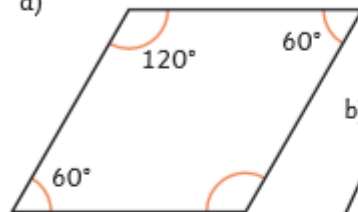




- 1) Give the missing angle in each of these quadrilaterals. Explain how you found your answer. Is there a way to find the angles in some of the shapes without having to carry out a calculation?

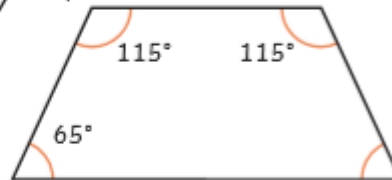


a)

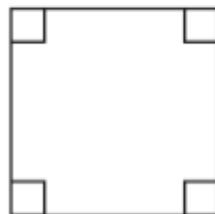


Not to scale

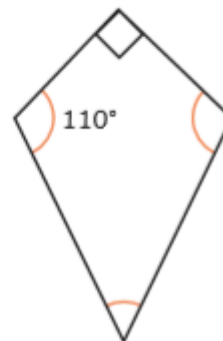
b)



c)



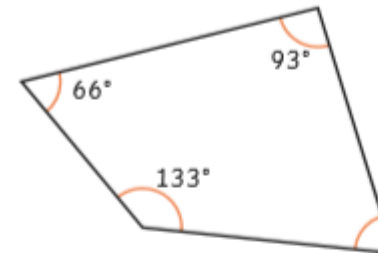
d)



- 2) Calculate the missing angles in each of these quadrilaterals.

Not to scale

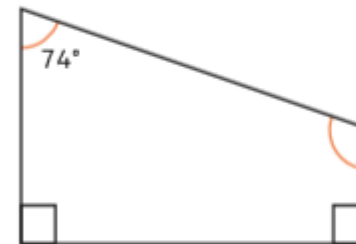
a)



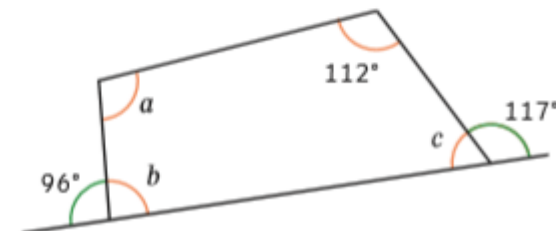
b)



c)

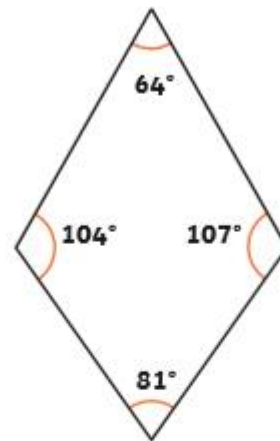


d)



Important note: quadrilaterals are not drawn to scale, do not use a protractor.

- 1) Monika measured the angles in this kite shape with a protractor and labelled it with the angles she found.



Not to scale

Leo says, "Without measuring the angles myself, I think I have found two reasons to prove Monika hasn't measured the angles correctly."

Which two reasons do you think Leo has found to explain how he knows that Monika has not measured the angles correctly in the kite? Explain your answer fully.

- 2) In a quadrilateral, two of the angles measure 17° and 84° .

Which of the following could be the pair of angles that is missing?

90° and 123° 66° and 35°

147° and 112° 160° and 87°



- 3) Which of these sets of angles could belong to a parallelogram? Which could not? Explain your answer fully.



- a) 71° , 72° , 108° , 109°
- b) 100° , 100° , 80° , 80°
- c) 128° , 128° , 51° , 51°

Important note: quadrilaterals are not drawn to scale, do not use a protractor.

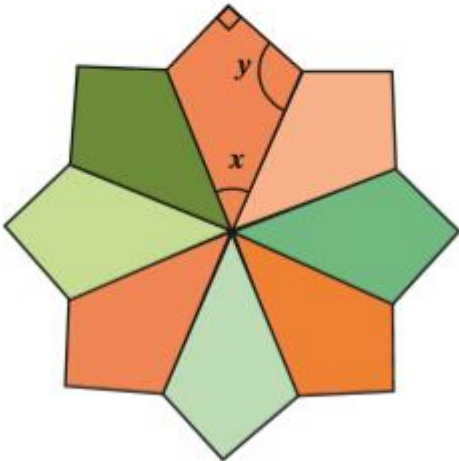


- 1) A quadrilateral has an angle of 126° . All of the other angles are equal.

What does each of the other angles measure?

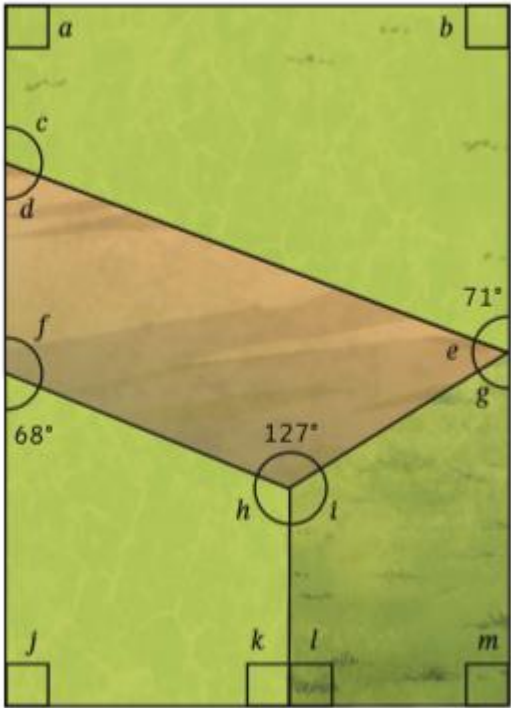


- 2) This tessellating picture is made from kite quadrilateral shapes.




Calculate the value of angles x and y . Explain how you worked each angle out.

- 3) A gardener is splitting his garden up into differently sized plots of land using fences. Calculate the value of all of the missing angles to show the gardener at what angle each of his fences needs to be put up to split the land correctly.



Important note: quadrilaterals are not drawn to scale, do not use a protractor.

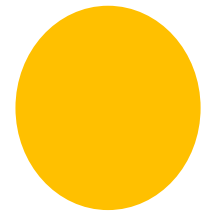
ANSWERS

- 
- 1) a) Rhombus: 120° - Can be found by understanding that opposite angles are equal.
b) Isosceles Trapezium: 65° - Can be found by understanding that the base angles are equal.
c) Square: 90° - Can be found by understanding that all angles in a square are right angles.
d) Kite: 110° and 50° - 110° can be found by understanding that diagonally opposite angles are equal in a kite. 50° can be found by: $360^\circ - (90^\circ + 110^\circ + 110^\circ)$.
- 2) a) 68°
b) Both missing angles are 138°
c) 106°
d) a) 101°
b) 84°
c) 63°

- 1) The first reason is that angles in a quadrilateral add to 360° and the angles in this kite add to 356° .

The second reason is that opposite angles in this kite shape are equal but Monika's angle measurements are not equal.

- 2) 147° and 112° are the missing angles.
- 3) a) Could not belong to the parallelogram as there is not two sets of equal angles.
b) Could belong to the parallelogram as the angles add to 360° and it has two sets of equal angles.
c) Could not belong to the parallelogram as the angles add to 358° not 360° .



1) Each of the angles will measure 78° .

2) Angle $x = 45^\circ$

There are 8 kites therefore angle x can be worked out using understanding that angles around a point add to 360° and by then using the calculation:

$$360^\circ \div 8 = 45^\circ$$

$$\text{Angle } y = 112.5^\circ$$

$$360^\circ - (45^\circ + 90^\circ) = 245^\circ$$

$$245^\circ \div 2 \text{ (as the kite has equal, diagonally opposite angles)} = 112.5^\circ$$

3) All missing angles can be worked out from using the three angles that are given and the right angles.

$$a = 90^\circ \quad h = 112^\circ$$

$$b = 90^\circ \quad i = 121^\circ$$

$$c = 109^\circ \quad j = 90^\circ$$

$$d = 71^\circ \quad k = 90^\circ$$

$$e = 50^\circ \quad l = 90^\circ$$

$$f = 112^\circ \quad m = 90^\circ$$

$$g = 59^\circ$$

