

Varied Fluency – Angles in Polygons

National Curriculum Objectives:

Mathematics Year 6 (6G2a) [Compare and classify geometric shapes based on their properties and sizes](#)

Mathematics Year 6: (6G4a) [Find unknown angles in any triangles, quadrilaterals and regular polygons](#)

Mathematics Year 6: (6G4b) [Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles](#)

Differentiation:

Developing Questions to support finding angles in polygons or angles on a straight line (triangles or straight lines identified for children on shapes and some angles given.)

Expected Questions to support finding angles in polygons, angles on a straight line or at a point (triangles or straight lines identified for children on shapes.)

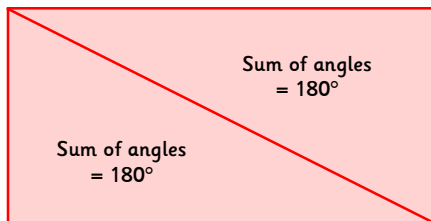
Greater Depth Questions to support finding angles in polygons, angles on a straight line, angles at a point and vertically opposite angles (children expected to independently split shapes into triangles, find straight lines and opposite angles.)
Include irregular polygons?

More [Year 6 Properties of Shapes](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

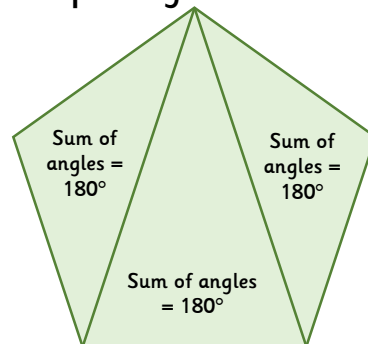
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1a. This rectangle is split into 2 triangles. The sum of the angles in each triangle is 180° . Use this to help you work out the sum of all of the interior angles in the rectangle.



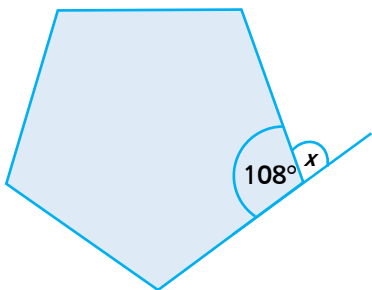
VF

1b. This pentagon is split into 3 triangles. The sum of the angles in each triangle is 180° . Use this to help you work out the sum of all of the interior angles in the pentagon.



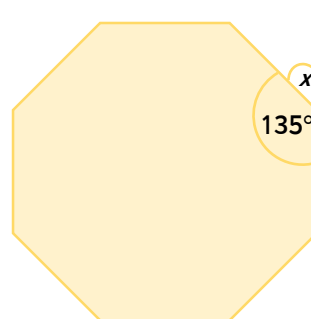
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2a. The sum of angles on a straight line is 180° . Use this to help you to work out the size of an exterior angle (x) in this pentagon.



VF

2b. The sum of angles on a straight line is 180° . Use this to help you to work out the size of an exterior angle (x) in this octagon.



VF

3a. Each interior angle of a regular polygon is 90° . The sum of its interior angles is 360° . What is its name?



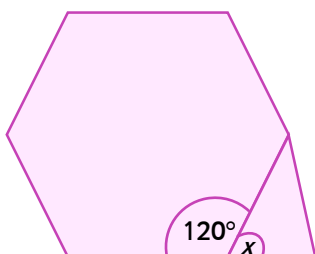
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3b. Each interior angle of a regular polygon is 60° . The sum of its interior angles is 180° . What is its name?



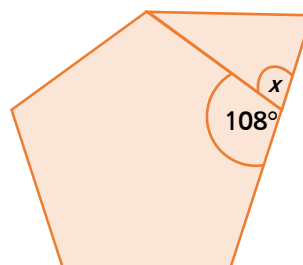
VF

4a. Use your understanding of the sum of angles on a straight line to help you calculate the size of angle x .



VF

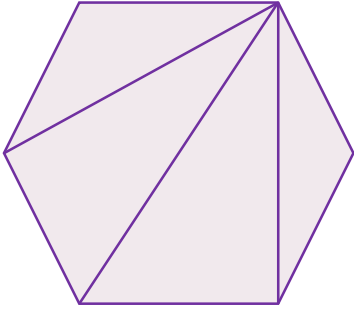
4b. Use your understanding of the sum of angles on a straight line to help you calculate the size of angle x .



VF

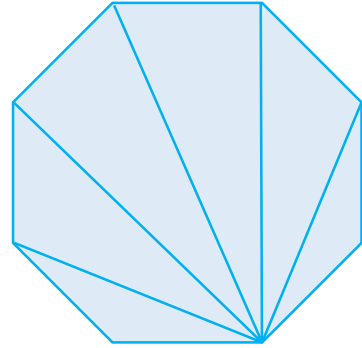
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5a. This hexagon is split into 4 triangles. Think about the sum of the angles in each triangle. Use this to help you work out the sum of the interior angles in the hexagon.



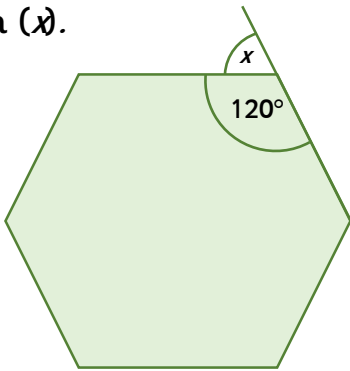
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5b. This octagon is split into 6 triangles. Think about the sum of the angles in each triangle. Use this to help you work out the sum of the interior angles in the octagon.



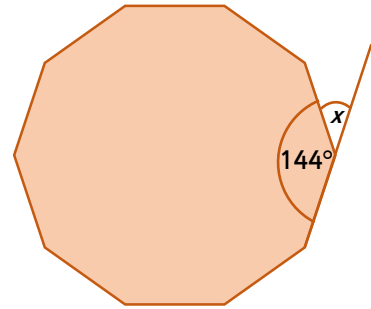
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6a. Think about the sum of angles on a straight line. Use this to help you to work out the exterior angle in this hexagon (x).



VF

6b. Think about the sum of angles on a straight line. Use this to help you to work out the exterior angle in this decagon (x).



VF

7a. The sum of the angles in a polygon is 360° . What is the name of the polygon?



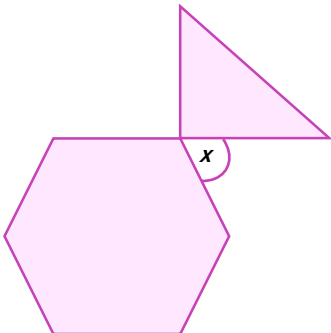
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7b. The sum of the angles in a regular polygon is 540° . What is the name of the polygon?



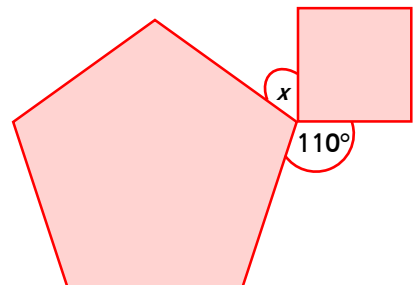
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8a. Use your understanding of interior angles of a polygon and angles at a point to help you calculate the size of angle x .



VF

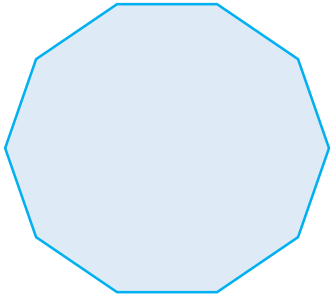
8b. Use your understanding of interior angles of a polygon and angles at a point to help you calculate the size of angle x .



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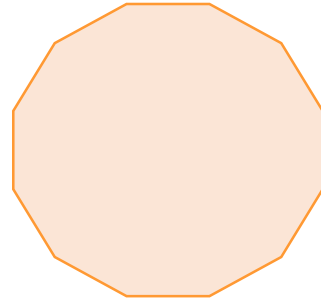
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9a. Split the decagon below into triangles. Think about the sum of the angles in each triangle. Use this to help you work out the sum of the interior angles in the decagon.



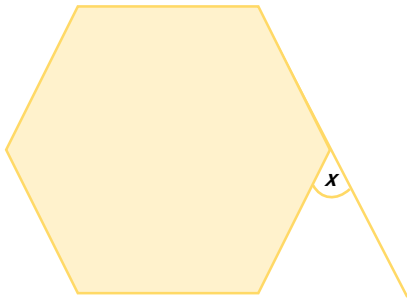
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9b. Split the dodecagon below into triangles. Think about the sum of the angles in each triangle. Use this to help you work out the sum of the interior angles in the dodecagon.



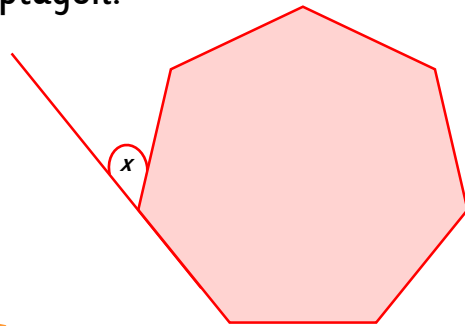
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10a. Use what you know about angles to find the size of angle x . Then find the sum of all exterior angles of a hexagon.



VF

10b. Use what you know about angles to find the size of angle x . Then find the sum of all exterior angles of a heptagon.



VF

11a. Each interior angle of a regular polygon is 108° . Work out the name of the polygon.



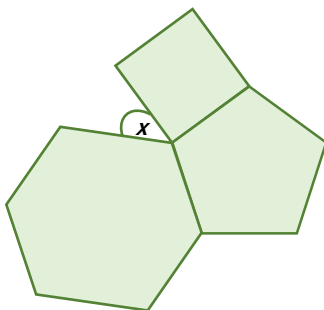
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11b. Each interior angle of a regular polygon is 140° . Work out the name of the polygon.



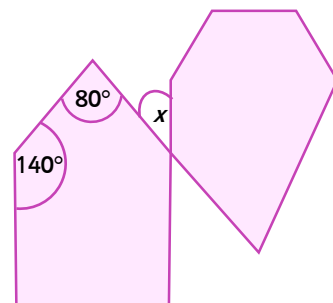
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12a. Use your understanding of angles to help you calculate the size of angle x .



VF

12b. Use your understanding of angles to help you calculate the size of angle x .



VF

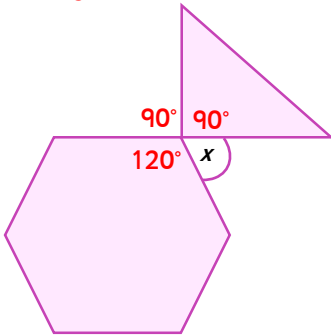
Varied Fluency – Angles in Polygons

Developing

- 1a. $180^\circ \times 2 = 360^\circ$
1b. $180^\circ \times 3 = 540^\circ$
2a. $180^\circ - 108^\circ = 72^\circ$
2b. $180^\circ - 135^\circ = 45^\circ$
3a. $360^\circ \div 90 = 4$. The shape has 4 sides and as is regular, it must be a square.
3b. $180^\circ \div 60 = 3$. The shape has 3 sides and as is regular, it must be an equilateral triangle.
4a. $180^\circ - 120^\circ = 60^\circ$. $x = 60^\circ$.
4b. $180^\circ - 108^\circ = 72^\circ$. $x = 72^\circ$.

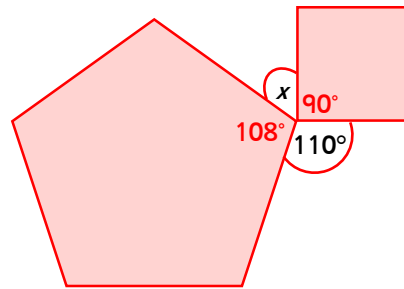
Expected

- 5a. $180^\circ \times 4 = 720^\circ$
5b. $180^\circ \times 6 = 1080^\circ$
6a. $180^\circ - 120^\circ = 60^\circ$. $x = 60^\circ$.
6b. $180^\circ - 144^\circ = 36^\circ$. $x = 36^\circ$.
7a. It could be any quadrilateral.
7b. Pentagon.
8a.



$$120^\circ + 90^\circ + 90^\circ = 300^\circ. 360^\circ - 300^\circ = 60^\circ$$
$$x = 60^\circ$$

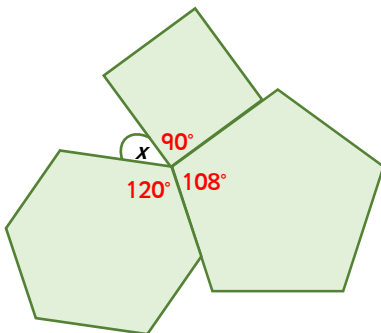
8b.



$$108^\circ + 110^\circ + 90^\circ = 308^\circ. 360^\circ - 308^\circ = 52^\circ$$
$$x = 52^\circ$$

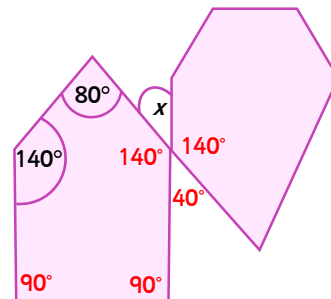
Greater Depth

- 9a. A decagon can be split into 8 triangles. $180^\circ \times 8 = 1440^\circ$.
9b. A dodecagon can be split into 10 triangles. $180^\circ \times 10 = 1800^\circ$.
10a. The interior angle of a hexagon is 120° . $180^\circ - 120^\circ = 60^\circ$. $x = 60^\circ$.
10b. The interior angle of a heptagon is 128.6° (rounded to one decimal place). $180^\circ - 128.6^\circ = 51.4^\circ$. $x = 51.4^\circ$.
11a. Pentagon.
11b. Nonagon.
12a.



$$120^\circ + 90^\circ + 108^\circ = 318^\circ.$$
$$360^\circ - 318^\circ = 42^\circ. x = 42^\circ$$

12b.



$$140^\circ + 140^\circ = 280^\circ. 360^\circ - 280^\circ = 80^\circ.$$
$$80^\circ \div 2 = 40^\circ.$$