WALT: Investigate the interior angles of polygons

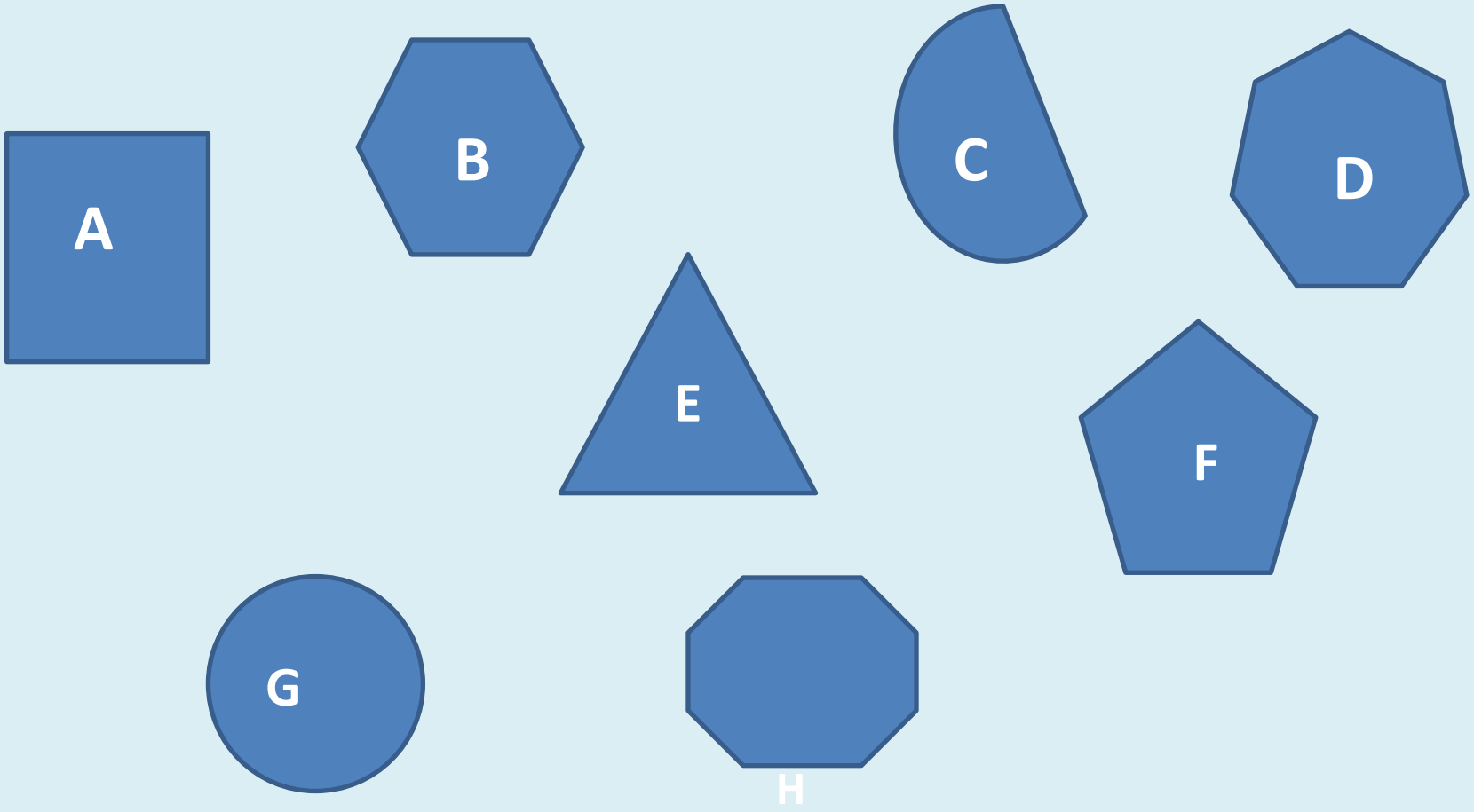
WILF:

I can recognise quadrilaterals and polygons.

I can calculate missing angles

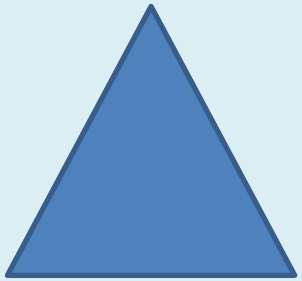
I can investigate a formula

Which shapes are polygons?

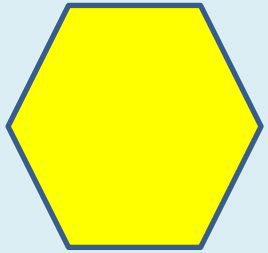


Polygons are 2d shapes with at least 3 straight sides.

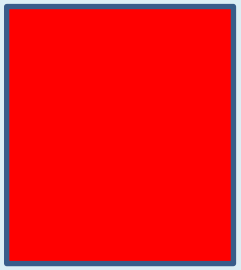
Regular polygons have **equal length sides** and **equal angles** such as …



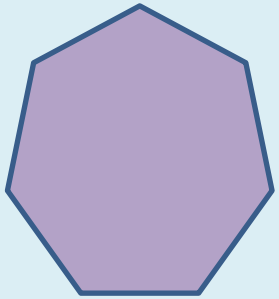
Triangle
3 sides



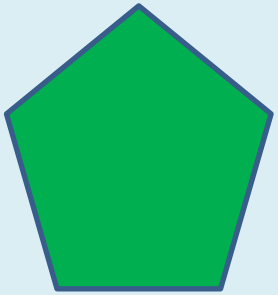
Hexagon
6 sides



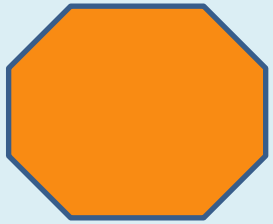
Quadrilateral
4 sides



Heptagon
7 sides



Pentagon
5 sides



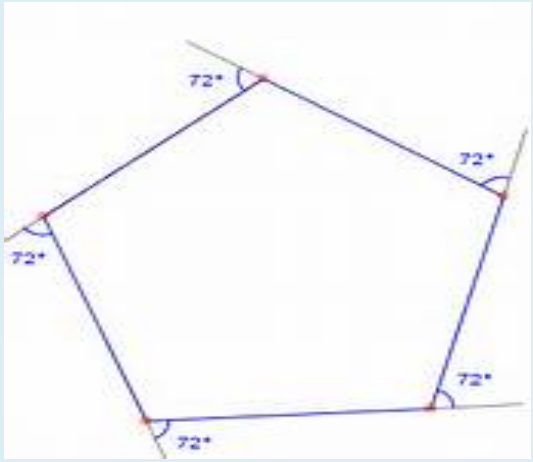
Octagon
8 sides

Polygons are **straight-sided** shapes.

A regular polygon has equal sides and equal interior angles.

- What are interior angles?

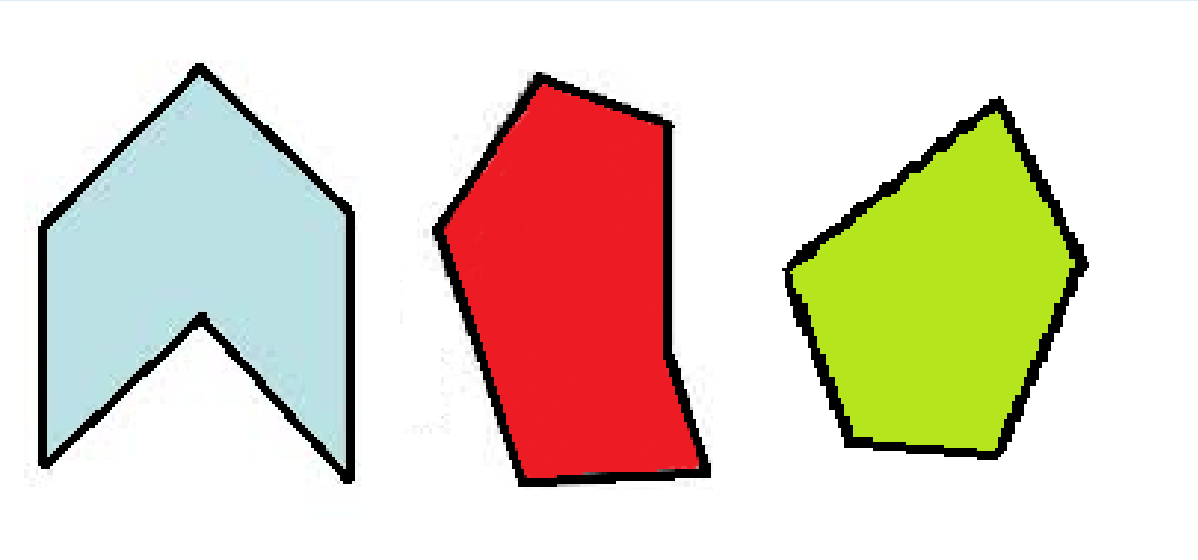
They are the angles inside a shape.



Exterior angles are on the outside (the bit left over).

What is an irregular polygon?

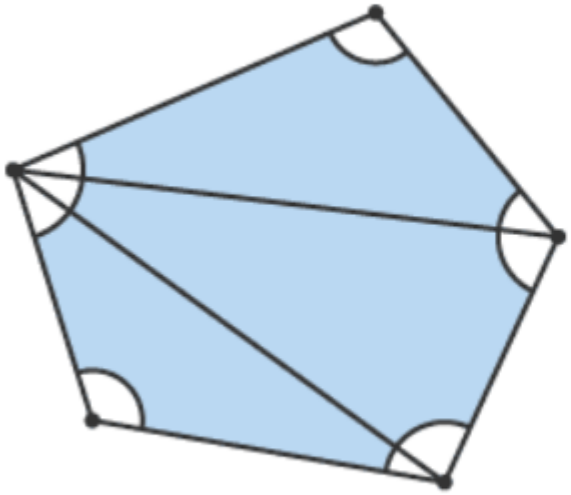
- Irregular polygons have at least 1 side or angle that's different in size.

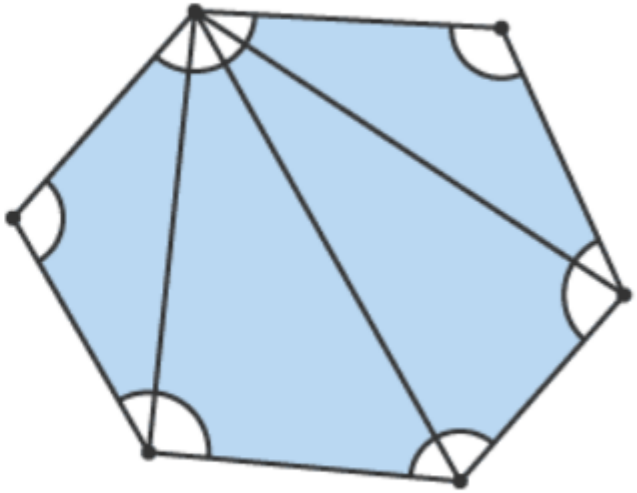


Finding the total internal angle of a polygon

Interior angles of polygons

To find the sum of interior angles in a polygon divide the polygon into triangles.



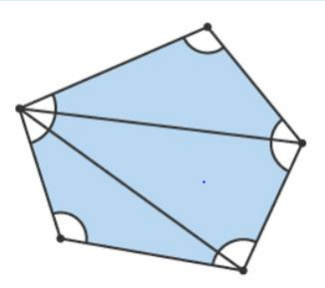


The sum of interior angles in a triangle is 180°. To find the sum of interior angles of a polygon, multiply the number of triangles in the polygon by 180°.

TASK: Finding the total internal angle of a polygon

Example: Calculate the sum of interior angles in a **pentagon**.

- Draw a pentagon and the number of triangles (3).



- The sum of the interior angles is: 3 x 180= **540°**
- Angles in a **regular pentagon** = 540 ÷ 5 =

Task: Using the method above, calculate the total interior angle of each polygon:

Quadrilateral / Hexagon / Heptagon / Octagon

TASK: Finding the total internal angle of a polygon

You may have noticed that the number of triangles in each polygon is two less than the number of sides.

We can therefore use this formula to work out the total internal angle of a polygon:

$$(\text{Number of sides} - 2) \times 180$$

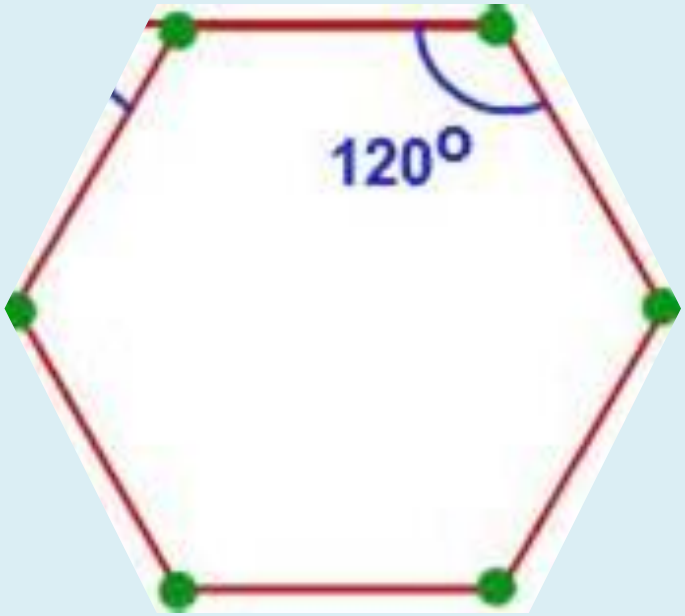
$$(N - 2) \times 180$$

Try this with a triangle and then a quadrilateral. Does this formula work?

Now try with a pentagon, hexagon .

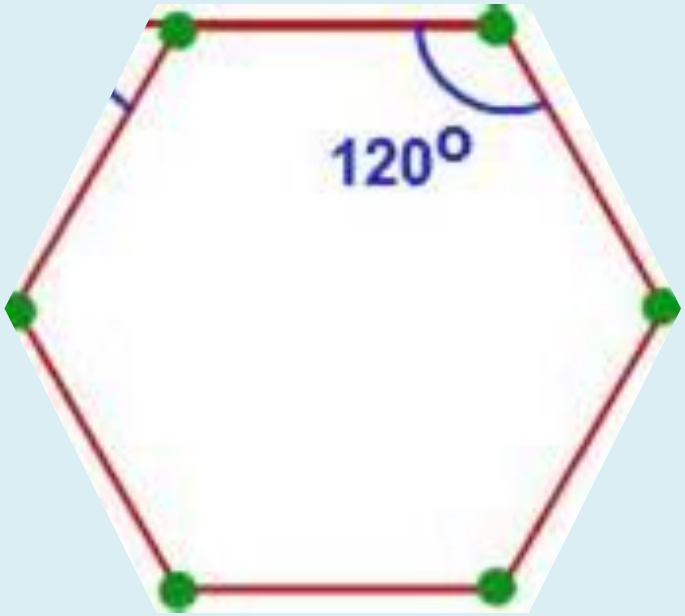
How can we calculate the angles in this regular hexagon?

- Discuss in pairs

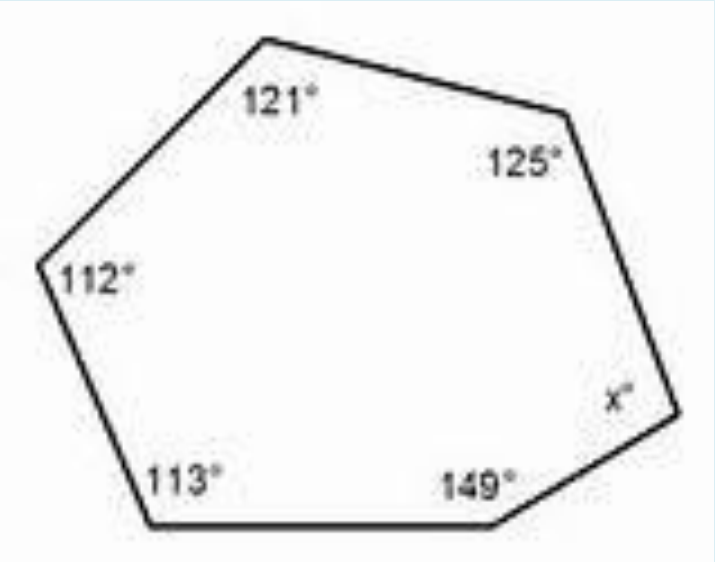


How can we calculate the angles in this regular hexagon?

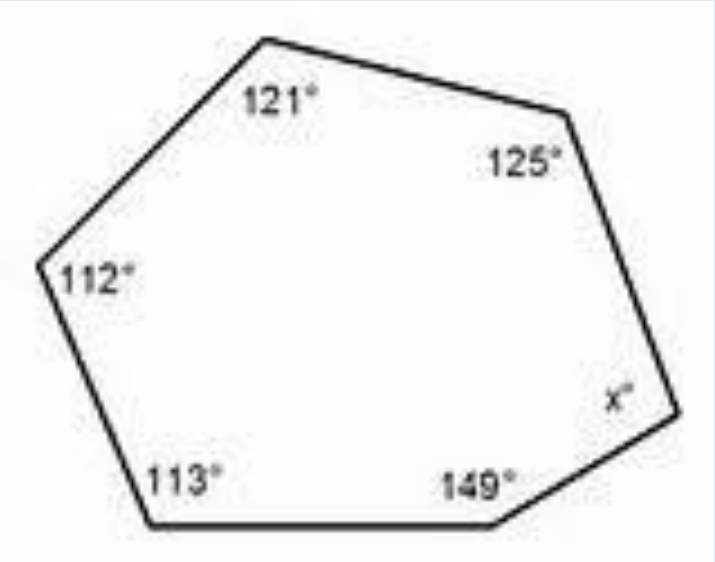
- All the angles are 120 degrees because it is a **regular** hexagon, so they are all the same.



Work out the missing angle in this polygon using the formula.



Work out the missing angle in this polygon using the formula.



Formula = 6 – 2 = 4 x 180 = 720

known angles = 112+113+149+125+121 = 620

720 – 620 =**100 degrees**

Reasoning question

James says that the interior angles in a pentagon add up to 550°. Is he correct? Explain your answer.

Reasoning question

James says that the interior angles in a pentagon add up to 550°. Is he correct? Explain your answer.

James is incorrect – the total interior angles of a pentagon equal 540°. I know this because I can split a pentagon into 3 triangles and a triangle angles total 180°. 3 x 180° = 540°.

Plenary

True or false

Quadrilaterals are rectangles or squares.

Polygons are straight sided shapes.

The interior angles in a polygon add up to 360°

The formula for finding the total internal angles in a polygon is n – 3 x 180

Plenary

True or false

Quadrilaterals are rectangles or squares. False. They are four sided shapes.

Polygons are straight sided shapes. True

The interior angles in a polygon add up to 360° False. The angles in quadrilateral add up to 360°

The formula for finding the total internal angles in a polygon is n – 3 x 180 False. It's n-2 x 180.