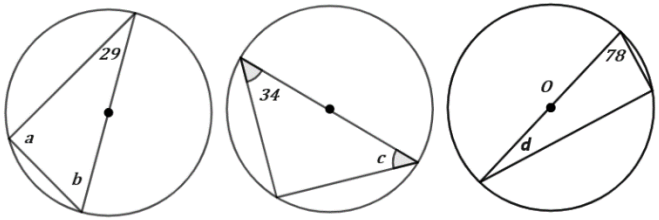
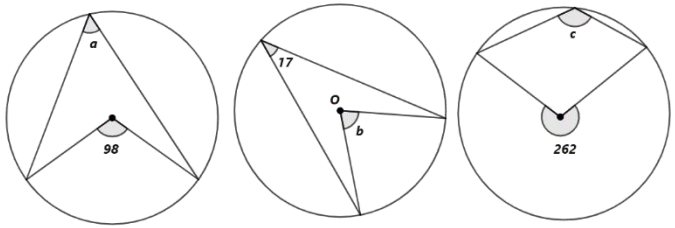
**Circle Theorem 1 – www.m4ths.com – Steve B! ©**

*Please Note: Different fonts and angle notation have been used intentionally to allow students to experience different ways questions may appear.*

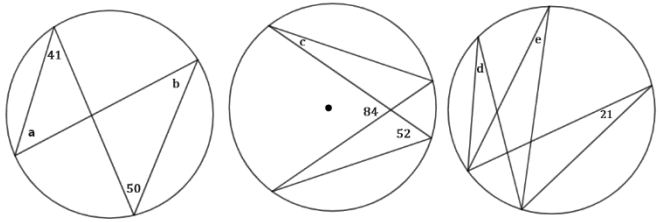
(1) Find the size of each missing angle below.



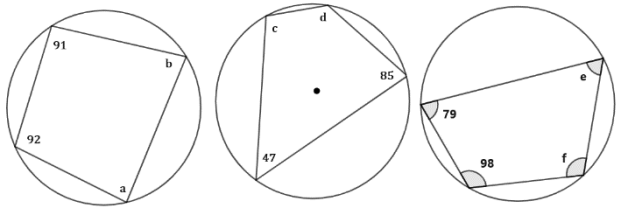

(2) Find the size of each missing angle below.



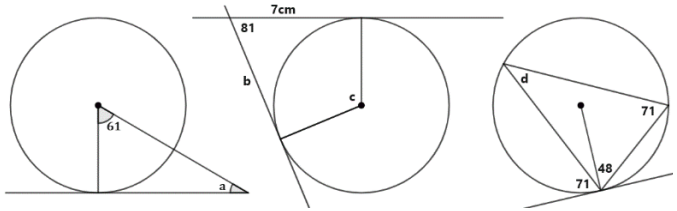

(3) Find the size of each missing angle below.



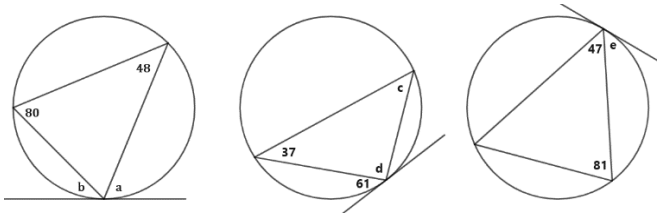

(4) Find the size of each missing angle below.



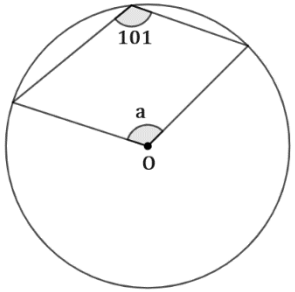

(5) Find the size of each missing angle below.



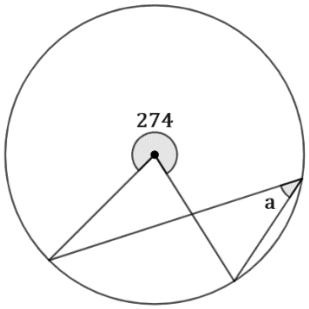

(6) Find the size of each missing angle below.




(7) The diagram below shows a circle, centre $O$.

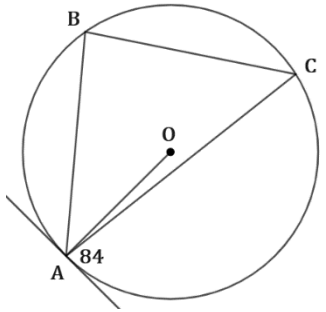



(a) Explain why it's not possible to use the 'cyclic quadrilateral' theorem to find the size of angle **a**.
(b) Find the size of angle **a**.
(8) The diagram below shows a circle centre $O$.

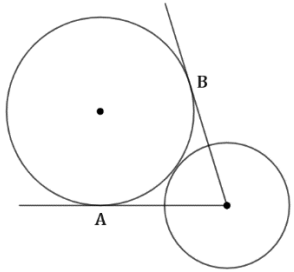



(a) Explain why 'angles in the same segment' cannot be used to find the size missing angle.
(b) Find the size of the missing angle.

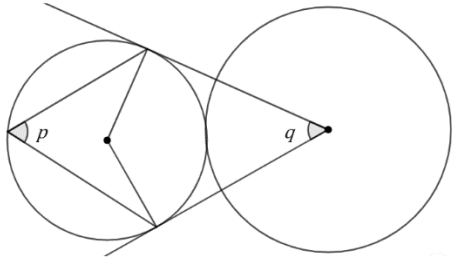
(9) The circle below has centre $O$. The points $A, B$ and $C$ lie on the circumference of the circle. A tangent to the circle is drawn at $A$. The $\Delta ABC$ is isosceles.




(a) Write down the size of $< ABC$.
(b) Find the size of $< BAO$.
(10) Two touching circles of radius $3cm$ and $2cm$ respectively are shown below.



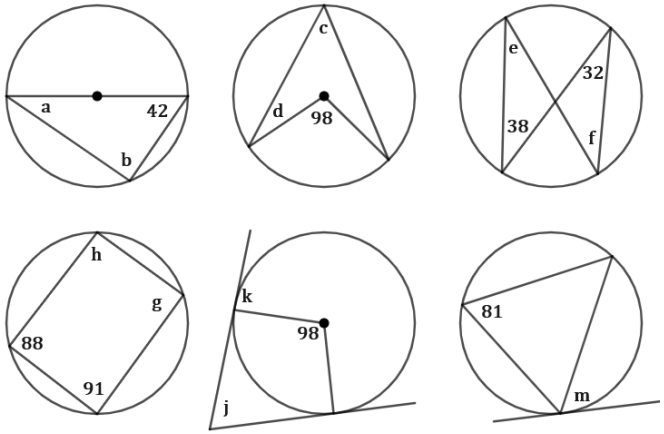

Tangents from the centre of the smaller circle touch the larger circle at the points A and B.
Find the distance of the points A and B from the centre of the smaller circle. You must show full workings.
(11) The diagram below shows two touching circles. Tangents to the smaller circle meet at the centre of the larger circle. The centre of the smaller circle is shown.



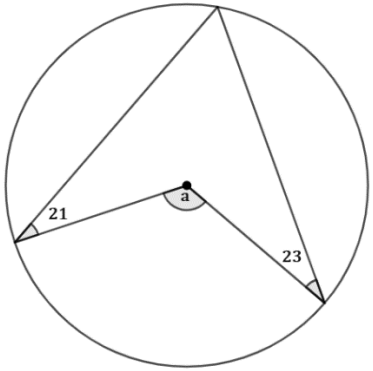

Express $q$ in terms of $p$ in its simplest form.

**Circle Theorem 2 – www.m4ths.com – Steve B! ©**

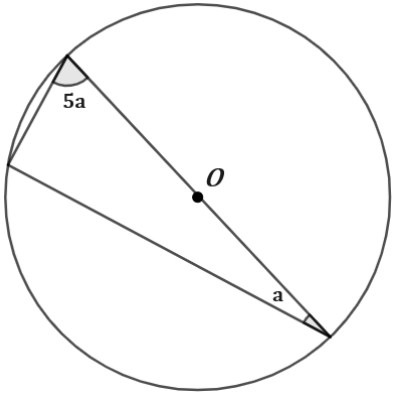
(1) Find the size of each missing angle below.



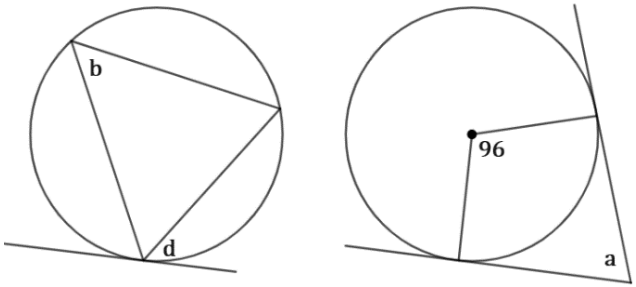

(2) Explain why angle $a = 88^o$ in the diagram below.




(3) A circle, centre $O$, is shown. Explain why $a = 15^o$.

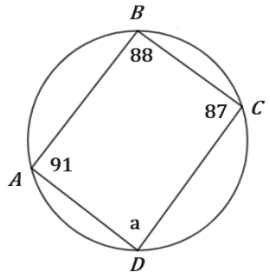



(4) Two circles are drawn below, each with tangents.




Given that $a = 1.5b$, find the value of $d$.

(5) A circle has cyclic quadrilateral inscribed inside it as shown below.



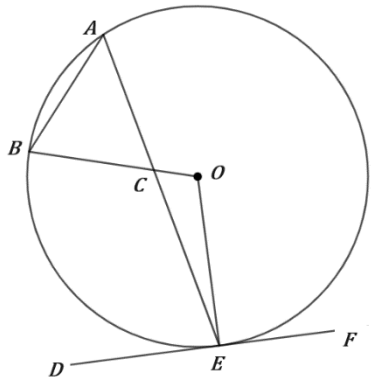

(a) Explain what is wrong with the diagram.

(b) Explain how the diagram could be corrected.

(c) Find the value of $a$.

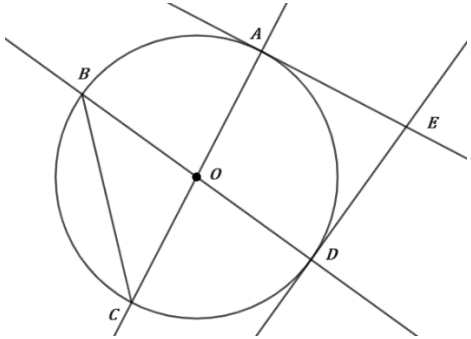
(d) Explain why $AB$ is **not** a diameter of the circle.

(6) Below is a circle, centre $O$ with tangent $DF$. The points $A, B$ and $E$ lie on the circle and $AB = AC$.




Given $< ABC = 64^o$, find the size of $< DEC$.

(7) A circle, centre $O$, is shown in the diagram below.



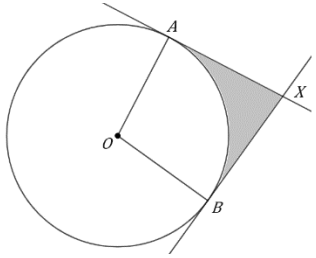

$AC$ is a chord to the circle.

$AE$ and $DE$ are tangents to the circle.

(a) Given that $< OCB = x$, find a simplified expression, in terms of $x$, for $< AED$.

(b) Using your answer to part (a), or otherwise, prove that $< AED = < AOB$.

(8) The diagram below shows a circle centre $O$ with tangents $AX$ and $BX$.




Given that $OX = 10cm$ and $OB = 6cm$, find the area of the shaded region shown to 3SF.

(9) In a circle, centre $O$, the points $A, B, C$ and $D$ lie on the circumference of the circle and form the cyclic quadrilateral $ABCD$.

Given that:

$$< DAC = 8x + y$$
$$< ABC = 6x + 3y$$
$$< BCD = 10x - y$$
$$< CDA = 6x + 2y$$

Explain clearly why the quadrilateral $ABCD$ is neither a rectangle, parallelogram, trapezium or a kite.