

## **Geometrical statements in GCSE Maths papers**

The notes below refer to the new 2010 GCSE Edexcel Mathematics specifications.

In questions that relate to Geometry candidates can be asked to give a reason for a calculation or proof. In many cases this is related to angles. This could also be part of a requirement for candidates to communicate in mathematical terms. If questions have an asterisk they are also linked to QWC (Quality of Written Communication) marks, again for communicating mathematically.

In Geometry the need to communicate in mathematics terms is embodied in mathematical statement relating to geometrical properties. It is important that candidates show with clarity their understanding of the use of any geometrical property that they might use in solving problems.

The attached list gives some examples of responses to questions which would be considered clear communication in these respects. These are not unique: there are other similar statements that could be used to earn the marks, but these statements contain those key words and phrases which are judged to be minimal in terms of a request to give reasons for mathematical deduction in geometry.

## Rules in Geometry

### Lines:

Vertically opposite angles are equal.



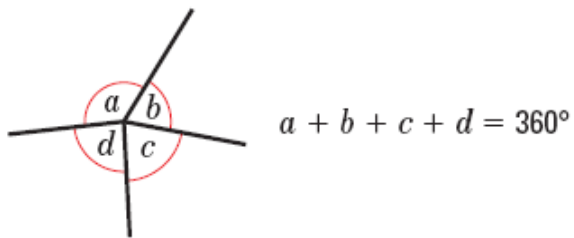
Angles  $a$  and  $b$  are the same.

Angles  $c$  and  $d$  are the same.

Angles on a straight line add up to  $180^\circ$

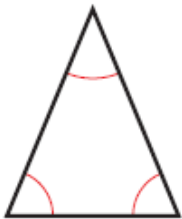


Angles at a point add up to  $360^\circ$

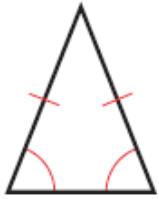


### Triangles and quadrilaterals:

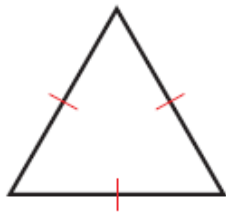
Angles in a triangle add up to  $180^\circ$



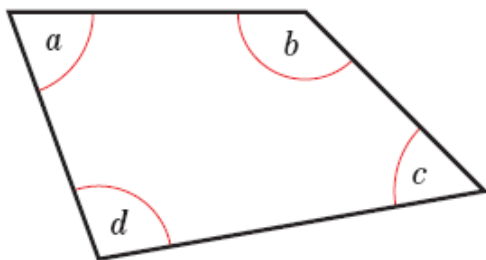
Base angles of an isosceles triangle are equal.



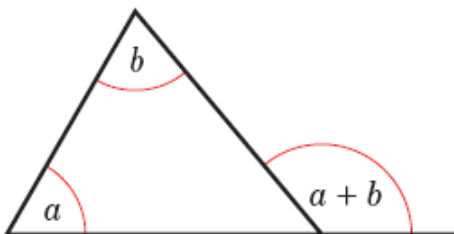
Angles in an equilateral triangle are equal.



Angles in a quadrilateral add up to  $360^\circ$



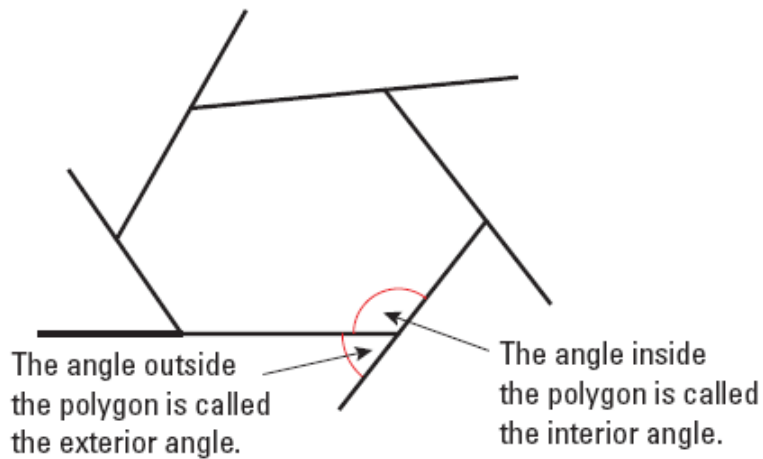
An exterior angle (of a triangle) is equal to the sum of the internal opposite angles.



## Polygons:

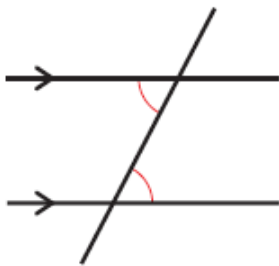
Exterior angles of a polygon add up to  $360^\circ$ .

The interior and exterior angle of any polygon add up to  $180^\circ$ .

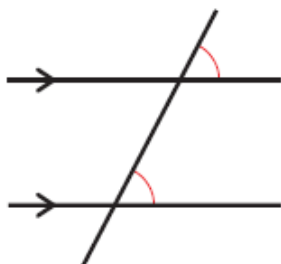


## Parallel lines:

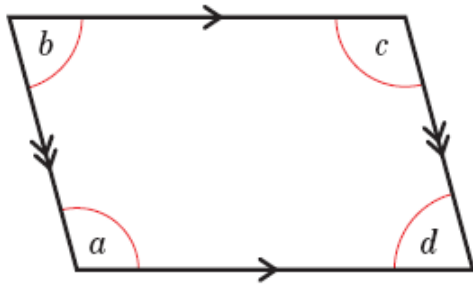
Alternate angles are equal.



Corresponding angles are equal.

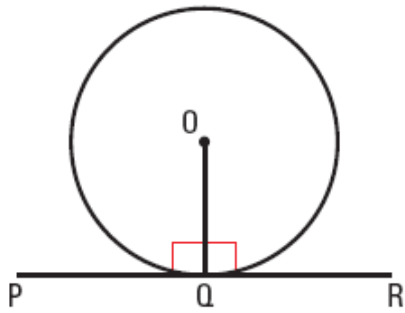


Allied angles add up to  $180^\circ$ .

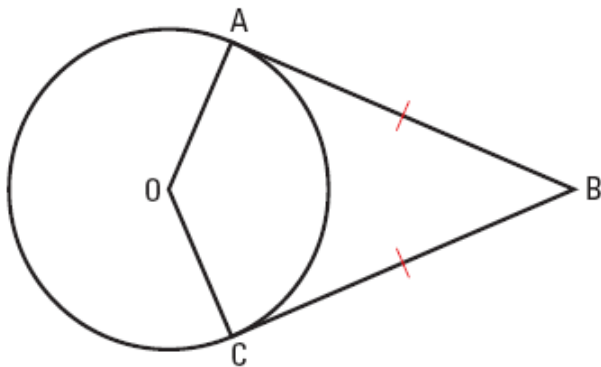


### Circle Theorems:

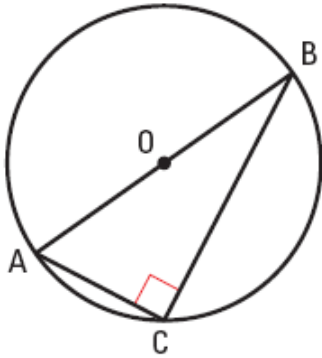
The tangent to a circle is perpendicular ( $90^\circ$ ) to the radius.



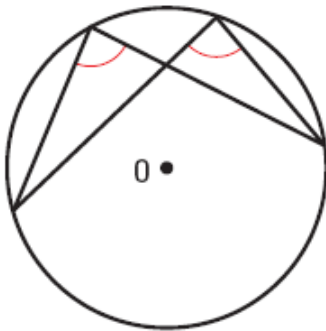
Tangents from an external point are equal in length.



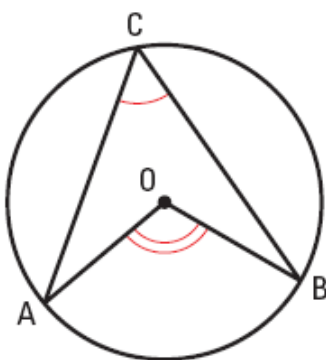
Angles in a semicircle are  $90^\circ$ .



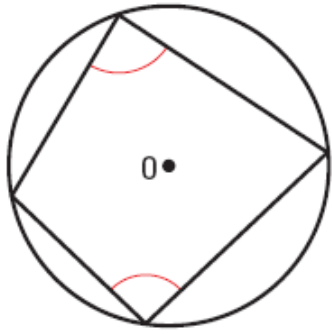
Angles in the same segment are equal.



The angle at the centre of a circle is twice the angle at the circumference.



Opposite angles of a cyclic quadrilateral add to  $180^\circ$ .



Alternate segment theorem.

