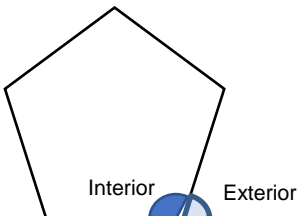
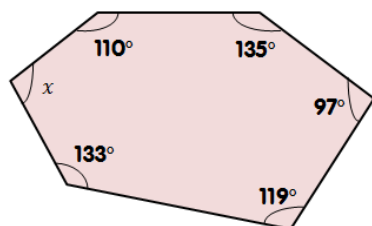


Guidance for tutors

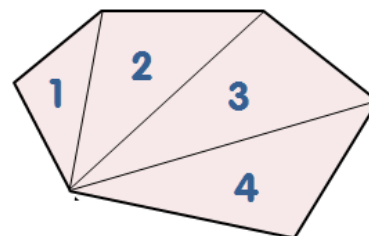
Outcome	SA3	Student can consistently:	Find the size of interior and exterior angles in any sized (regular) polygon.
How the topic is examined	<ul style="list-style-type: none"> Examined through test paper questions. Questions are equally likely to appear on calculator and non-calculator papers. Questions could be asked about regular and irregular polygons and students could be asked to work out: <ul style="list-style-type: none"> The size of an interior or exterior angle of a regular polygon. A missing interior or exterior angle of a regular polygon. Often these problems are asked in a problem solving context. 		
Prior knowledge	<ul style="list-style-type: none"> Students should be confident with: <ul style="list-style-type: none"> Four rules of number Angles in simple shapes (SA2) In addition questions involving this topic can have links to: <ul style="list-style-type: none"> Finding the area of basic shapes (SLAV1) Forming and solving equations (AEq1) 		
Suggested tuition approaches	<ul style="list-style-type: none"> Polygons are shapes made up of straight edges. Students should know the following <ul style="list-style-type: none"> The names of three sided to 12 sided polygons. A regular polygon has equal sides and equal angles. An irregular polygon doesn't have all sides the same and all angles the same. That the exterior angle of a regular polygon can be calculated using $\frac{360}{n}$, where n is the number of sides. The sum of the interior and exterior angle of any polygon is 180° <div style="display: flex; align-items: center; justify-content: space-around;">  <div style="border: 1px solid black; padding: 10px; width: 300px;"> <p>The exterior angle of a regular pentagon is $\frac{360}{5} = 72^\circ$</p> <p>The interior angle + exterior angle = 180°</p> <p>Therefore the interior angle = $180 - 72 = 108^\circ$</p> </div> </div>		

Guidance for tutors

- Another way of finding a missing angle in a polygon is to;
 - Split the shape up into triangles (from a point)
 - Multiply the number of triangles by 180 – this will tell you how many degrees all the interior angles should sum to.
 - Add up the angles you are told and subtract this from the above number and this should give the missing angle.



Find the size of angle x



Split the shape up into triangles

$$\text{Total interior angles} = 180 \times 4 = 720^\circ$$

Sum of known angles

$$= 110 + 133 + 135 + 97 + 119 = 594$$

$$x = 720 - 594 = 126^\circ$$

- To work out the sum of interior angles in an n sided polygon you can use $360(n - 2)$.
- There are an increasing number of problems that requires students to use angle properties to form and then solve an algebraic equation (See SA2).
- Students may need to rearrange the formulae above to find the number of sides a polygon has.

Common errors and misconceptions

- Mistakes are made with doing basic calculations without a calculator. There are a lot of possibilities for error when the polygons increase in size.
- Students need to ensure they show all their working.
- Students must give full reasons when the question asks "Give reasons for your answer".
- When diagrams looked quite complicated this can put students off answering the question and they quickly give up. Encourage them to show all angles on the diagram. This will help.

Guidance for tutors

	<ul style="list-style-type: none">Students forget the formulae for interior and exterior angles. If they use the triangle method they have a way they can always work these values out.
Suggested resources	<ul style="list-style-type: none">Questions<ul style="list-style-type: none">https://www.tes.com/teaching-resource/ks3-maths-angles-in-polygons-worksheet-6165951http://www.castleschool.co.uk/angles-polygons2.pdfhttp://www.cimt.org.uk/projects/mepres/book8/bk8_15.pdf (pp56-59)Past GCSE Questions<ul style="list-style-type: none">https://keshgcsemaths.files.wordpress.com/2013/11/35_angles_polygons2.pdfVideo tutorial<ul style="list-style-type: none">https://www.khanacademy.org/math/geometry/parallel-and-perpendicular-lines/triang_prop_tut/v/sum-of-interior-angles-of-a-polygon