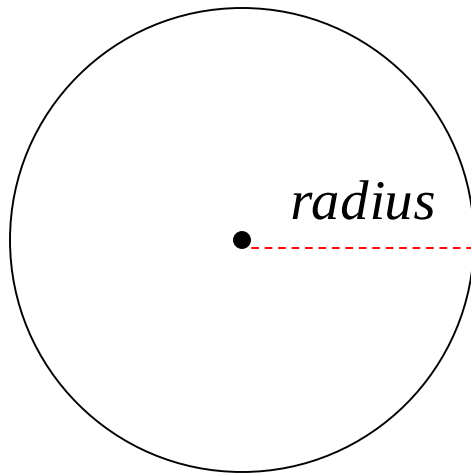


CIRCLES



Definition of Circle

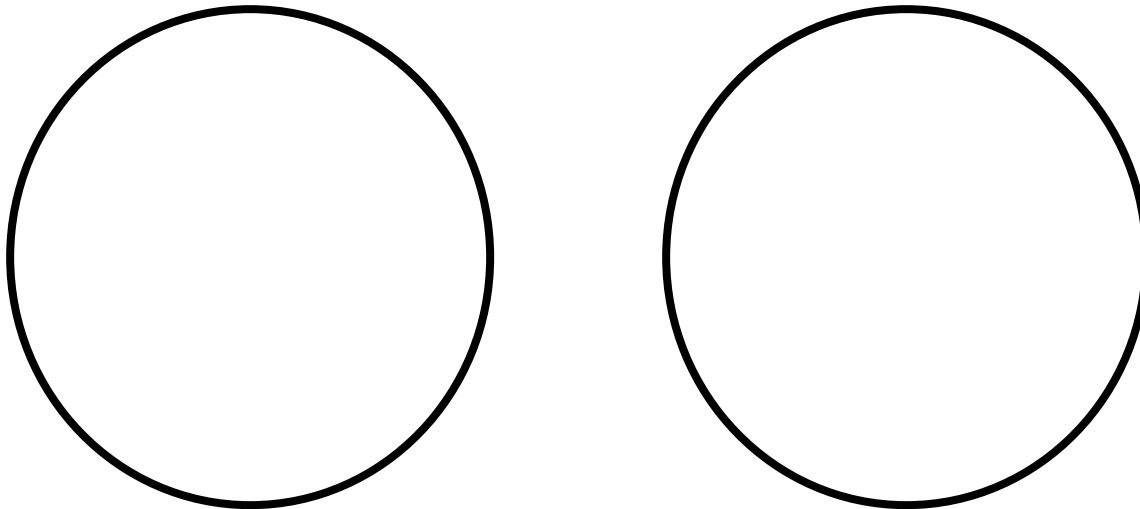
A circle is a set of points an equal distance from one point called the center.



The line segment from the center to the edge of the circle is called the radius.

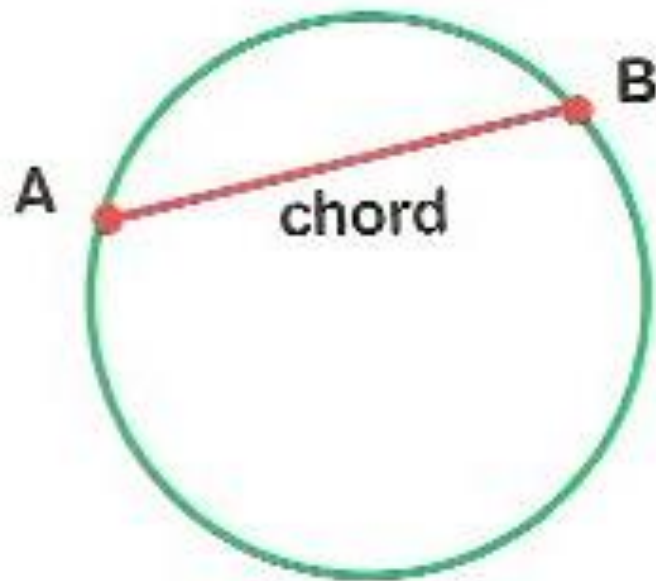
If two circles have the same radius,
then the circles are congruent

Congruent circles



Definition of Chords

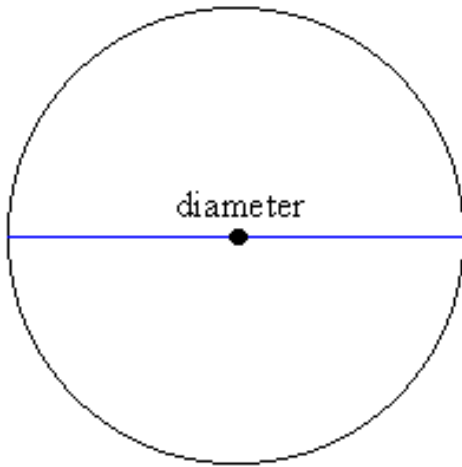
A chord is a line segment that touches the edges of the inside of a circle.



Definition of Chords

A chord is a line segment that touches the edges of the inside of a circle.

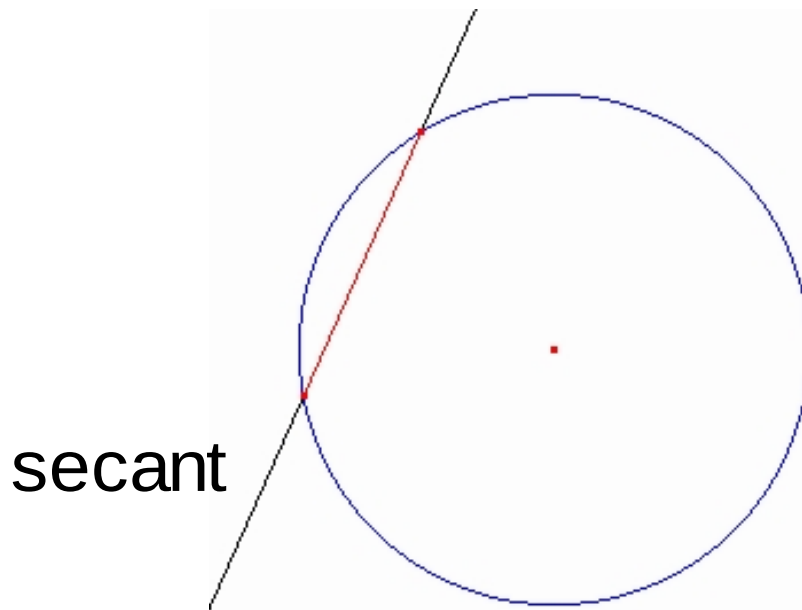
The Greatest Chord is the longest Chord in a circle, called the diameter.



The diameter goes through the center and equals two radii

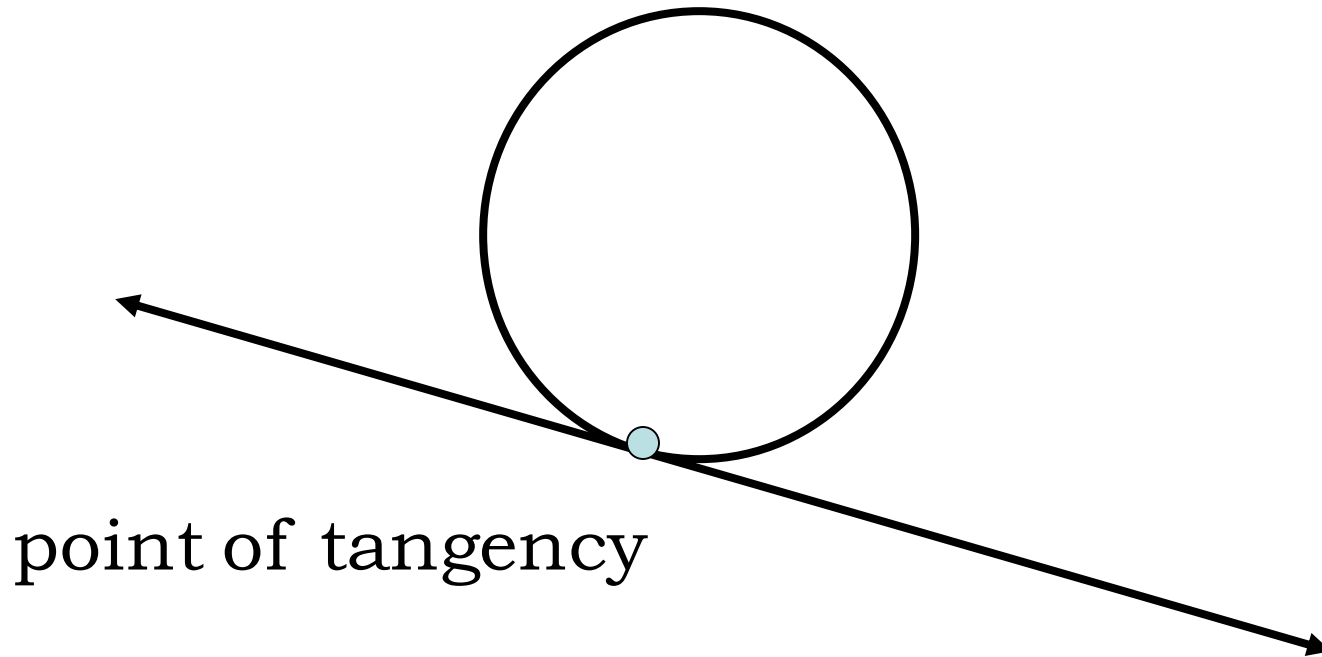
Definition of a Secant

A secant is a line touching the circle at two points



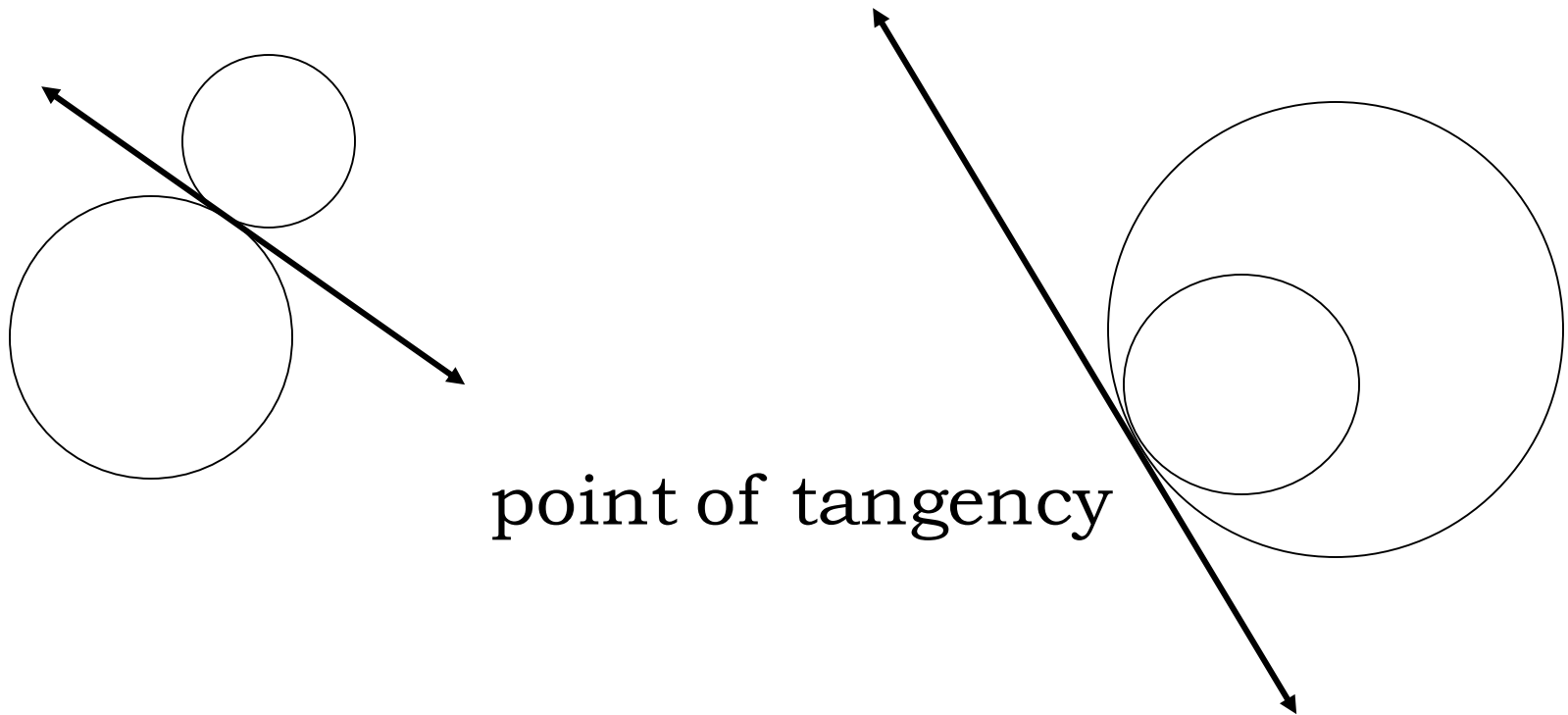
Definition of a Tangent

A line or line segment touching the circle at one point.



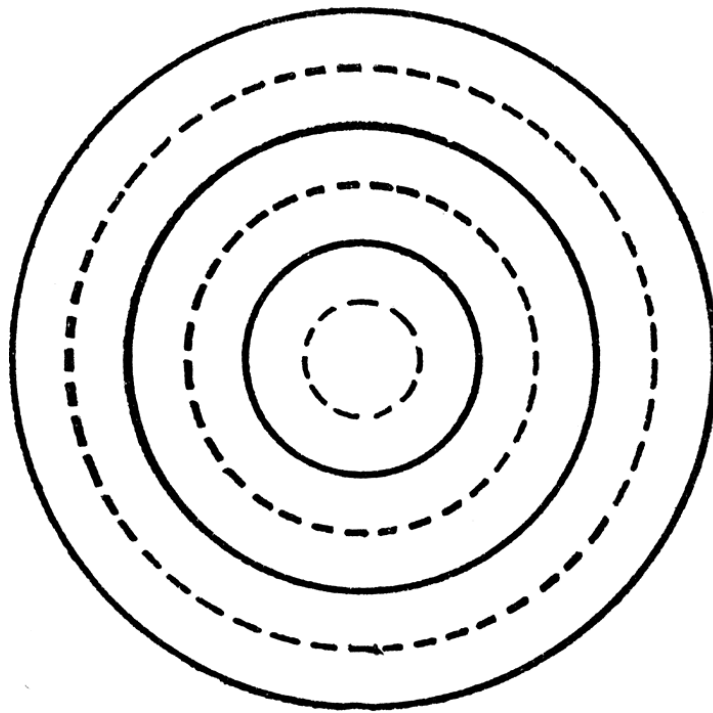
Definition of a Tangent

Tangents can be externally or internally



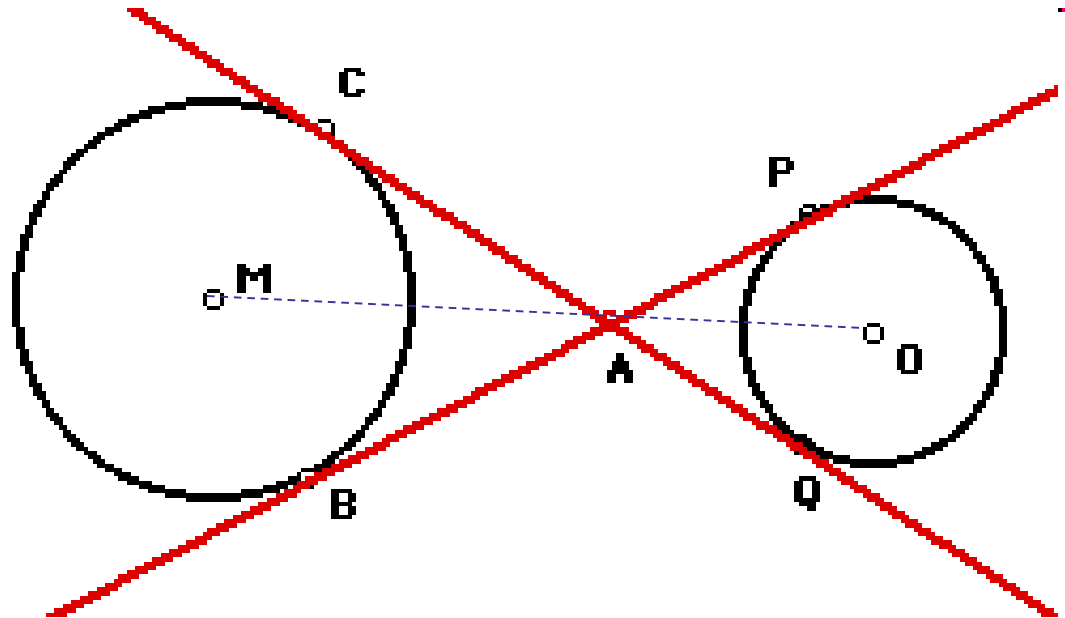
Definition of Concentric Circles

Concentric circles have the same center,
just with different radii on the same plane.



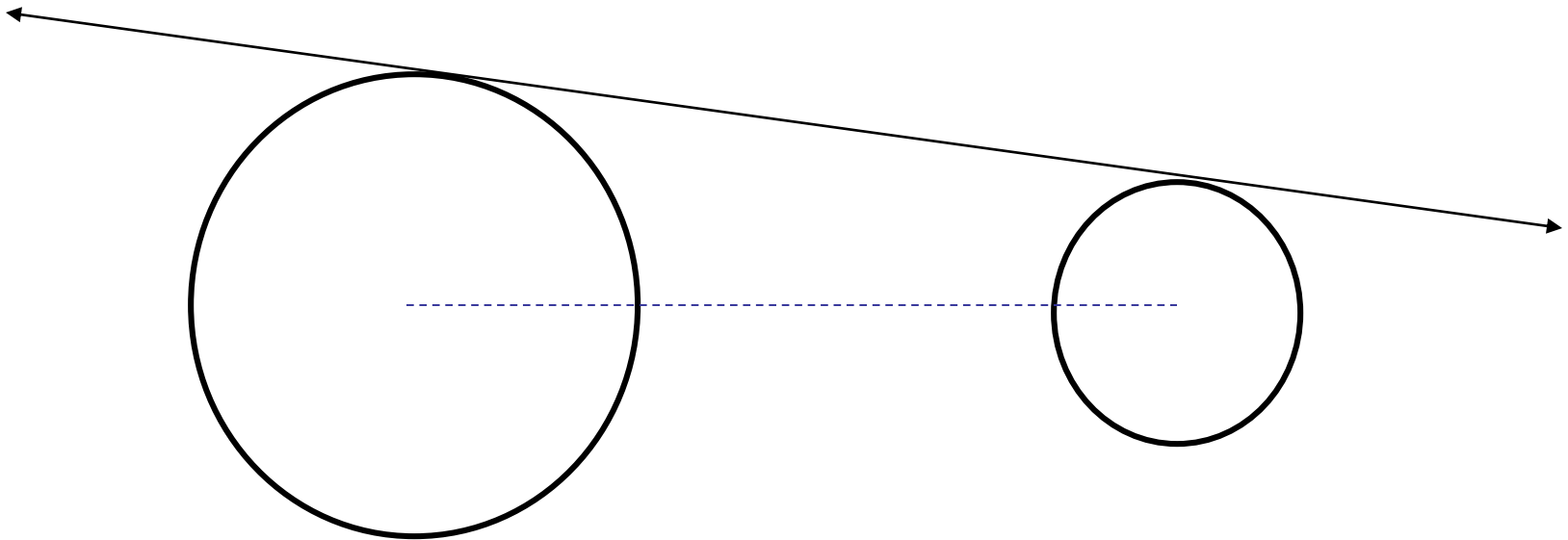
Common Tangents

Interior common tangents would go through a line segment drawn from the centers of two circles.



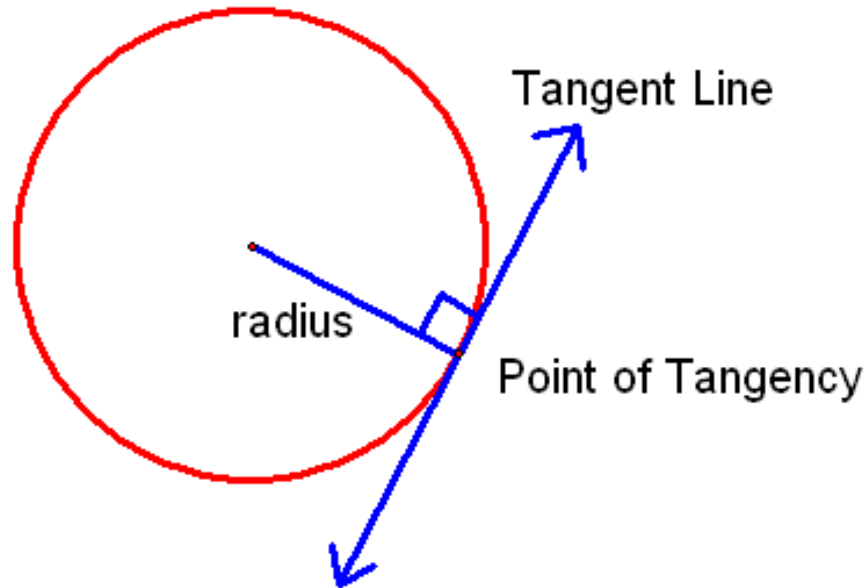
Common Tangents

Exterior common tangents do not cross a segment between the circles of two circles



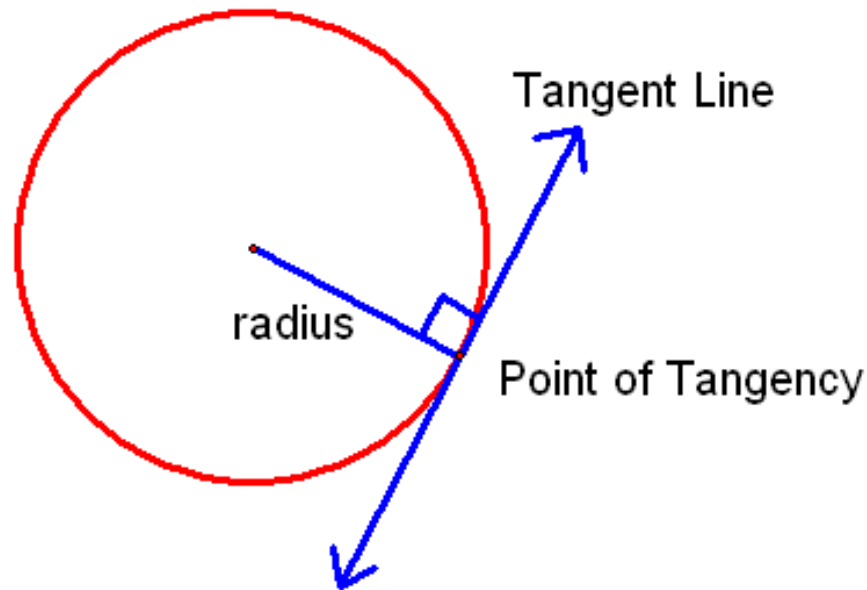
Point of Tangency Theorem

If a line is tangent to a circle, then it makes a right angle to the radius at the point of tangency.



Point of Tangency Theorem (Converse)

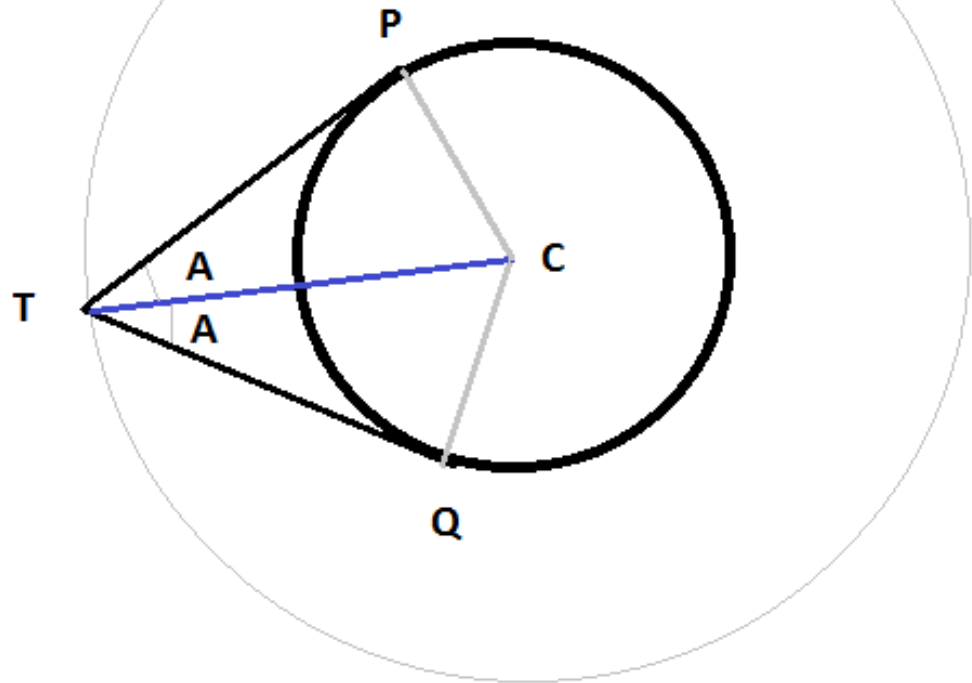
If a line is perpendicular to the radius at its endpoint, then the line is tangent to the circle



Theorem about the Intersection of two tangent line segment

If two tangent lines intersect at one point, the segments from the point to the point of tangency are congruent.

$$\overline{TP} \cong \overline{TQ}$$

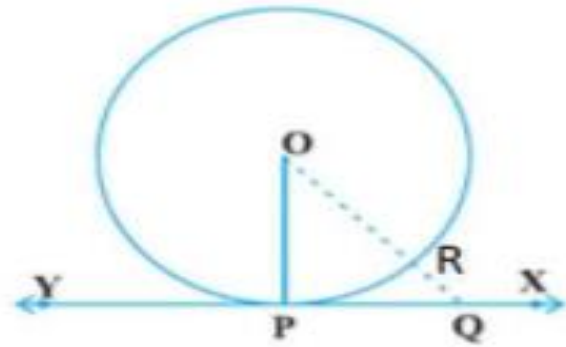


The tangent at any point of a circle is perpendicular to the radius through the point of contact.

Given: A circle with center O.

With tangent XY at point of contact P.

To prove: $OP \perp XY$



Proof: Let Q be point on XY

Connect OQ

Suppose it touches the circle at R

$$OP = OR \text{ (radii of the same circle)}$$

$$OQ = OR + RQ$$

$$OQ = OP + RQ$$

$$OQ > OP$$

Same will be the case with all other points on circle

Hence, OP is the smallest line that connects XY And smallest line is perpendicular

$$\therefore OP \perp XY$$

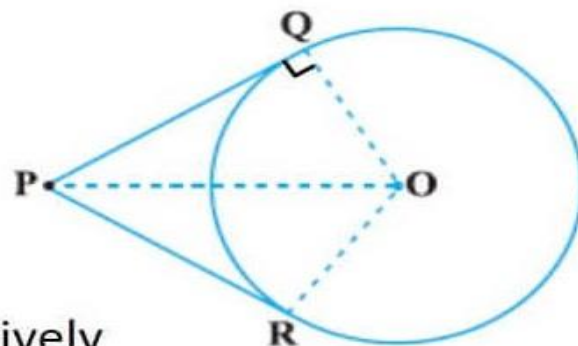
The lengths of tangents drawn from an external point to a circle are equal.

Given: Let circle be with centre O

and P be a point outside circle

PQ and PR are two tangents to circle

intersecting at point Q and R respectively



To prove: Lengths of tangents are equal

i.e. $PQ = PR$

Construction: Join OQ, OR and OP

In ΔOQP and ΔORP

$$\angle OQP = \angle ORP \quad (\text{Both } 90^\circ)$$

$$OP = OP \quad (\text{Common})$$

$$OQ = OR \quad (\text{Both radius})$$

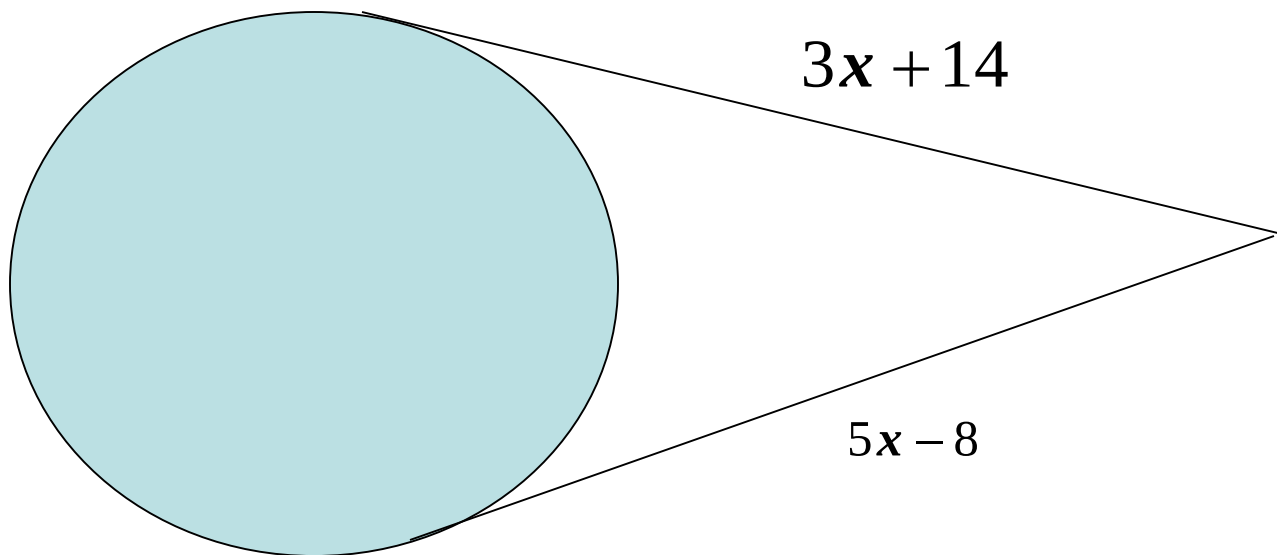
$$\therefore \Delta OQP = \Delta ORP \quad (\text{R.H.S congruency})$$

$$\text{Hence, } PQ = PR \quad (\text{CPCT})$$

Hence both tangents from external point are equal in length

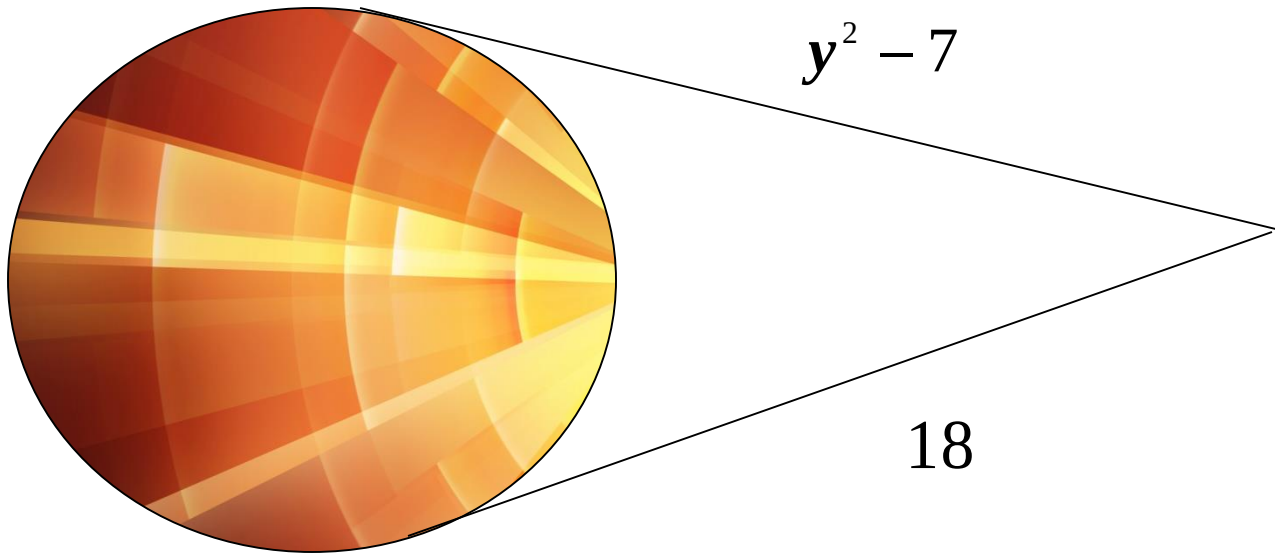
Solve for x

The line segment are tangent to the circle



Solve for y

The line segment are tangent to the circle



- Two concentric circles of radii 3 cm and 5cm are drawn. Find the length of the chord of the larger circle that touches the smaller circle.

- Prove that the opposite sides of a quadrilateral circumscribing a circle subtends supplementary angles at the centre.