



# Shape and Space

CIRCLE GEOMETRY

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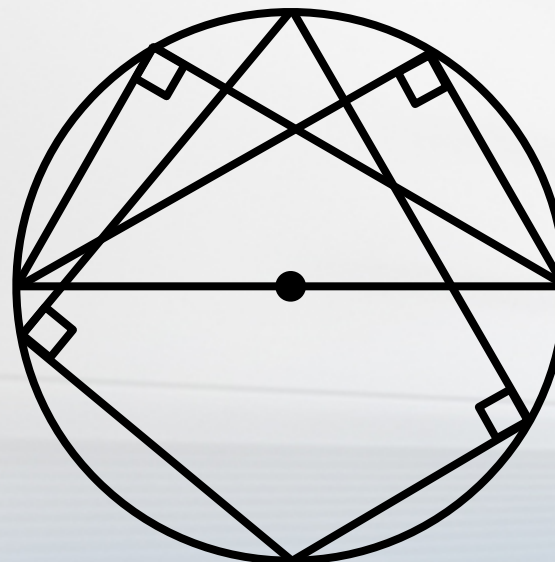


# Circle Geometry

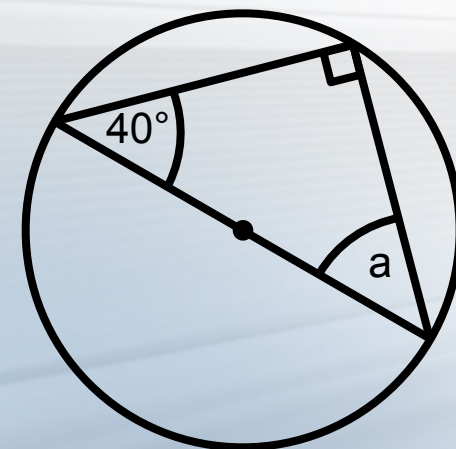


## Rule 1 : ANGLE IN A SEMICIRCLE = $90^\circ$

A triangle drawn from the two ends of a diameter will always make an angle of  $90^\circ$  where it hits the edge of the circle, no matter where it hits.



$$a = 50^\circ$$

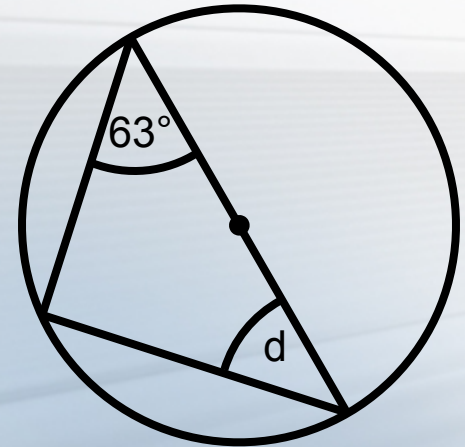
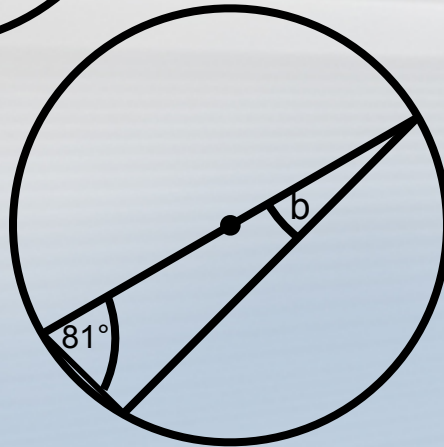
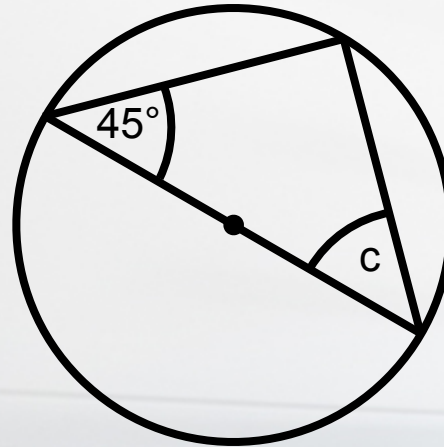
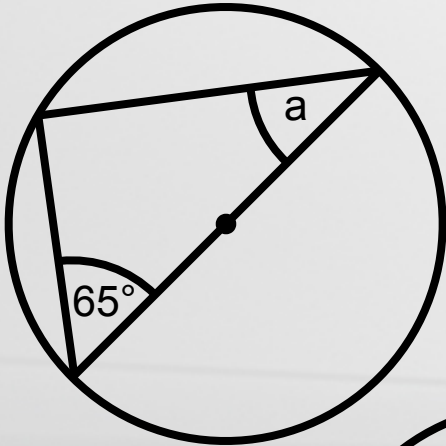




# EXERCISES



What is the size of each angle? Copy each diagram.



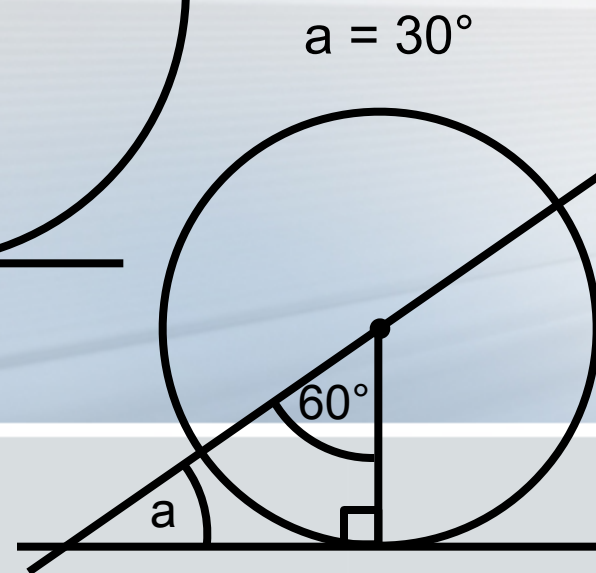
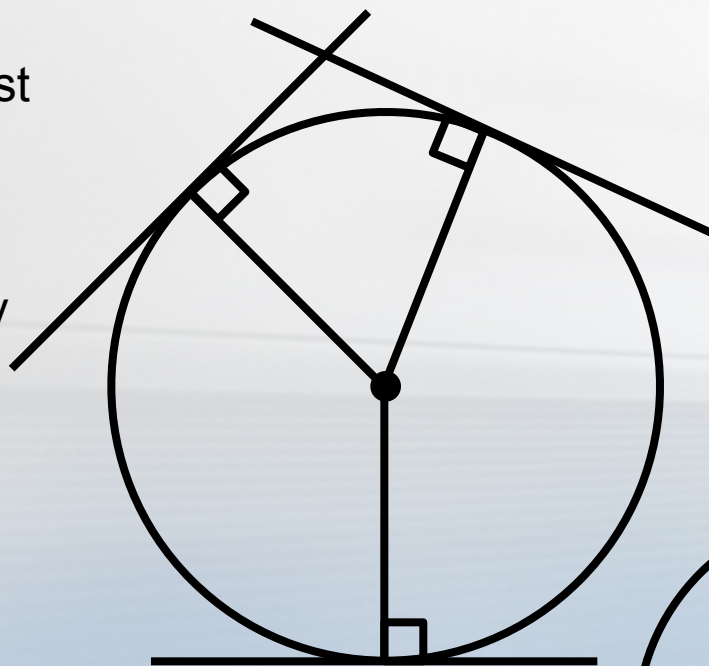


# Circle Geometry



## Rule 2 : A TANGENT AND RADIUS MEET AT $90^\circ$

A tangent is a line that just touches the edge of a curve. If a tangent and radius meet at the same point, then the angle they make is exactly  $90^\circ$ .

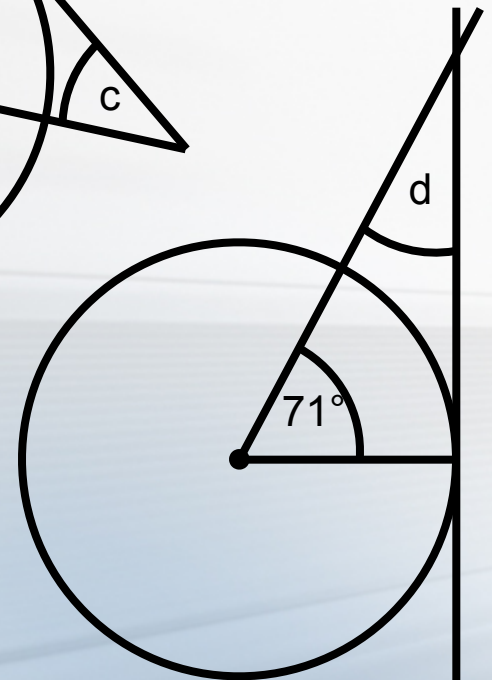
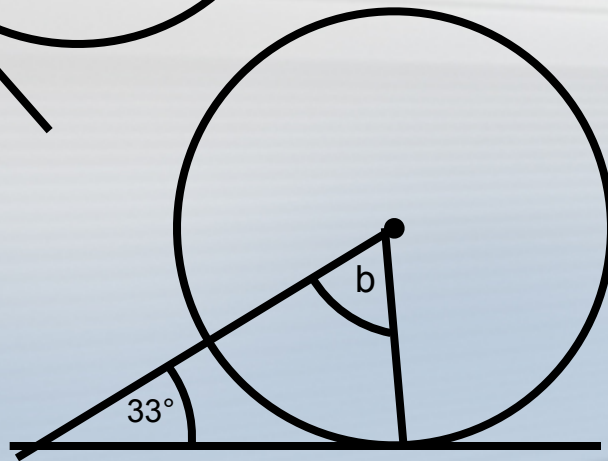
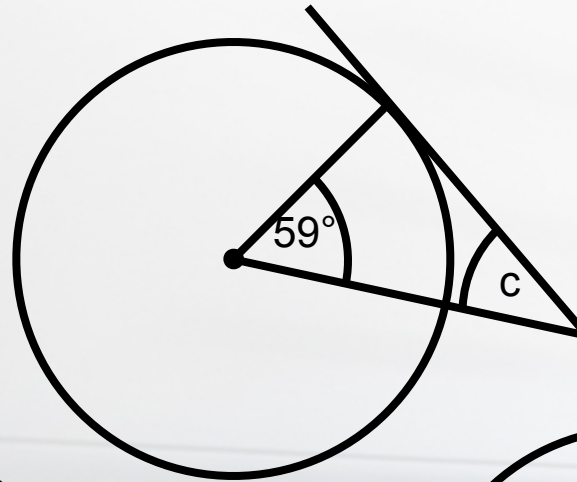
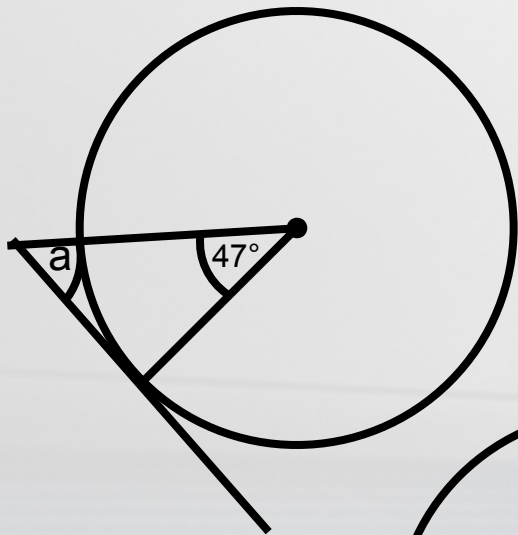




# EXERCISES



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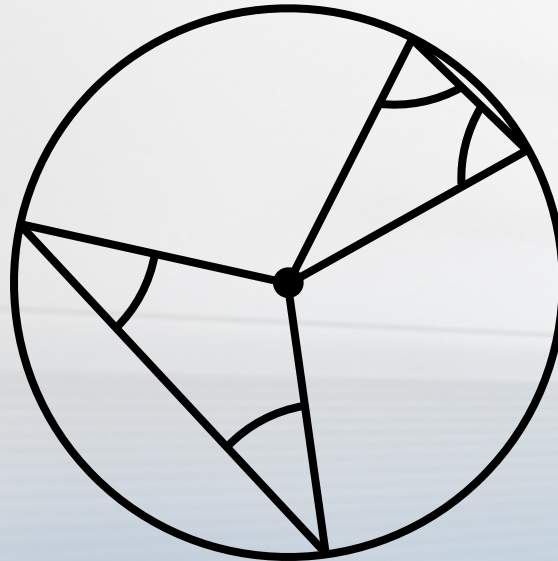


# Circle Geometry

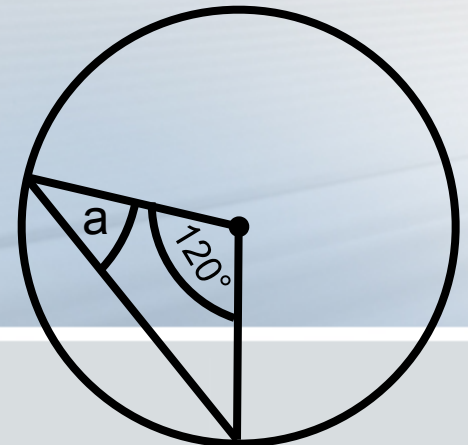


## Rule 3 : TWO RADII CREATE AN ISOSCELES TRIANGLE

These triangles are constructed using two radii. Therefore they are isosceles triangles.



$$a = 30^\circ$$

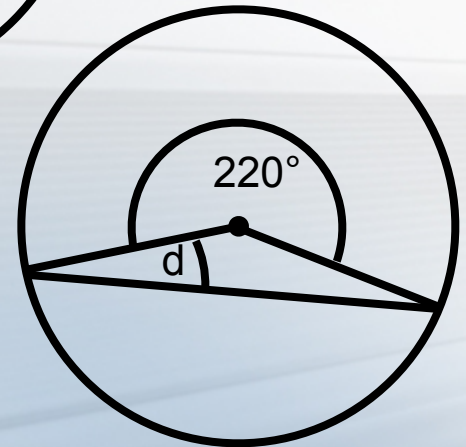
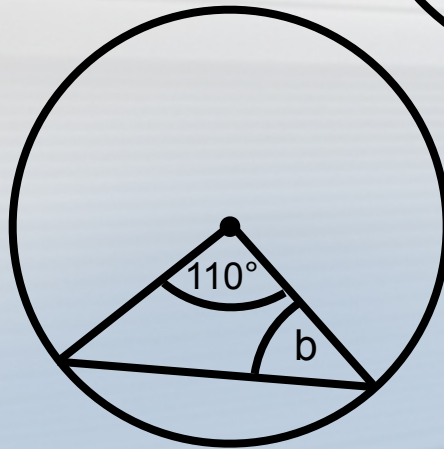
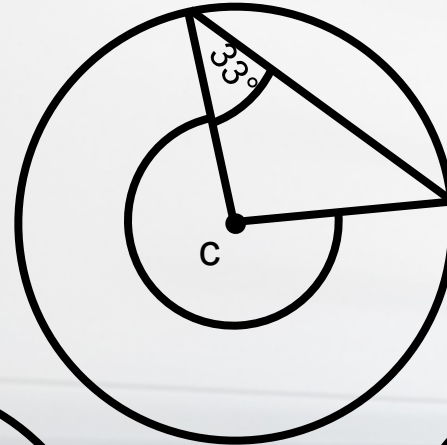
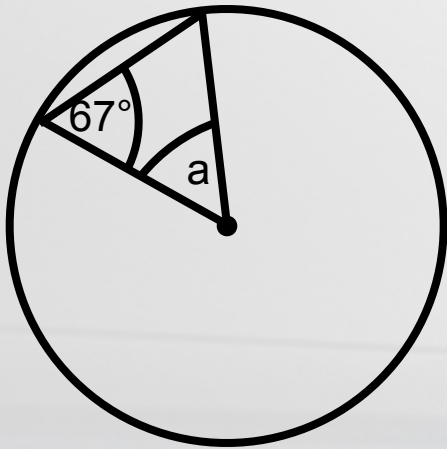




# EXERCISES



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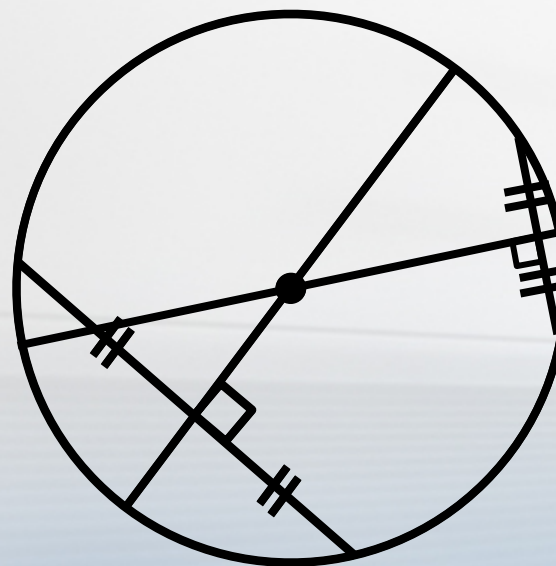


# Circle Geometry

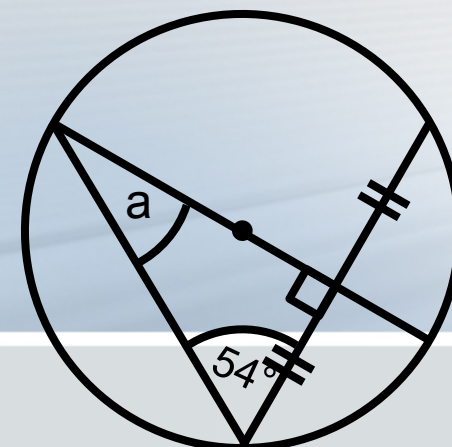


## Rule 4 : THE PERPENDICULAR CORD BISECTOR IS A DIAMETER

No matter where you draw the cord, the line that cuts it exactly in half at  $90^\circ$  will go through the center of the circle – the diameter line.



$$a = 36^\circ$$



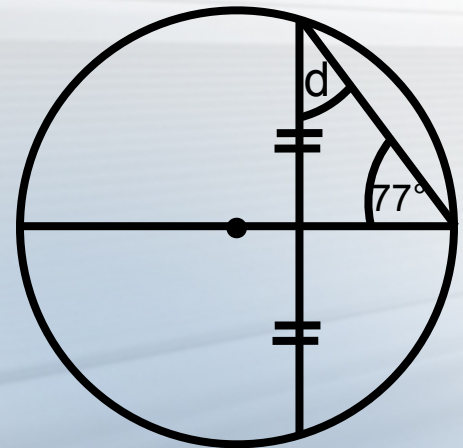
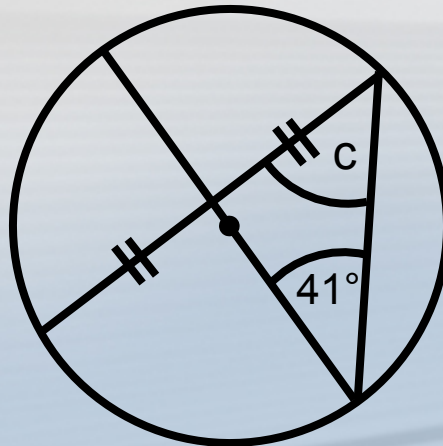
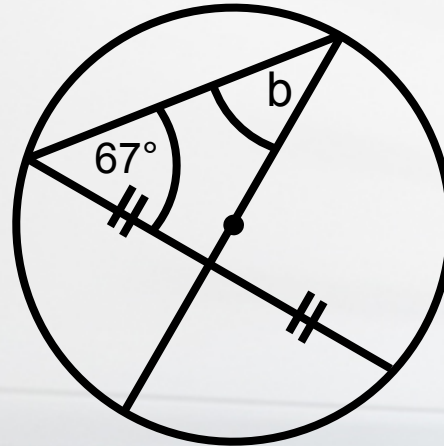
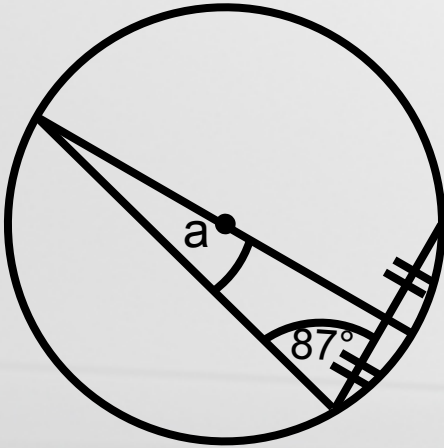




# EXERCISES



What is the size of each angle? Copy each diagram.



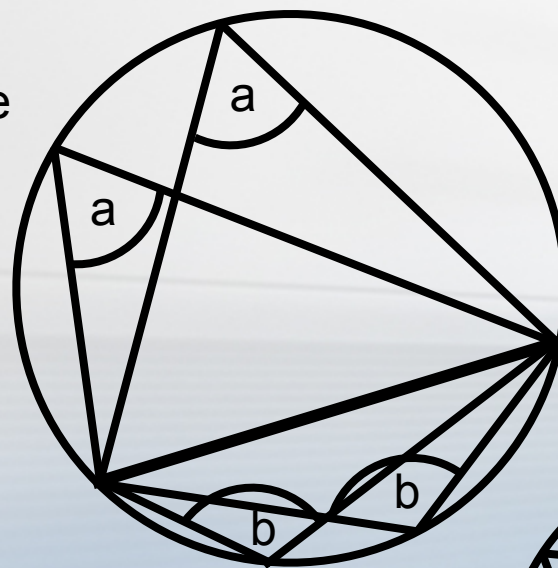


# Circle Geometry

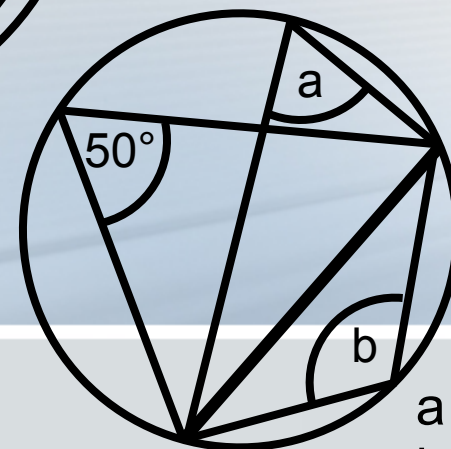


## Rule 5 : ANGLES IN THE SAME SEGMENT ARE EQUAL

All triangles drawn from a chord will have the same angle where they touch the circle. Also the two angles on opposite sides of the chord add up to  $180^\circ$



$$a + b = 180^\circ$$



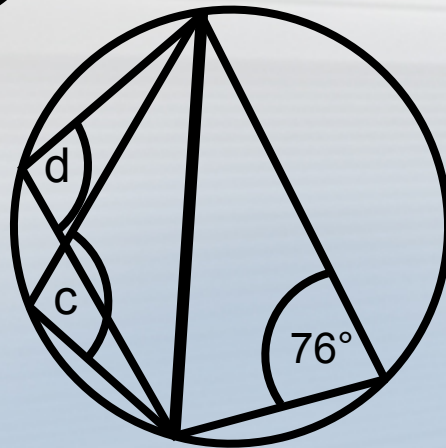
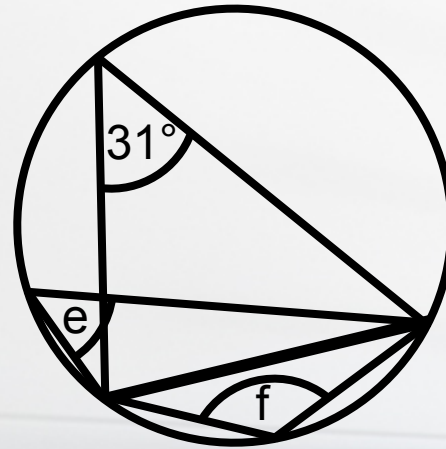
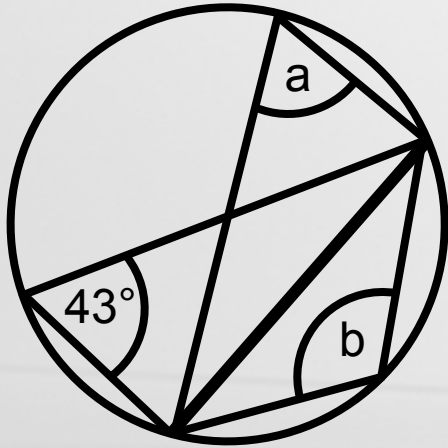
$$a = 50^\circ$$
$$b = 130^\circ$$



# EXERCISES



What is the size of each angle? Copy each diagram.



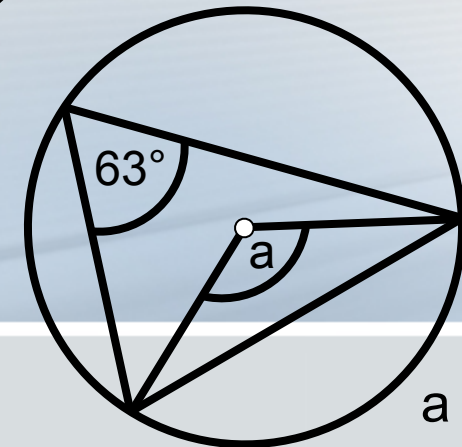
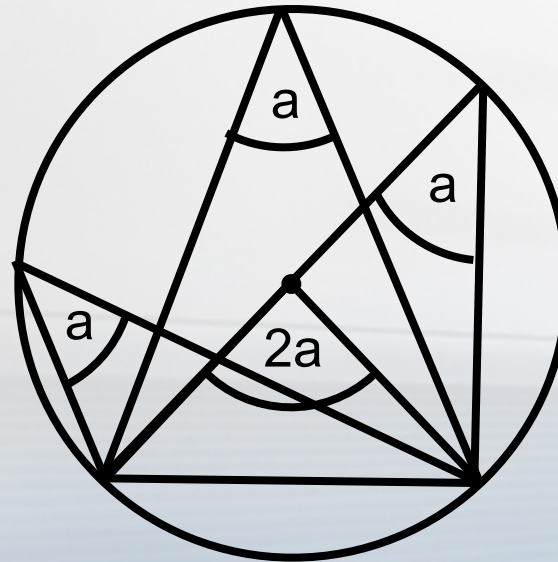


# Circle Geometry



## Rule 6 : ANGLE AT THE CENTRE IS TWICE THE ANGLE AT THE EDGE

Within the same segment, the angle made at the centre of a circle is exactly double the angle formed by the same chord at the edge of the circle.



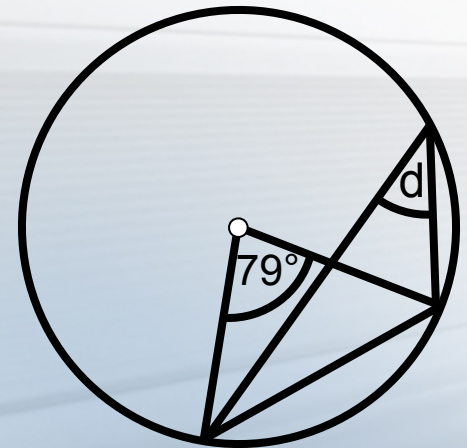
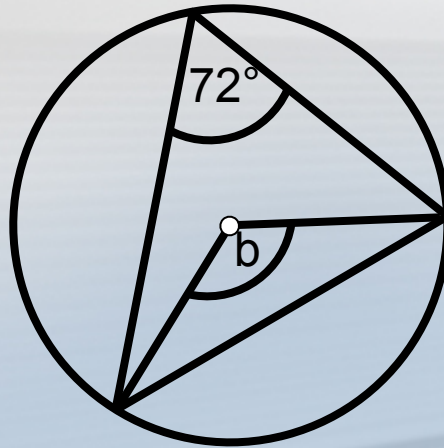
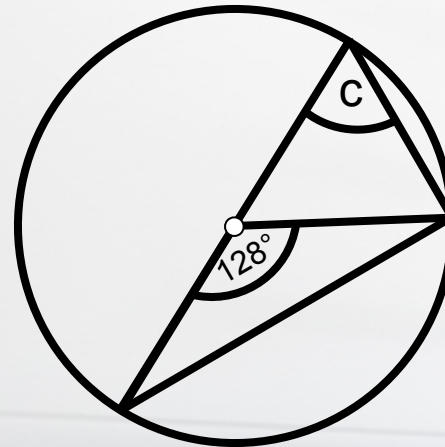
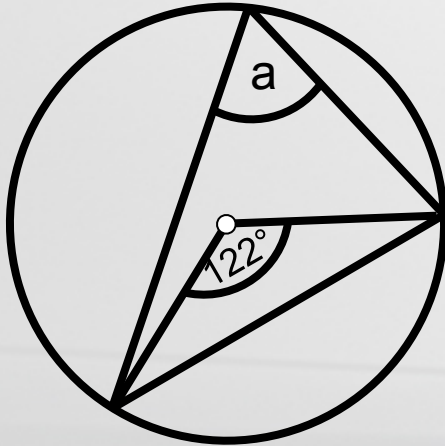
$$a = 126^\circ$$



# EXERCISES



What is the size of each angle? Copy each diagram.





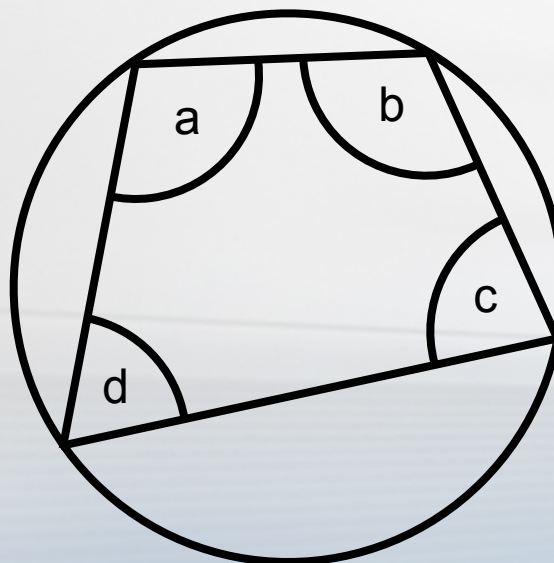
# Circle Geometry



◦

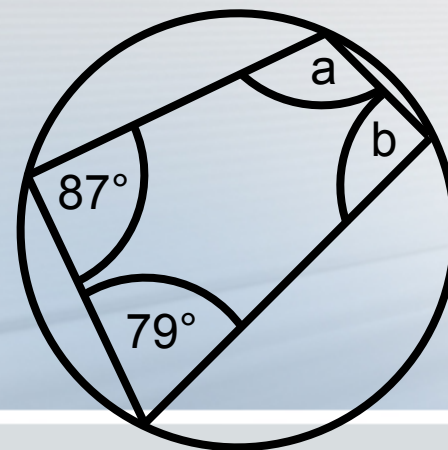
**Rule 7 : OPPOSITE ANGLES OF A CYCLIC QUADRILATERAL ADDS TO 180°**

A cyclic quadrilateral is a four sided shape with every corner touching the circle. Both pairs of opposite angles add up to 180°



$$a + c = 180^\circ$$

$$b + d = 180^\circ$$



$$a = 93^\circ$$

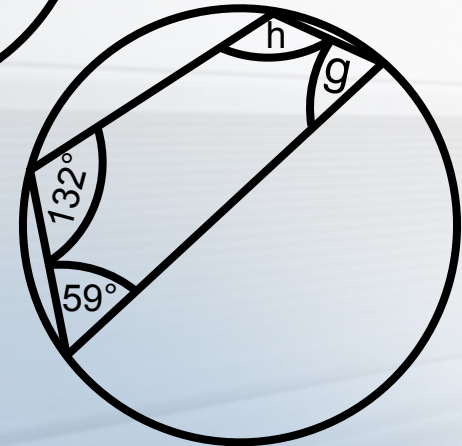
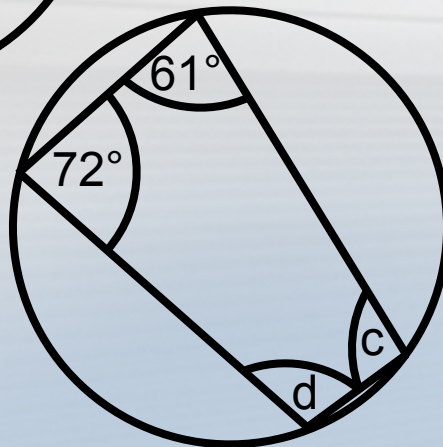
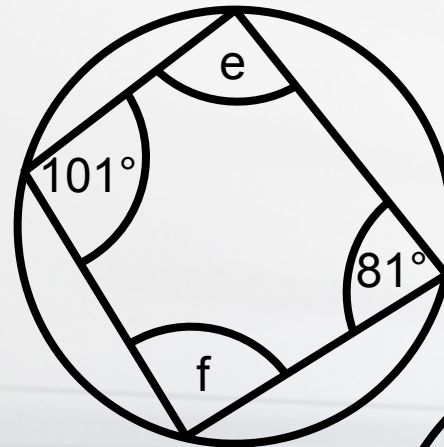
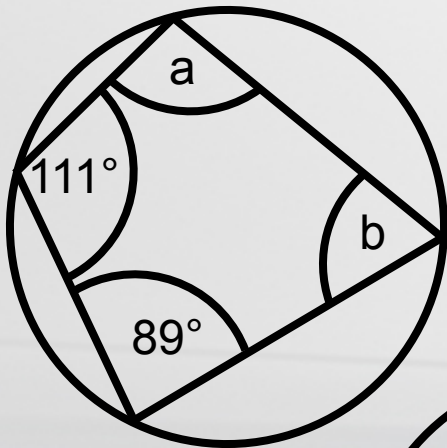
$$b = 101^\circ$$



# EXERCISES



What is the size of each angle? Copy each diagram.



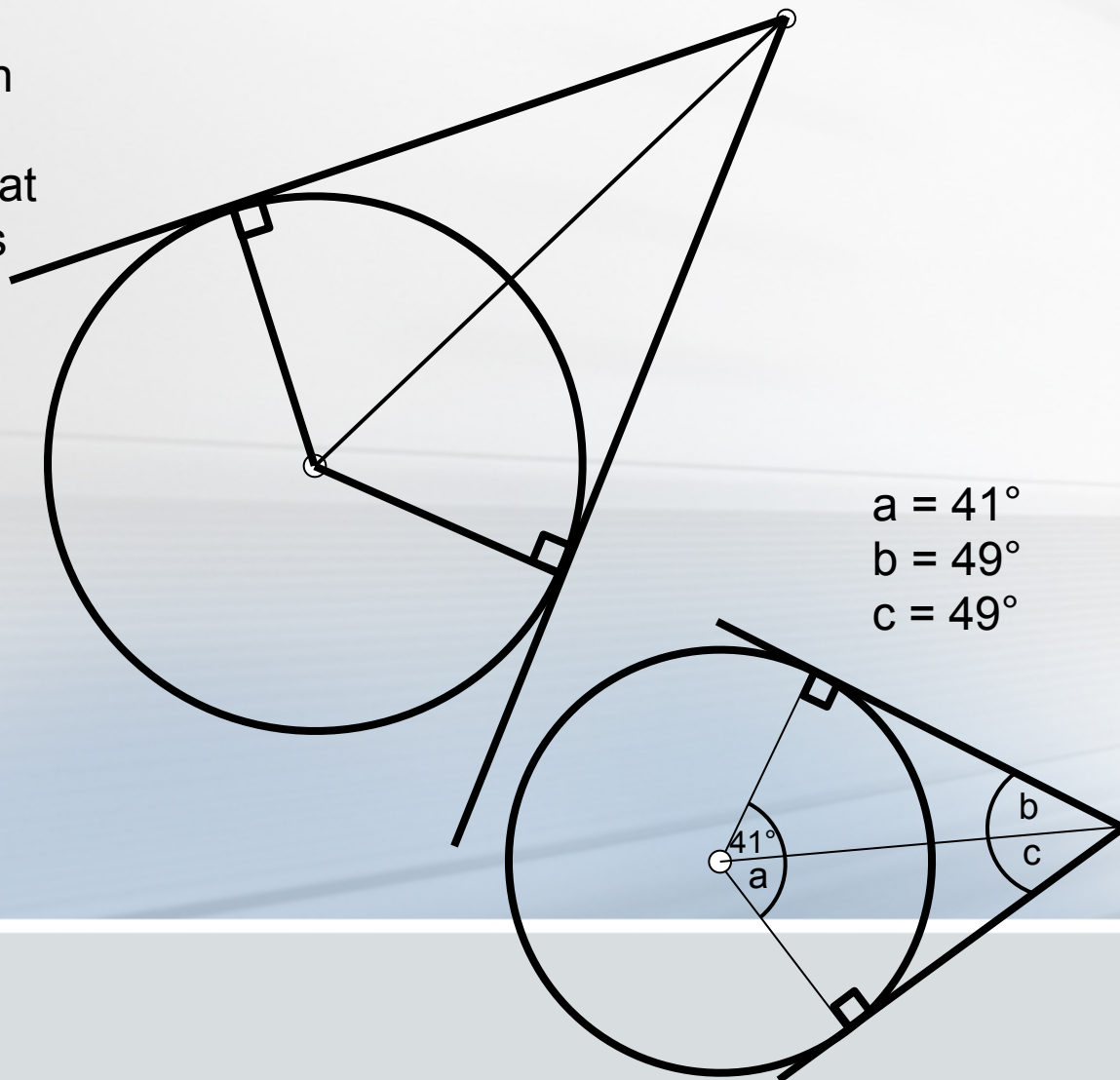


# Circle Geometry



## Rule 8 : EQUALITY OF TANGENTS FROM A POINT

The two tangents drawn from an outside point always touch the circle at the same distance. This creates a reflective situation with two congruent right angled triangles.



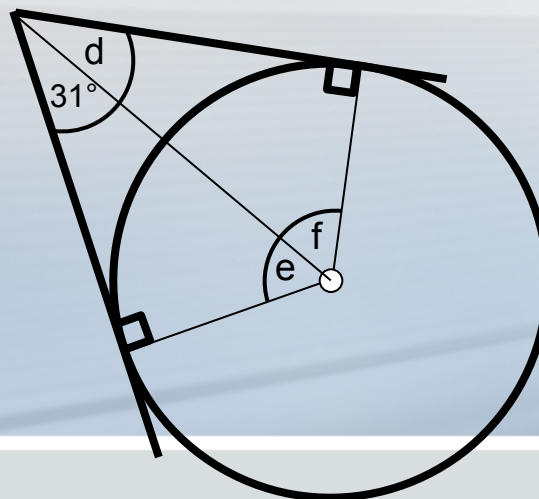
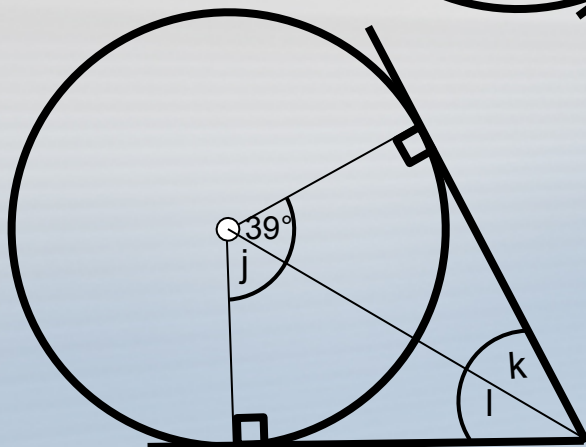
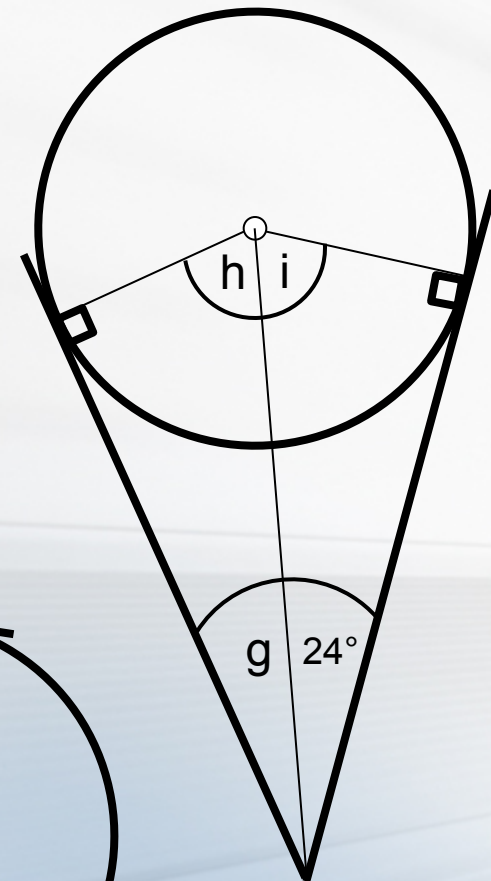
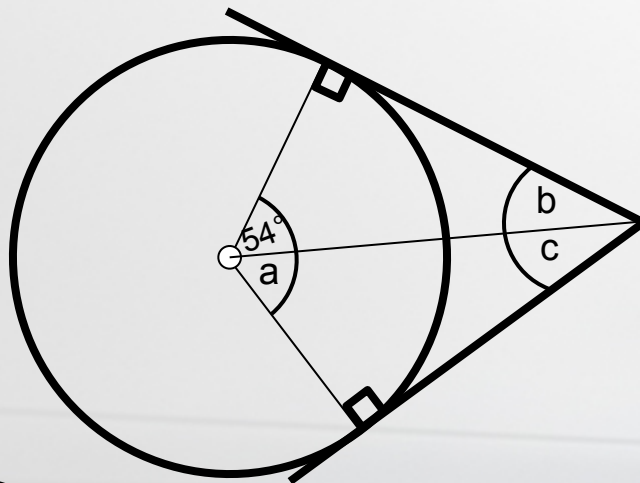




# EXERCISES



What is the size of each angle? Copy each picture.



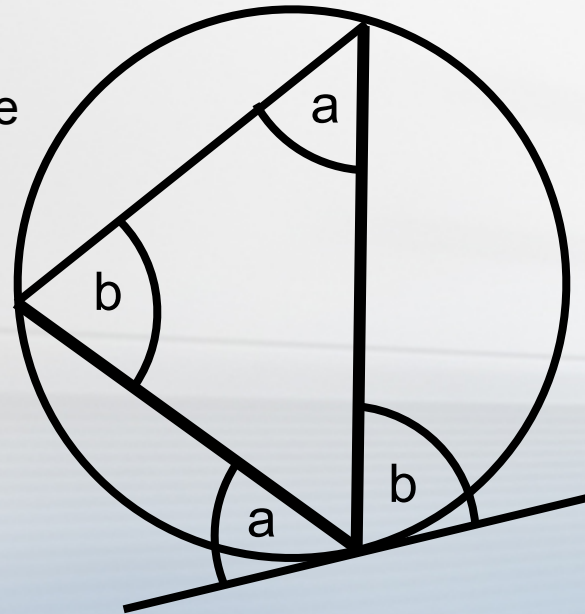


# Circle Geometry

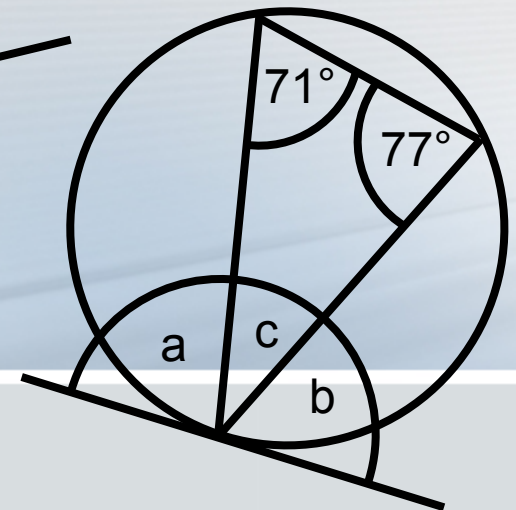


## Rule 9 : ANGLE IN THE OPPOSITE SEGMENT IS EQUAL

The angle between the tangent and a chord is equal to the opposite angle in the triangle in the other segment. This is the most difficult to remember!



$$\begin{aligned} a &= 77^\circ \\ b &= 71^\circ \\ c &= 32^\circ \end{aligned}$$





# EXERCISES



What is the size of each angle? Copy each picture.

