

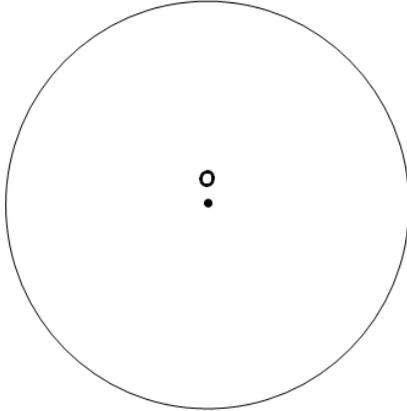
Circle Theorems - Investigation

Open the following link to carry out the investigation

<https://www.geogebra.org/m/rVRYQGRG>

Theorem 1 – Angle at the Centre theorem

Use the circle 1 for this theorem. Copy the circle 1 from the screen onto the circle below.



BOC is the angle at Centre

BDC is the angle at the Circumference

What relationship is there between the angle at the Centre and the angle at the circumference?

Move the four points around (on the circle) to investigate any change in the above stated relationship.

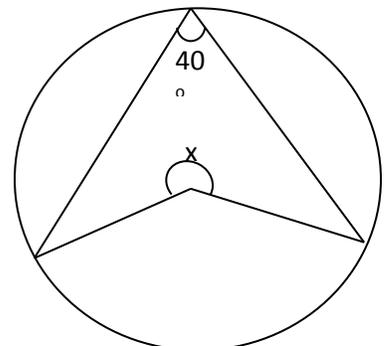
Increase the size of the circle by altering the value of the slider for radius, do you observe any change in the relationship. State your findings below.

Is there anywhere you can move the points to stop the relationship working?

Click on the show button to see the generalization of your investigation. Copy it in the space below.

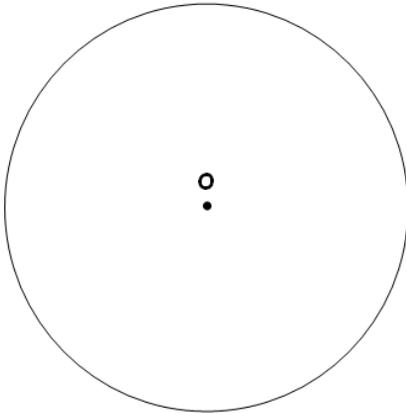
How could you use this to find this angle marked 'x'?

Why do you think if we nickname this the 'ARROW THEOREM' ?



Theorem 2 - Angles in the same segment

Use the circle 2 for this theorem. Copy the circle 2 from the screen onto the circle below.



The Chord JK splits the circle into two segments.

Above JK major segment and below JK minor segment

What relationship is there between the two angles?

Move the four points around (on the circle) to investigate any change in the above stated relationship.

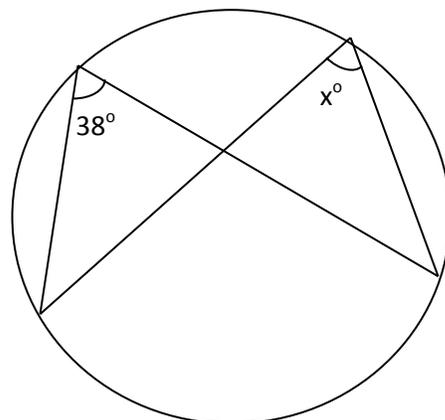
Increase the size of the circle by altering the value of the slider for radius, do you observe any change in the relationship. State your findings below.

Is there anywhere you can move the points to stop the relationship working?

Click on the show button to see the generalization of your investigation. Copy it in the space below.

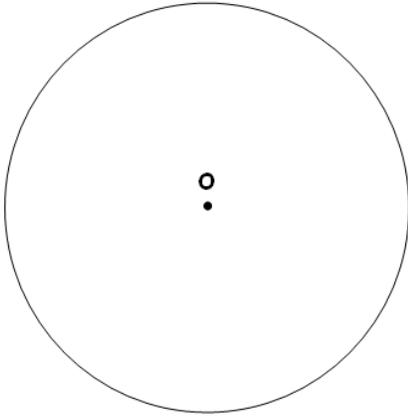
Can you try to nickname this theorem?

Can you use this to find angle x?



Theorem 3 – Angle in Semicircle

Use the circle 3 for this theorem. Copy the circle 3 from the screen onto the circle below.

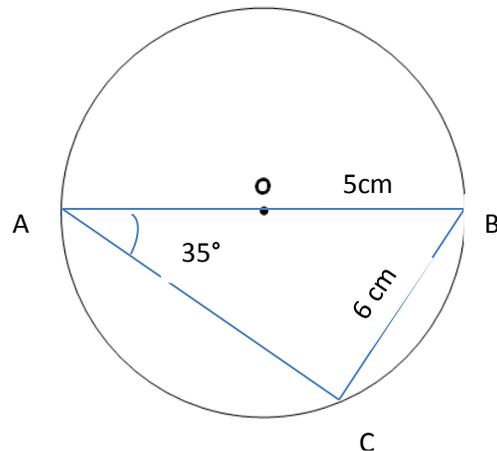


What do you notice about the angle in semicircle?

Move the points on the circumference of the circle. Change the radius of the circle to investigate and state the effect if any.

Click on the show button to see the generalization of your investigation. Copy it in the space below.

Find i) angle ABC



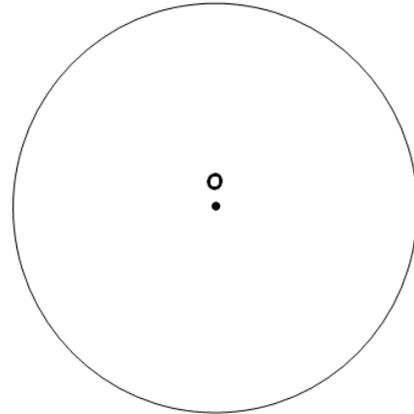
ii) length of AC

Open the following link to carry out the investigation

<https://www.geogebra.org/m/H6XmHeF9>

Theorem 4 – Tangent and radius theorem

Copy the circle from the screen onto the circle given beside.



What is your guess for the angle OBC.

Confirm your guess by Measuring the angle OBC using angle tool.

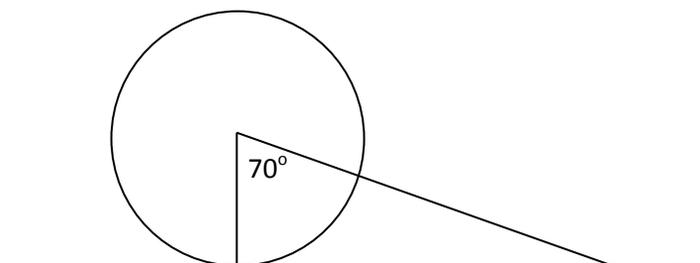
Move the point B on the circumference to observe the change in the measure of angle OBC.

What do you notice about the angle between the tangent and the radius?

If you join O to C, what type of triangle does it make?

State the theorem:

Use this to work out the missing angles in this triangle

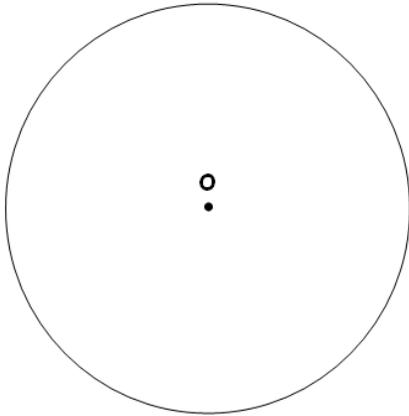


Open the following link to carry out the investigation

<https://www.geogebra.org/m/kMvhF27n>

Theorem 5 – Two tangents theorem

Copy the circle from the screen onto the circle given below



B is in the exterior of the circle. How many tangents are drawn from B to the circle?

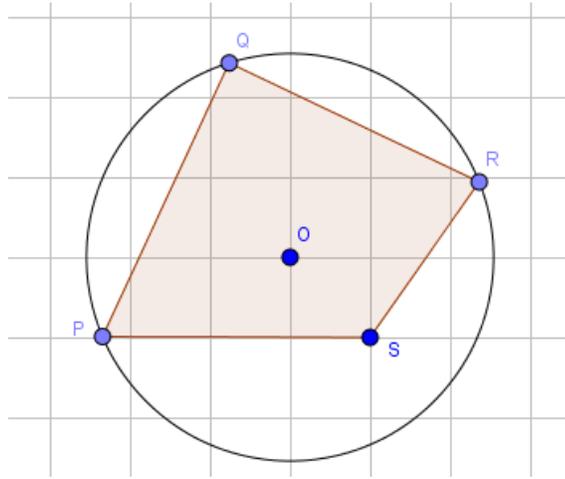
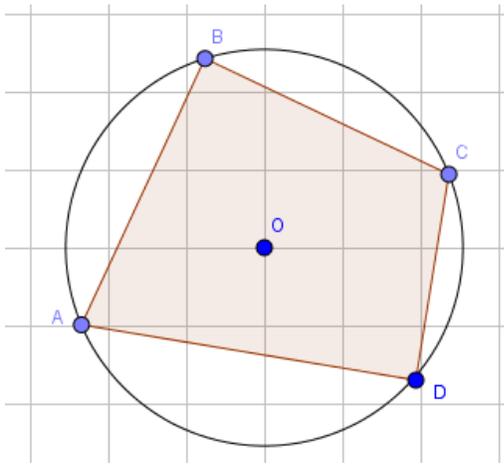
BA is the length of the tangents and BC is the length of the other tangent. What do you notice about the length BA and the length BC?

Move the Centre of the circle and the point B. do you notice any change in the length of BA and BC?

Join A to C and identify the type of the triangle ABC. State its type.

State the theorem about two tangents.

Theorem 6 – Cyclic Quadrilateral



The quadrilateral ABCD on the left above whose vertices lie on the circumference of the circle, that is called **Cyclic Quadrilateral**.

The quadrilateral PQRS on the right, all of whose vertices are not on the circumference, so it is not cyclic quadrilateral.

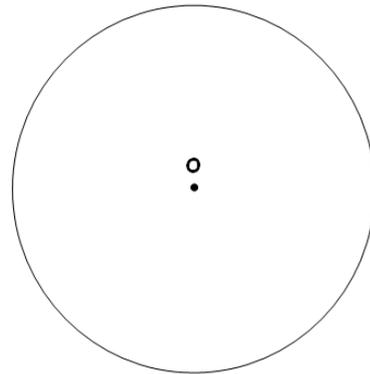
Click on the following link to carry out the investigation on the angles of cyclic quadrilateral.

<https://www.geogebra.org/m/PrgpGmpD>

Copy the circle from the screen onto the circle beside

Move the points A, B, C and D around

What relationship is there between the opposite angles?



Is there anywhere you can move the points to stop it working?

Why do you think If we call this the 'RECTANGLE THEOREM'

Which of the following shapes is it possible to make inside the circle?

Square	
Rectangle	
Kite	
Rhombus	
Trapezium	
Parallelogram	

State the theorem of opposite angles in cyclic Quadrilateral.