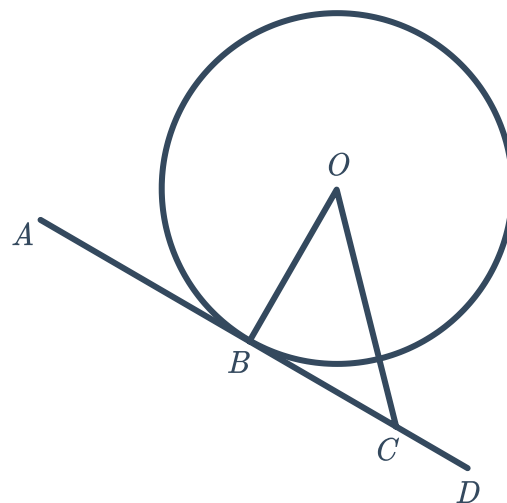


Tangents to a circle

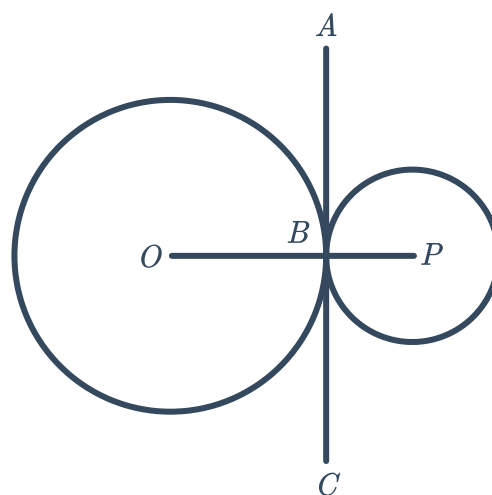
1 In the diagram, C is an arbitrary point on the line AD , and B is the point at which the tangent meets the circle.

- a What can be said about the lengths of OB and OC ?
- b What point on AD is closest to the centre of the circle?
- c In general, what can be said about the angle of a line joining some point to some other line by the shortest route?
- d Hence, what can be said about angle $\angle OBA$?



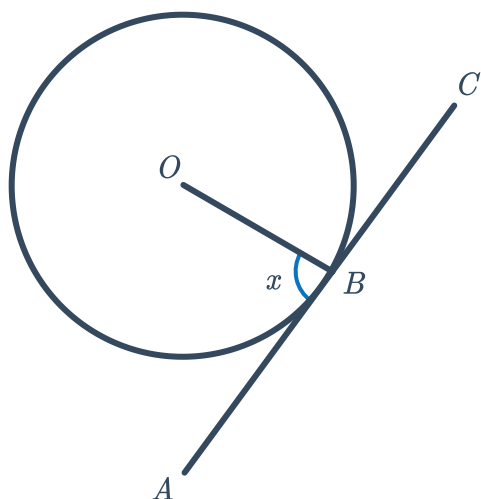
2 Consider the following figure:

- a Show that $\angle OBP$ is a straight angle.
- b Hence what can we say about points O , B and P ?

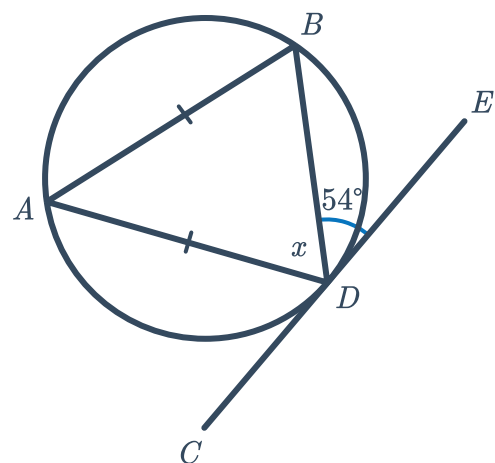


3 Find the value of the pronumerals in the following diagrams. Give reasons for your answer.

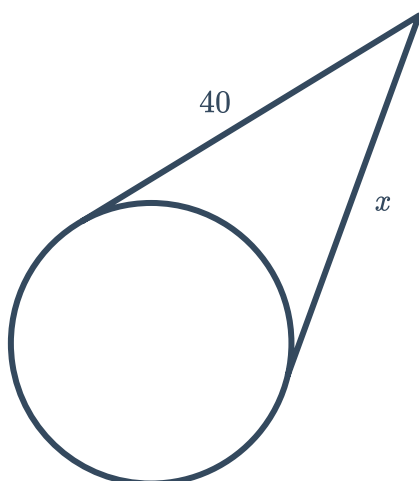
a



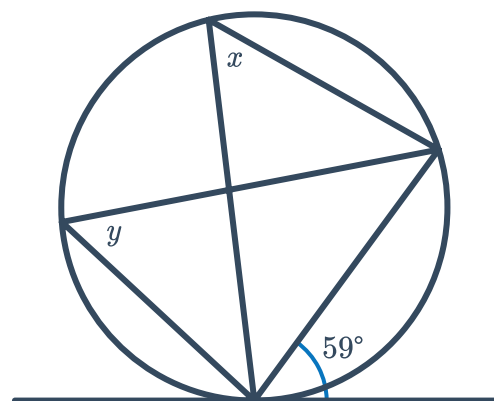
b



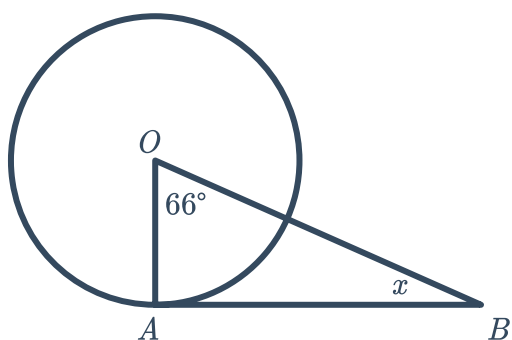
c



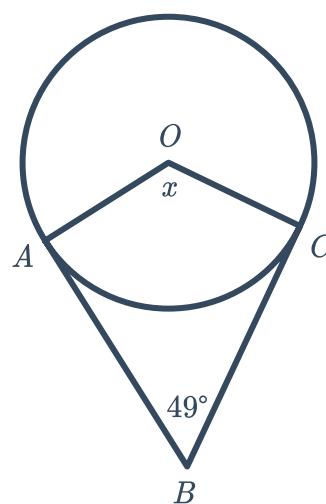
d



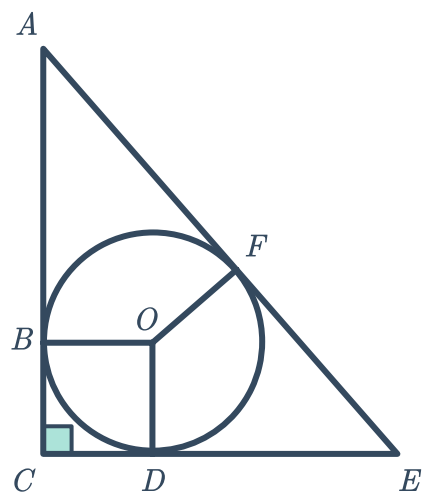
e



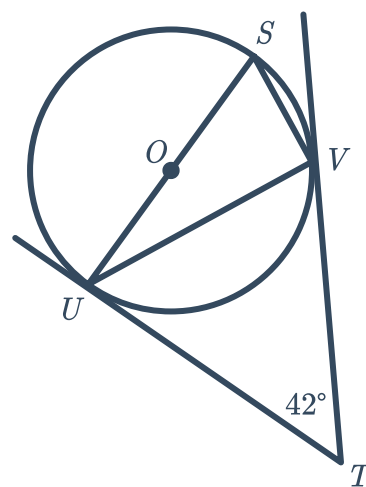
f



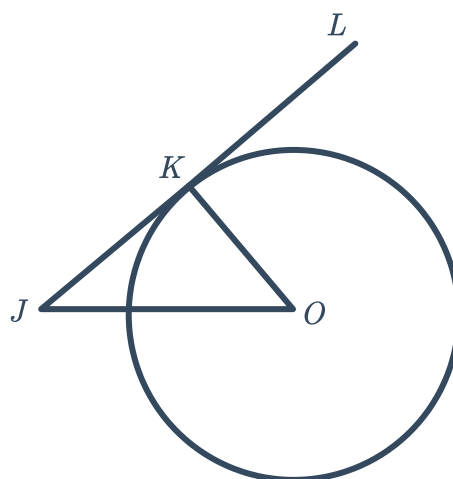
- 4 The circle in the following diagram has a radius of 8 and AB has a length of 9 units. Calculate the length of FE .



- 5 In the diagram, TU and TV are tangents to the circle with centre O . Find the size of $\angle SUV$.

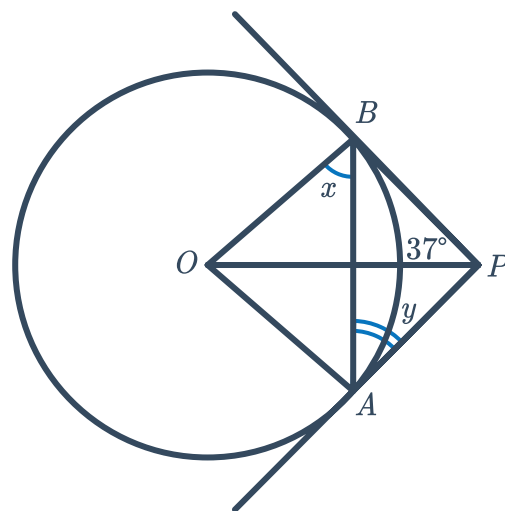


- 6 In the following diagram, JL is a tangent to the circle with centre O . $JO = 29$ and $JK = 20$. Find the length of the radius OK .



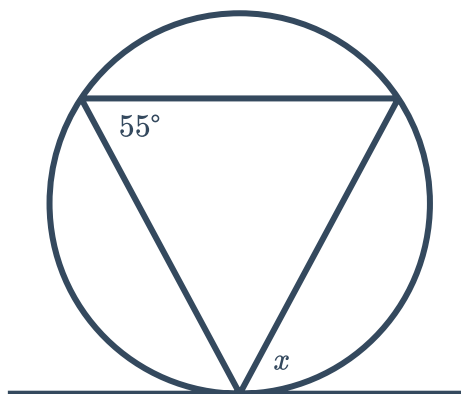
- 7 In the following diagram, PA and PB are two tangents issued from point P to the circle of center O , such that $\angle PBO = 37^\circ$.

- a Find the value of y .
b Find the value of x .

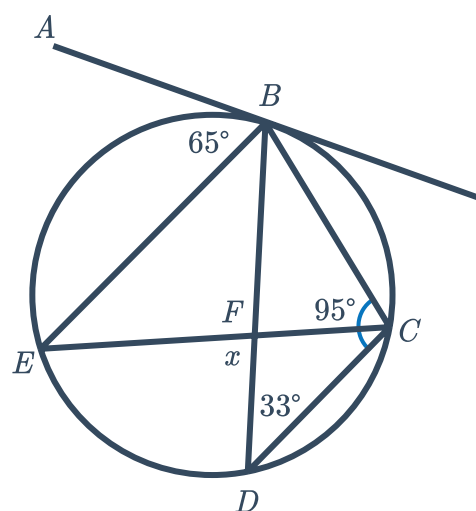


- 8 Find the value of the pronumerals in the following diagrams. Give reasons for your answer.

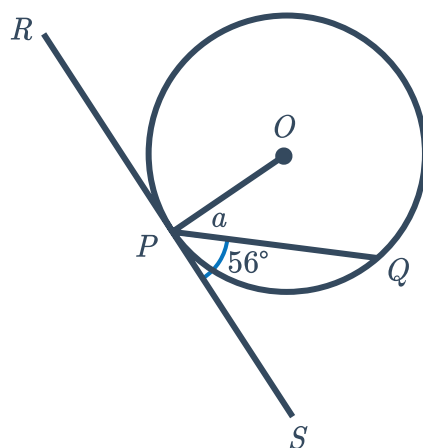
a



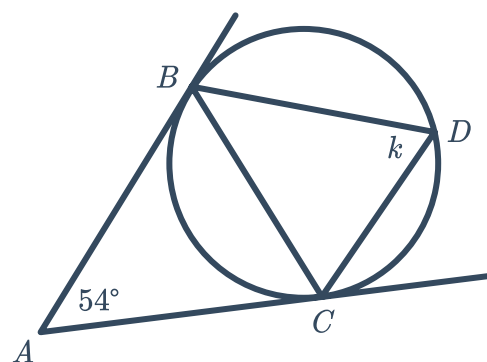
b



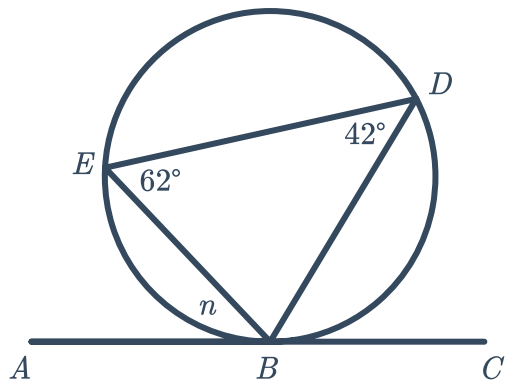
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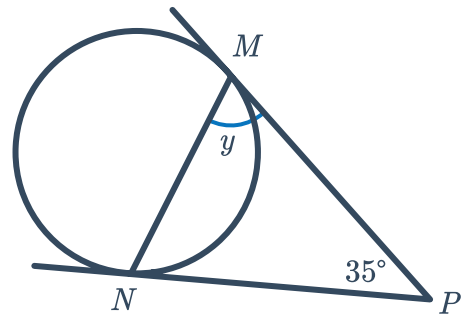
d



e

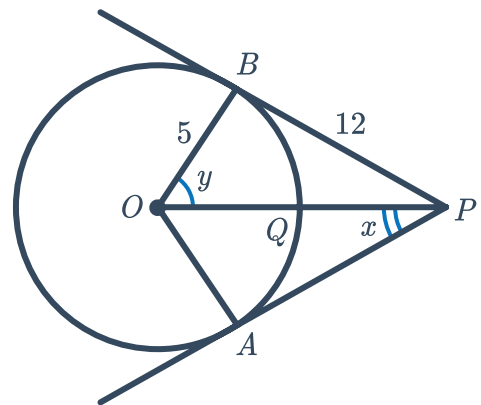


f

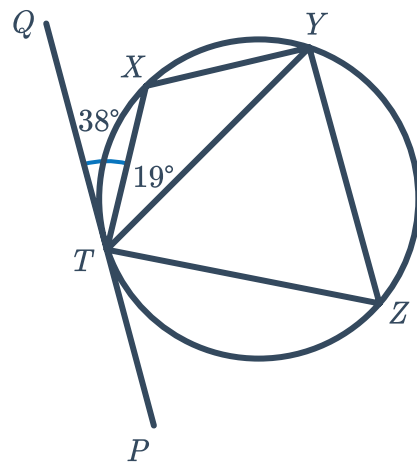


- 9 In the following diagram, PA and PB are two tangents issued from point P to the circle of center O , such that $PB = 5$.

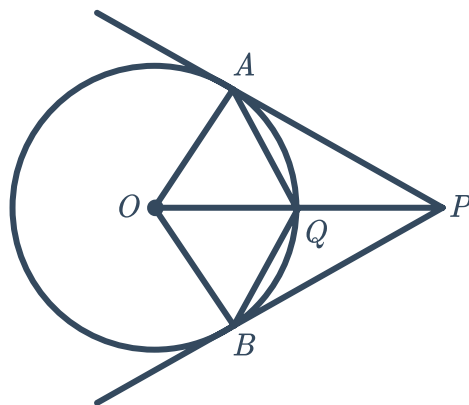
- Find the value of x .
- Find the value of y .



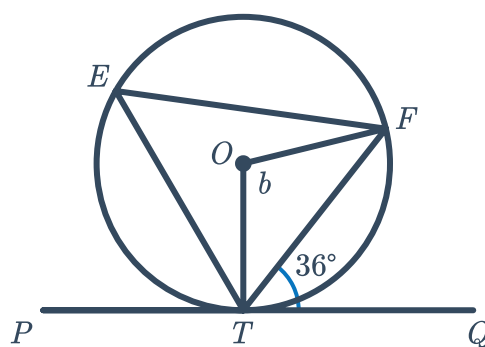
- 10 In the diagram, PT is a tangent to the circle. Find the size of $\angle YZT$.



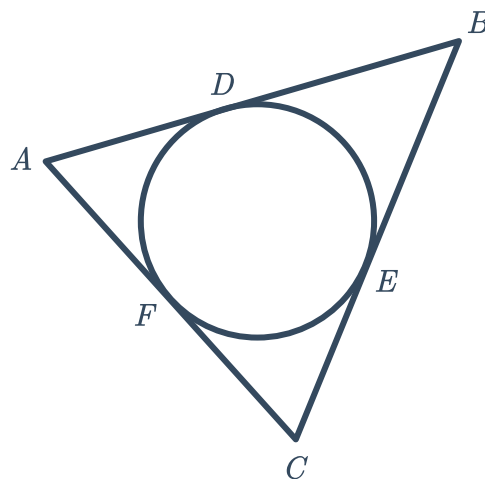
- 11 In the figure, O is the center of the circle, PA and PB are tangents. Find the size of $\angle APB$ if $\angle OAQ = 56^\circ$.



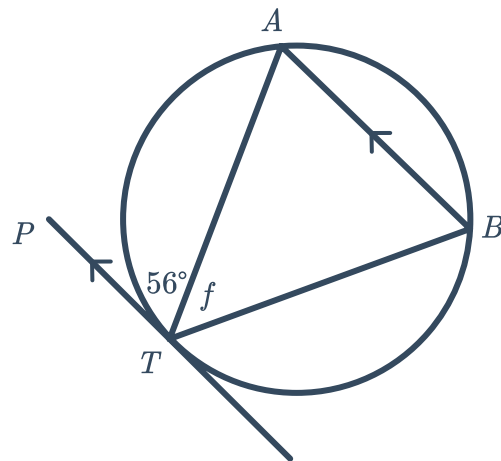
- 12 In the diagram, PT is a tangent to the circle with centre O . Determine the value of b .



- 13 In the following diagram, AB , BC and AC are tangents to the circle. $BD = 7$ cm, $AF = 6$ cm, and $BC = 11$ cm. Find p , the perimeter of $\triangle ABC$.

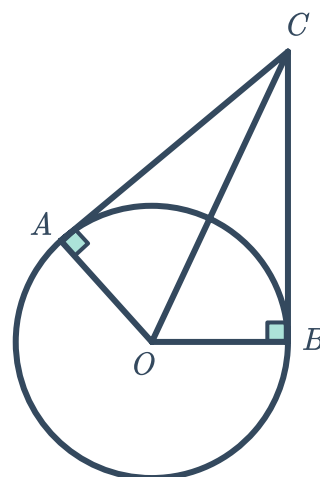


- 14 In the diagram, PT is a tangent to the circle.
Determine the value of f .

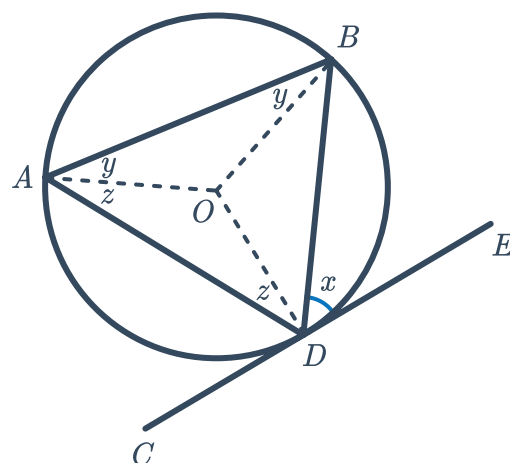


Proofs

- 15 Prove that $\triangle OAC$ and $\triangle OBC$ are congruent. Then, show that $AC = BC$.



- 16 For the following diagram, prove that $y + z = x$.



- 17 For the following diagram, prove that $AB \parallel FG$.

