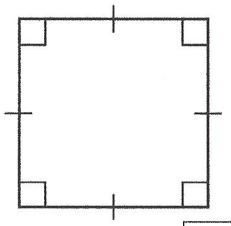
Angles in special ~~quadrilaterals~~ ~~special quadrilaterals~~ quadrilaterals

White Rose Maths

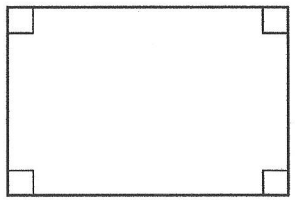
1 Work out the sum of the angles in each shape.

a)



360

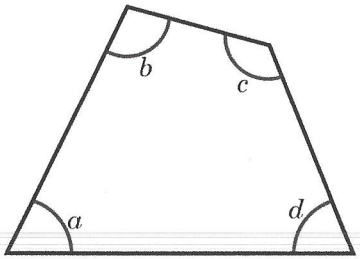
b)

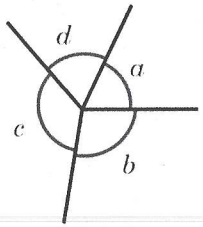


360

What do you notice? only right angles. Both add up to 360°

2 The diagrams show the four vertices of a quadrilateral arranged around a point.





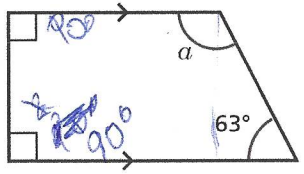
What do the diagrams illustrate about the sum of the angles in a quadrilateral?

Complete the sentence.

Angles in a quadrilateral add up to 360°.

3 Work out the size of the unknown angle in each trapezium.

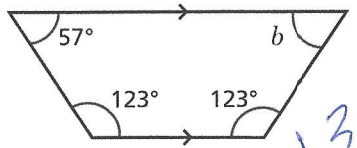
a)



180 − 360
63 243
243 117
1

a = 117°

b)



132
132
57
321
1

360 − 321 = 39

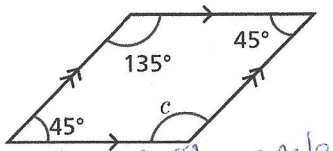
b = 39°

c) What is the same and what is different about the trapeziums?

They both have angles that add to 360°. They have different sized angles.

4 Work out the sizes of the unknown angles.

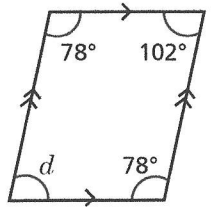
a)



c is the opposite angle of 135°

c = 135°

b)



204
156
360 − 360 = 102°

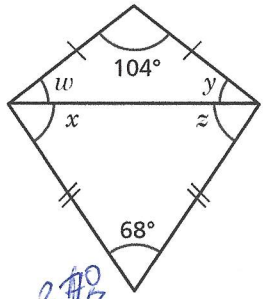
d = 102°

c) What do you notice about opposite angles in a parallelogram?

They have the same angles.

5 Two isosceles triangles are joined to form a kite.

a) Work out the sizes of the unknown angles.



$w =$ [ ] $y =$ [ ] $x =$ [56°] $z =$ [56°]

b) Work out $w + x$.

[ ] 94°

c) Work out $y + z$.

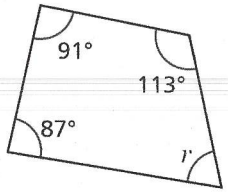
[ ] 94°

What do you notice? Talk about it with a partner.

In a isosceles triangle two angles are ~~eq~~ equal.

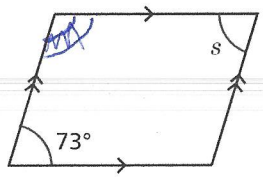
6 Work out the sizes of the unknown angles.

a)



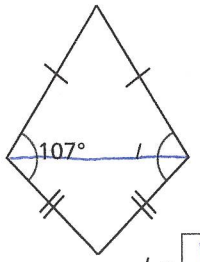
$r =$ [69°]

b)



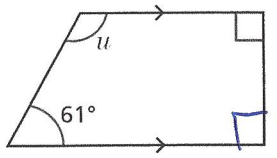
$s =$ [73°]

c)



$l =$ [107°]

d)



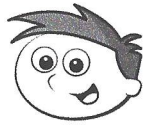
$u =$ [119°]

Opposite sides are parallel therefore therefore both angles are 90°

~~Compare your reasoning with a partner.~~

There are two isosceles triangles and that means the opposite angles are the same.

7 Teddy is drawing a quadrilateral.



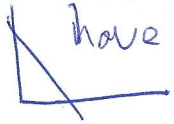
My quadrilateral has exactly three right-angles.

Is Teddy's quadrilateral possible? NO

Explain your answer.

~~Because if you~~ did this ~~you would have 4 but the closest you can get is~~, must

Also if you have 3 right angles you ~~will~~ have a 4th one.



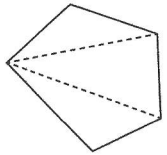
Angles in regular polygons.

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)



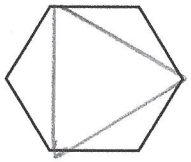
number of sides = 5

number of triangles = 3

3 × 180 = 540

The sum of the interior angles of a pentagon is 540°

b)



number of sides = 6

number of triangles = 4

4 × 180 = 540

The sum of the interior angles of a hexagon is 540°

c)

number of sides = 7

number of triangles = 5

5 × 180 = ~~900~~ 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 more sides than 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	1260
decagon	10	8	1440
hexagon	6	4	720
Octagon	8	6	1080
Dodecagon	12	10	1,800°

Compare answers with a partner.

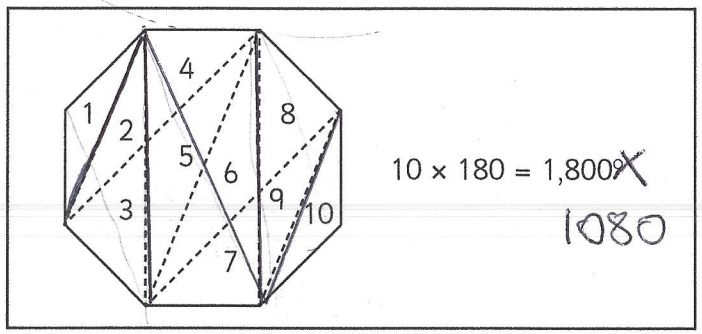
×360, 4, 1440, 12

180 | 1800 → 010

60 | 1800 → 030

3 Dani is working out the sum of the interior angles of a polygon.

Here are her workings.



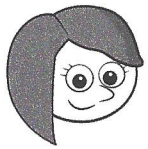
10 × 180 = 1,800 ~~?~~ 1080

Do you agree with Dani? No

Explain your answer. No because they overlap.

4 Rosie, Amir and Eva are drawing polygons.

a)



Rosie

I have split my polygon into four triangles.

What polygon has Rosie drawn?

Hexagon

b)

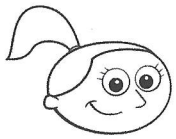
The sum of the interior angles of my polygon is 1,080°.

Amir

What polygon has Amir drawn?

Octagon

c)



Eva

My polygon has more sides than Rosie's but fewer than Amir's.

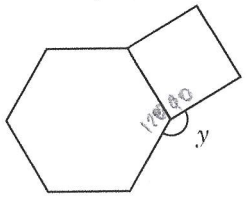
What is the sum of the interior angles of Eva's polygon?

900

5 Each compound shape is made up of regular polygons.

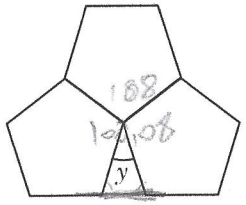
Work out angle y in each case.

a)



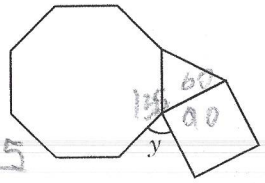
$y = 150°$

b)



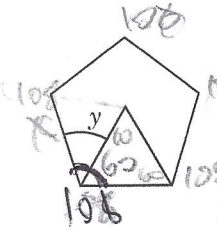
$y = 36°$

c)



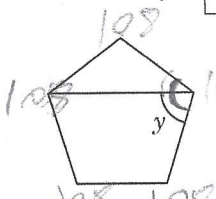
$y = 75°$

d)



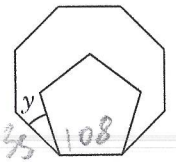
$y = 48°$

e)



$y = 72$

f)



$y = 27°$