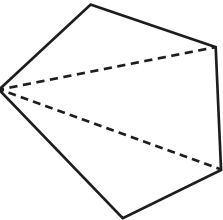


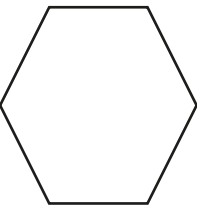
Understand and use the sum of the interior angles in any polygon

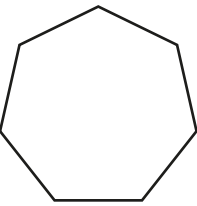
1 The sum of the interior angles of a triangle is 180° .

Split the polygons into triangles to work out the sum of their interior angles. Your lines should not overlap.

The first one has been done for you.

a)  number of sides = 5
number of triangles = 3
 $3 \times 180 = 540$
The sum of the interior angles of a pentagon is 540° .

b)  number of sides = 6
number of triangles = 4
 $4 \times 180 = 720$
The sum of the interior angles of a hexagon is 720° .

c)  number of sides = 7
number of triangles = 5
 $5 \times 180 = 900$
The sum of the interior angles of a heptagon is 900° .

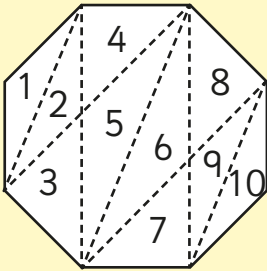
What do you notice about the number of sides compared to the number of triangles?

2 Complete the table.

Shape	Number of sides	Number of triangles	Sum of interior angles
quadrilateral	4	2	360°
pentagon	5	3	540°
nonagon	9	7	$1,260^\circ$
decagon	10	8	$1,440^\circ$
hexagon	6	4	720°
octagon	8	6	$1,080^\circ$
dodecagon	12	10	$1,800^\circ$

Compare answers with a partner.

3 Aisha is working out the sum of the interior angles of a polygon. Here are her workings.



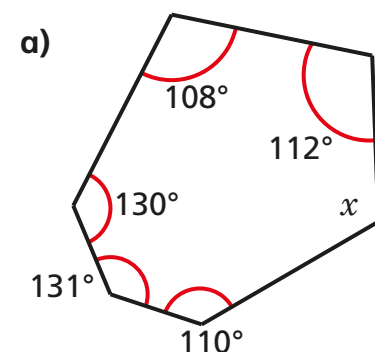
$10 \times 180 = 1,800^\circ$

Do you agree with Aisha? No

Explain your answer.

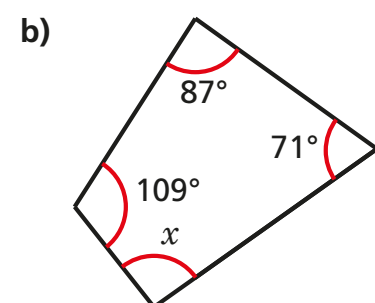
Her lines overlap and they shouldn't.

- 4 Work out the sum of the interior angles for each polygon.
Then work out the sizes of the unknown angles.



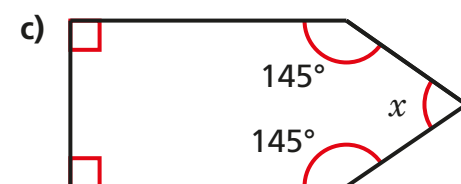
sum of interior angles = 720°

$x = 129^\circ$



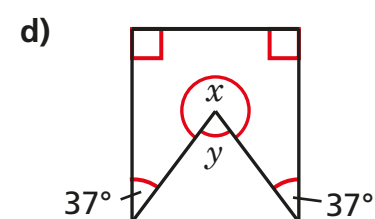
sum of interior angles = 360°

$x = 93^\circ$



sum of interior angles = 540°

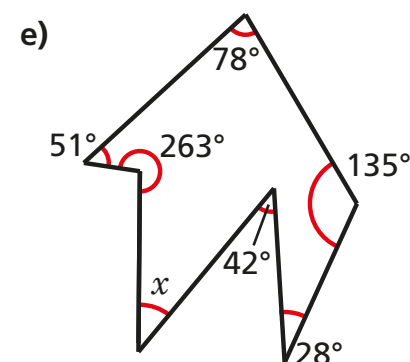
$x = 70^\circ$



sum of interior angles = 540°

$x = 286^\circ$

$y = 74^\circ$



sum of interior angles = 900°

$x = 27^\circ$

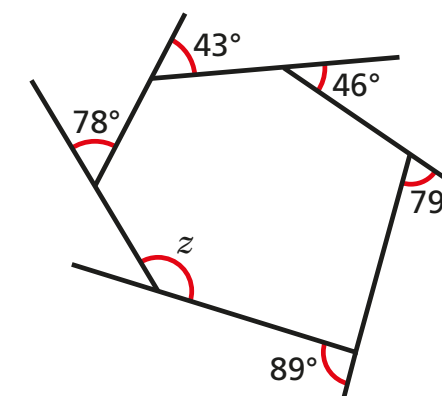
- 5 A polygon has n sides.
- a) Write an expression in terms of n for the number of triangles inside the shape.

$n-2$

- b) Write an expression in terms of n for the sum of the interior angles of the polygon.

$180(n-2)$

- 6 Here is an irregular hexagon.



- a) Work out the size of angle z

$z = 155^\circ$

- b) Did you use rules of interior angles or exterior angles?
Circle your answer

interior

exterior

Compare with a partner. Did they work it out the same way?