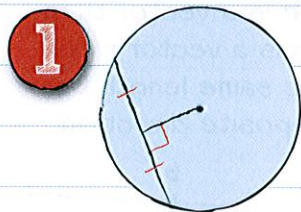
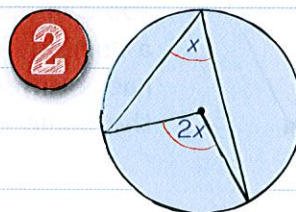


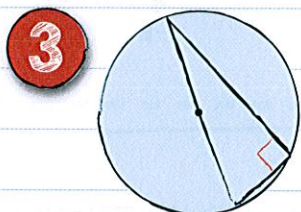
Circle theorems



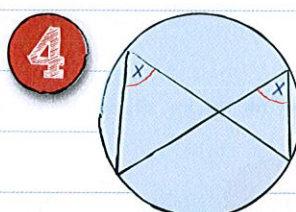
1 The perpendicular from a chord to the centre of the circle bisects the chord.



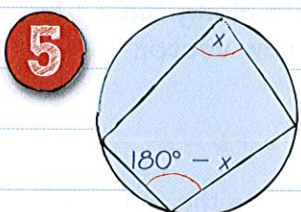
2 The angle at the centre of the circle is twice the angle on the circumference.



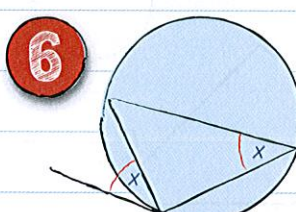
3 The angle in a semicircle is 90° .



4 Angles in the same segment are equal.



5 Opposite angles of a cyclic quadrilateral add up to 180° .



6 The angle between a tangent and a chord is equal to the angle in the alternate segment.

This is called the **ALTERNATE SEGMENT THEOREM**.

See page 84 for more circle facts.

Worked example

grade **A***

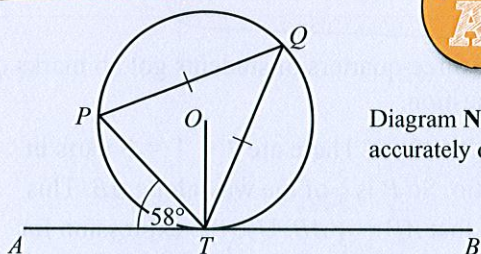


Diagram **NOT** accurately drawn

P, Q and T are points on the circumference of a circle, centre O .

The line ATB is the tangent at T to the circle.

$PQ = TQ$

Angle $ATP = 58^\circ$

Calculate the size of angle OTQ .

Give a reason for each stage in your working.

$\angle ATO = 90^\circ$

(angle between a radius and a tangent)

So $\angle PTO = 90^\circ - 58^\circ = 32^\circ$

$\angle PQT = 58^\circ$

(alternate segment theorem)

$\angle QPT = \angle QTP$

(base angles of an isosceles triangle)

So $\angle QTP = \frac{180^\circ - 58^\circ}{2} = 61^\circ$

So $\angle OTQ = 61^\circ - 32^\circ = 29^\circ$

EXAM ALERT!

About 80% of students got 0 marks on this question. Look for angles you can work out and write them on the diagram.

Give reasons for **each** step of your working.

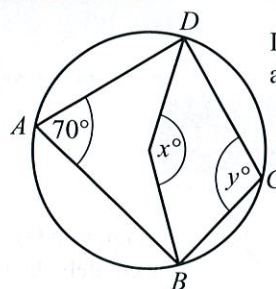
If a diagram has a triangle and a tangent in it, see if you can use the alternate segment theorem.

This was a real exam question that caught students out – **be prepared!**

ResultsPlus

Now try this

grade **A**



edexcel

Diagram **NOT** accurately drawn

- (a) (i) Work out the value of x . (1 mark)
- (ii) Give a reason for your answer. (1 mark)
- (b) (i) Work out the value of y . (1 mark)
- (ii) Give a reason for your answer. (1 mark)