Planner

Polygons

- Recognising different types of polygons
- Finding the sum of the interior angles of a polygon
- Finding interior and exterior angles of a regular polygon
- Finding the number of sides of a regular polygon

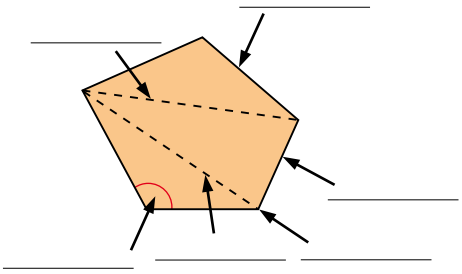
Keywords

You should know

explanation 1a explanation 1b

1 Draw and name each polygon. Then label the parts using words from the list.

a



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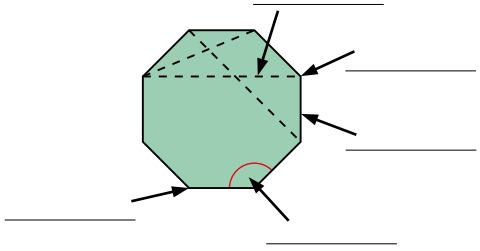
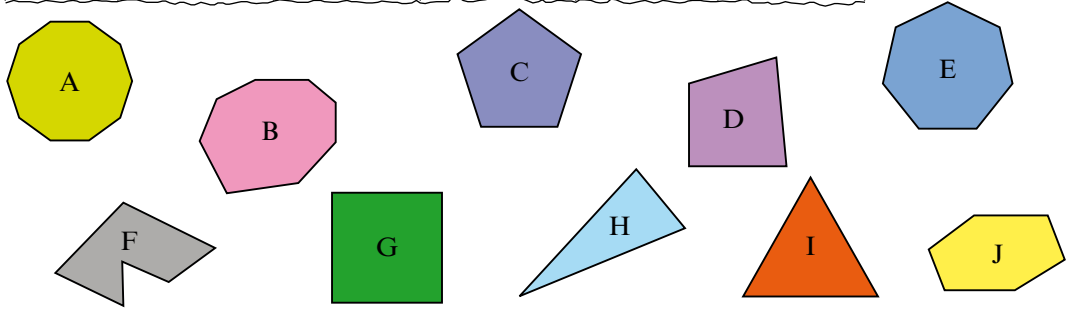


Edge	Diagonal	Interior angle	Vertex

2 Copy and complete the table for each polygon. The first one has been done for you.

Shape	Name	Regular	Irregular	Convex	Concave
A	Decagon	✓		✓	



3 Draw three different types of pentagon.

4 This question is about regular polygons.

a Write two conditions for a polygon to be regular.

b Draw a regular quadrilateral.

c Draw two more quadrilaterals.
Each quadrilateral must have only one of the conditions you listed in **a**.

explanation 2a | explanation 2b | explanation 2c | explanation 2d | online

5 Alison is making a table to show the sums of the interior angles of polygons.

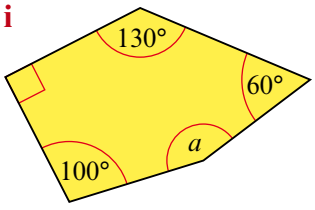
Number of sides	3	4	5	6	7	8
Sum of interior angles	180°	360°				

a Explain how Alison can complete the table.

b Copy and complete the table.

c Use the table to find the angles marked with letters in these shapes.

i



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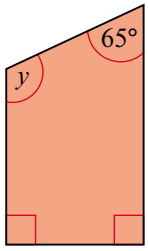

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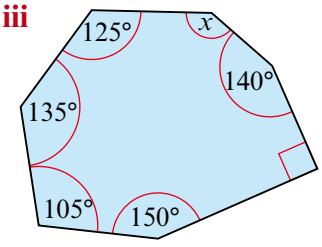

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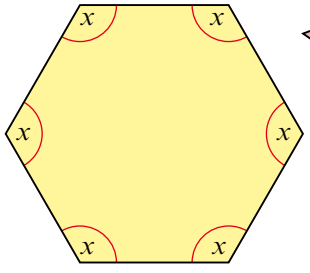

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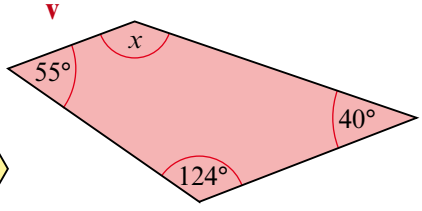

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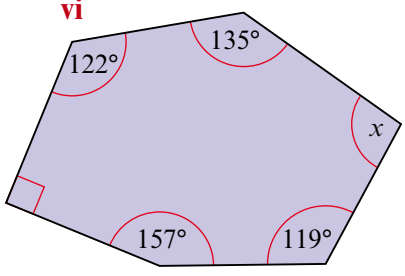
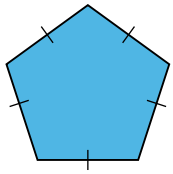


6 Find the size of the interior angle of each of these regular polygons.

a



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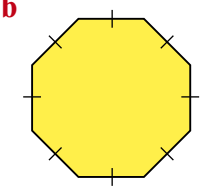

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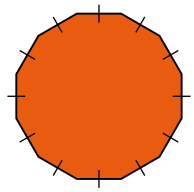


7 The list shows the seven interior angles of a heptagon.
One of the angles is hidden. What is the size of this angle?

150° 128° 136° 143° [redacted] 124° 67°

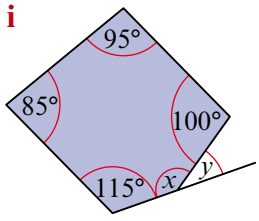
explanation 3a explanation 3b

8 This question is about the formula $(n - 2) \times 180°$.

a Explain what the formula works out.

b For each polygon, use the formula to calculate the size of angle x, then work out the size of angle y.

i



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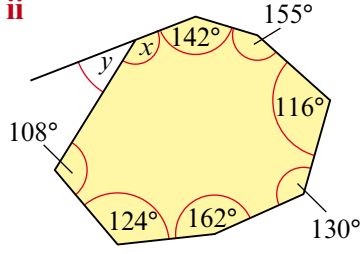

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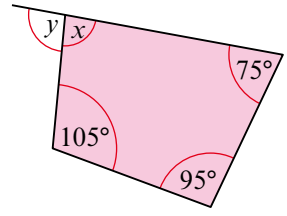


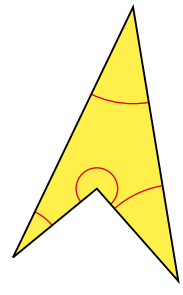
9 Paul and Tamin are investigating concave polygons.

Paul wonders if the formula $(n - 2) \times 180°$ will work for the interior angles of a concave quadrilateral.

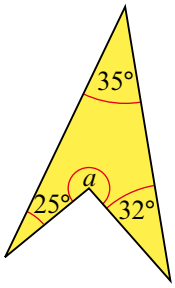
Tamin suggests dividing the shape into two triangles with a dotted line.

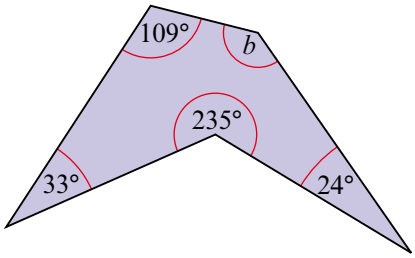
Does the formula work for a concave quadrilateral?

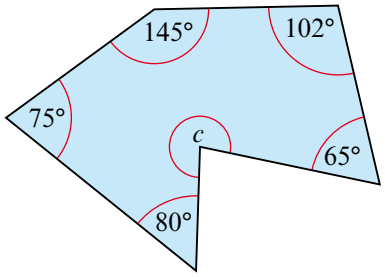
Explain your answer.



10 Find the size of angles a, b and c.







11 Use the formula $(n - 2) \times 180°$ to help you find the interior angle of these.

a a regular decagon

b a regular 16-sided polygon

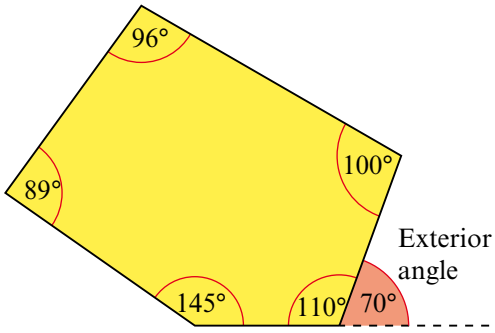
12 **a** Use the formula $(n - 2) \times 180°$ to find the sum of the interior angles of a heptagon.

b Find the interior angle of a regular heptagon.

c Use a protractor and ruler to draw a regular heptagon with sides 4 cm.

explanation 4a | explanation 4b | explanation 4c | explanation 4d

13 The diagram shows the five interior angles of a pentagon and one of its exterior angles.



a Sketch the pentagon and label all the exterior angles.

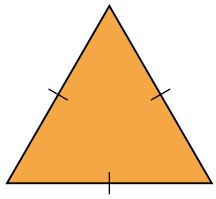
b Add up the five exterior angles and comment on your answer.

14 The diagram shows three polygons.

i Sketch each shape and label the exterior angles.

ii Check that the exterior angles total 360°.

a



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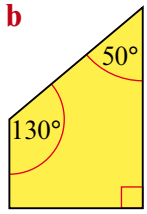

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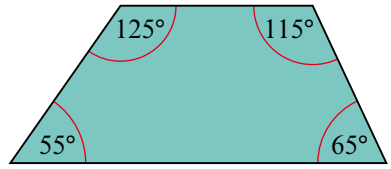
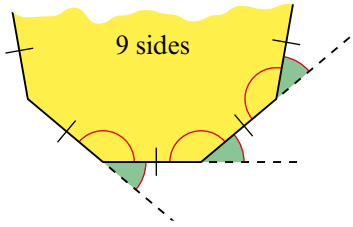


15 The diagrams show parts of regular polygons. For each diagram, calculate the exterior angle first and then find the interior angle.

a



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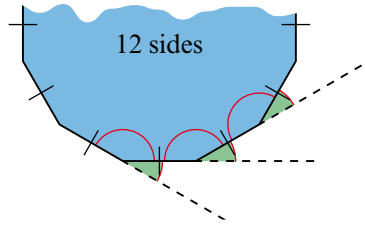

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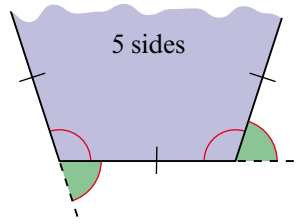


16 Explain two different ways of finding the interior angle and the exterior angle of a regular hexagon.

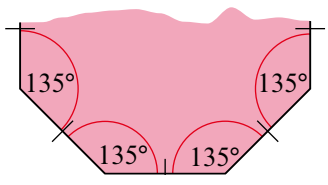
17 **a** Write the properties of a regular polygon.

b When the number of sides of a regular polygon increases, what happens to size of the interior angles?

c The diagrams show parts of regular polygons with their interior angles.

Which of these polygons has the greatest number of sides?

i



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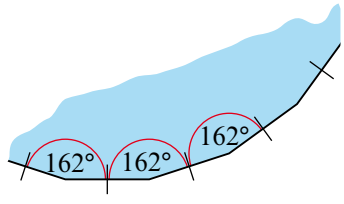

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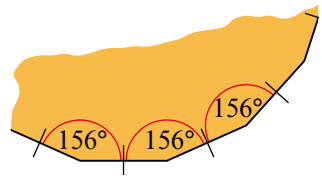


d Find the number of sides of each polygon shown in **c**.

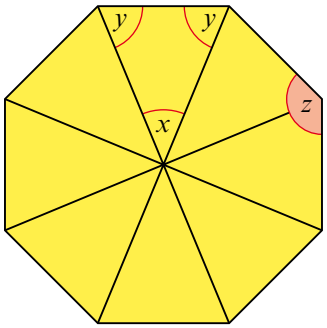
18 **a** A regular polygon has interior angles of 165°. How many sides does it have?

b A regular polygon has interior angles of 168°. How many sides does it have?

c A regular polygon has interior angles of 171°. How many sides does it have?

explanation 5a | explanation 5b | explanation 5c | online

19 The diagram shows a regular octagon. Complete the statements.



a Angle x is _____ because _____

_____

b Angle y is _____ because _____

_____

c Angle z is _____ because _____

_____

20 The diagram below shows two regular pentagons.

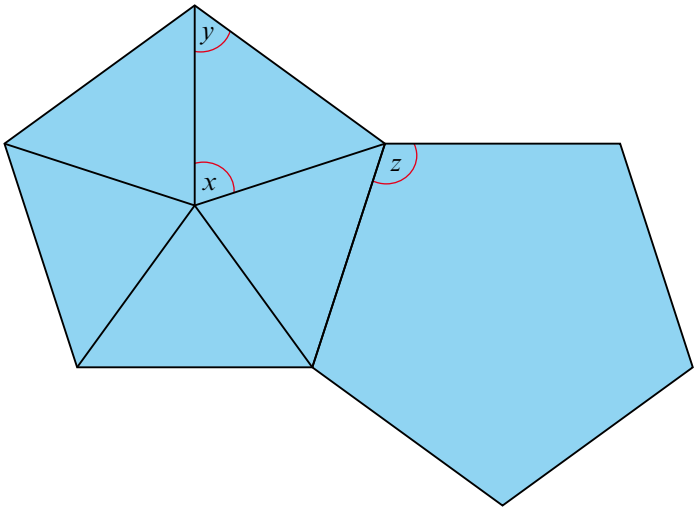
a Priya says that you divide 360° by 5 to find the size of angle x. Is this true?

b Find the size of angle x.

c Why is the triangle containing the angles x and y *not* an equilateral triangle?

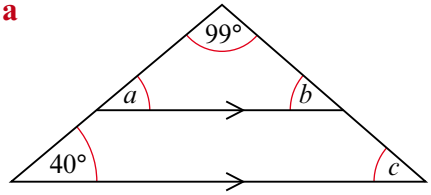
d Explain how to find the size of angle y.

e Find the size of angle z.



21 Find the angles labelled with letters. Give reasons for your answers.

a



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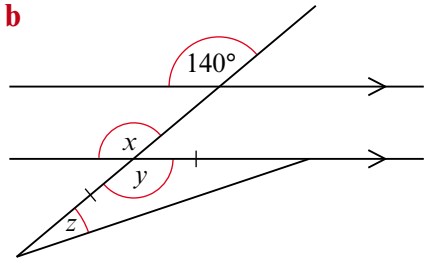

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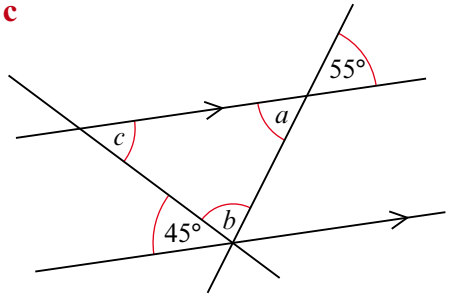


22 ABCD is a quadrilateral.

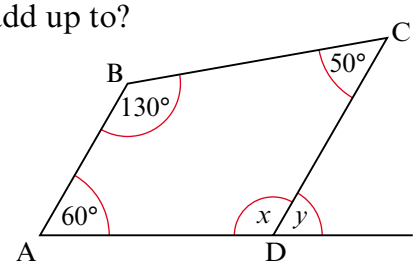
a What do the angles inside a quadrilateral add up to?

b Find angle x.

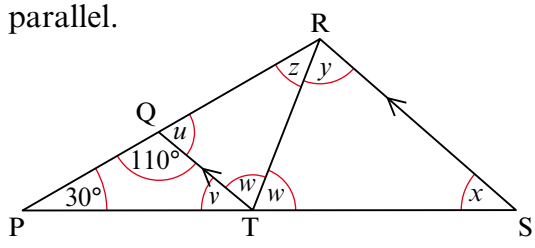
c Find angle y.

d Is the line DC parallel to AB?

e What are the angles BAD and y called?



23 The lines TQ and SR are parallel.



a Find angle v.

b The line TR cuts the angle QTS in half. Each part is labelled w. Find angle w.

c Find angle x.

d Find angle u.

e Find angle z.

f Find angle y.

g What do the triangles QRT and TRS have in common?