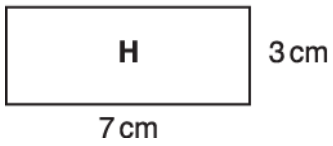
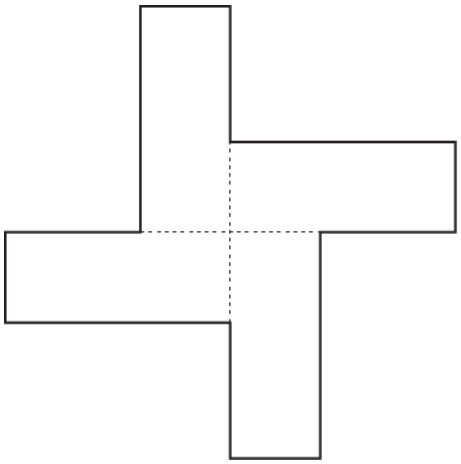
1. Rectangle **H** has length 7 cm and width 3 cm.



Not to scale

This shape is made from four rectangles each of which is identical to **H**.



Not to scale

(i) How many lines of symmetry does this shape have?

_____

[1]

(ii) What is the order of rotation symmetry of this shape?

_____

[1]

(iii) What is the perimeter of this shape?

_____ cm

[3]

2(a). Nico reads this description of a quadrilateral to Emma.

- Opposites sides are equal
- Opposite angles are equal
- The diagonals bisect at 90° but are not equal

Emma says “This quadrilateral is a square”.

Explain why she is wrong.

---

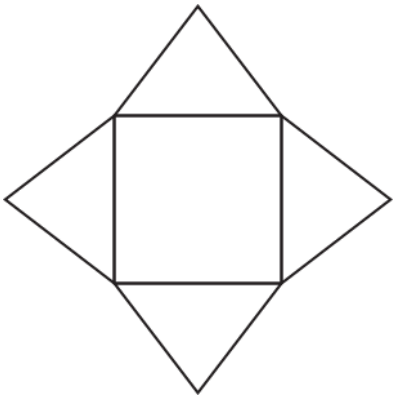
[1]

(b). What is the correct name of this quadrilateral?

---

[1]

3(a). The shape shown consists of four equilateral triangles and a square.



Not to scale

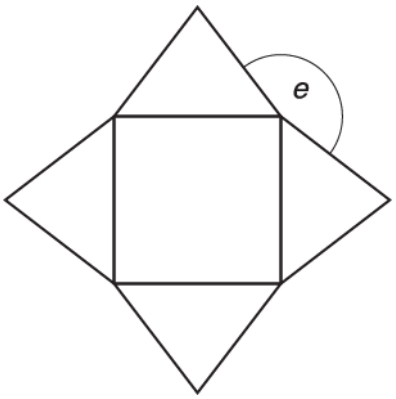
(i) Write down the order of rotational symmetry of the shape.

(i)_____ [1]

(ii) On the shape above, draw all the lines of symmetry.

[1]

(iii) Work out the size of angle *e*.



Not to scale

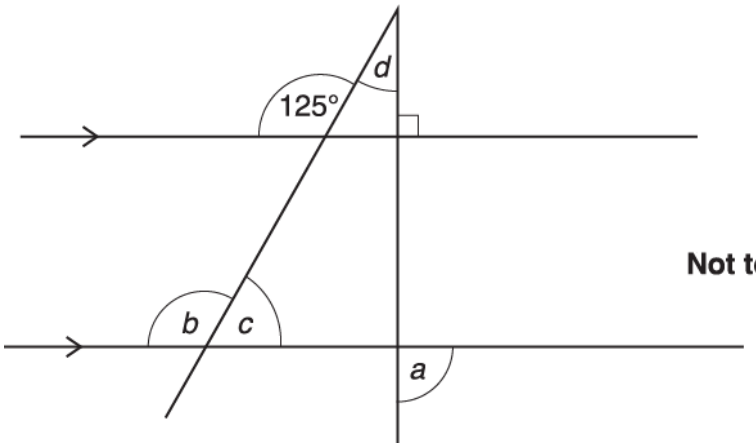
(iii)_____ ° [3]

(b). Select the mathematical name of a quadrilateral that has four equal sides but **is not** a square. Draw a ring around the correct answer.

Rectangle Parallelogram Trapezium Rhombus Kite

[1]

4. This diagram shows two parallel lines with two lines crossing them.



Not to scale

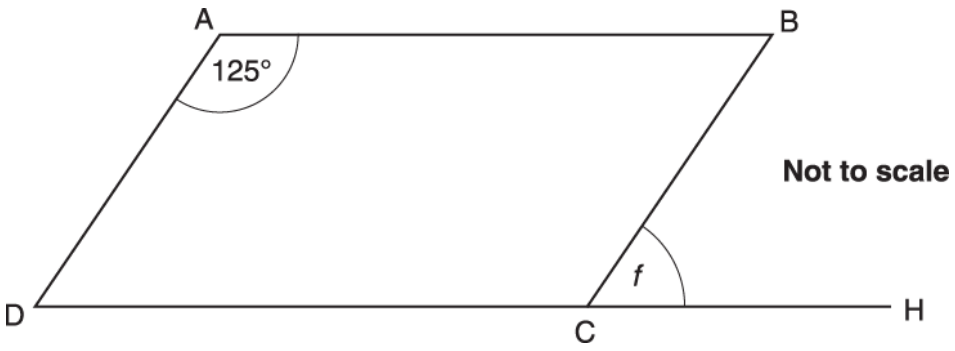
Find the size of

angle *d*.

_____° [3]

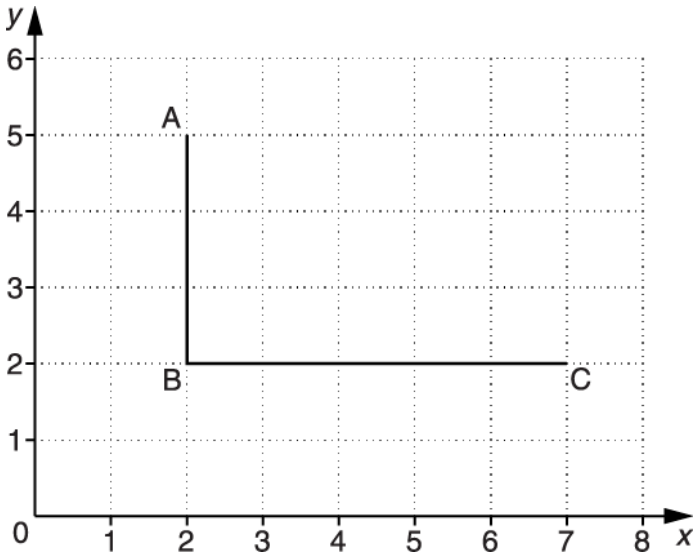
5. ABCD is a parallelogram and DCH is a straight line.

Work out angle *f*.



_____ ° [2]

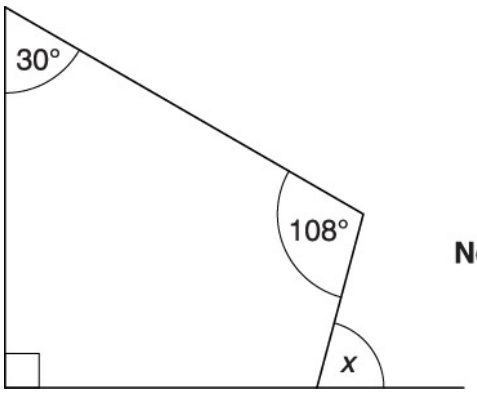
6. Two sides of a rectangle ABCD are drawn on this one-centimetre grid.



On the grid, complete rectangle ABCD.

[1]

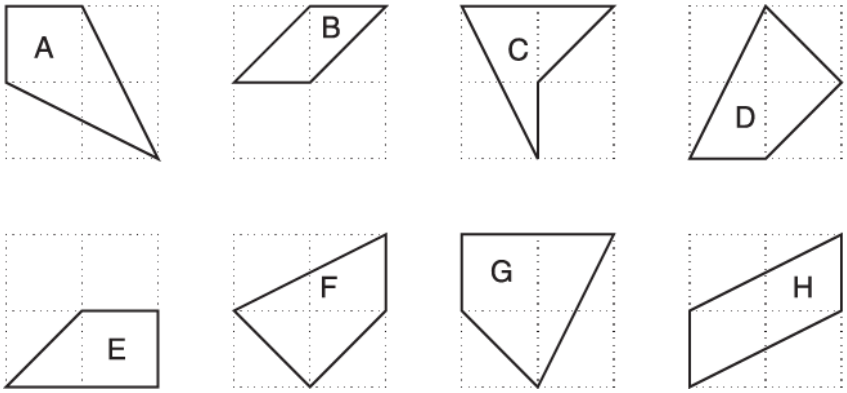
7. Work out angle *x*.



Not to scale

_____ ° [3]

8(a). Jason draws some quadrilaterals on square grids.



Which quadrilateral has one line of symmetry?

_____ [1]

(b). Which **two** quadrilaterals are parallelograms?

_____ and _____ [1]

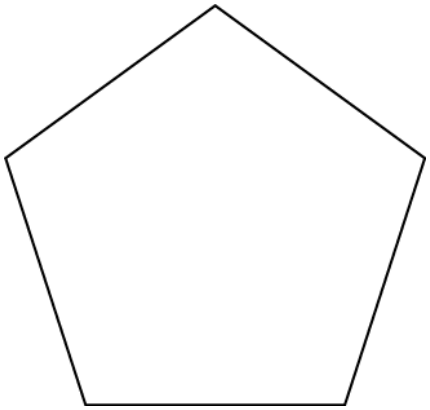
(c). Which quadrilateral contains a right angle **and** is a trapezium?

_____ [1]

(d). Which **two** quadrilaterals are congruent?

_____ and _____ [1]

9(a). Here is a regular polygon.



How many lines of symmetry does this polygon have?

_____ [1]

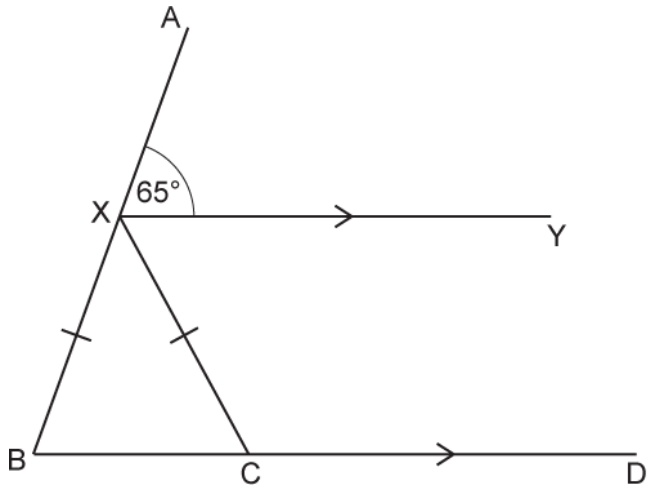
(b). What is the order of rotation symmetry of this polygon?

_____ [1]

10. XY and BD are parallel lines.

X is a point on AB and C is a point on BD.

XB = XC.



Not to scale

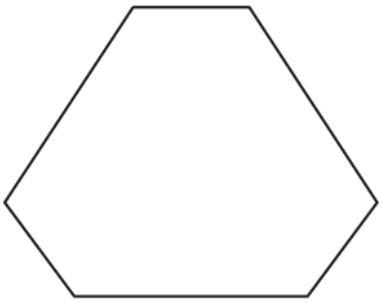
Work out angle BXC.

Give a reason for each angle you work out.

_____ ° **[4]**

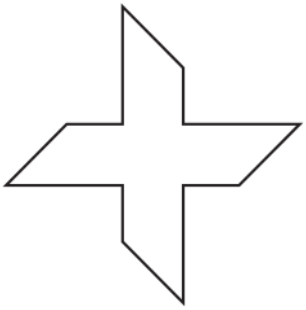
11(a)

. Write down the number of lines of symmetry of this hexagon.



---------- [1]

(b). Write down the order of rotation symmetry of this shape.



---------- [1]

(c). A triangle has just one line of symmetry.

Write down the mathematical name of this type of triangle.

---------- [1]

(d). Sara says

All parallelograms have 2 lines of symmetry and rotation symmetry of order 2.

Explain why Sara is not correct.

---

[1]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1		i	0 or none or zero	1		Examiner's Comments In (i) '0' was seen quite often and 2 or 4 were common errors.
		ii	4	1		Examiner's Comments (ii) was more successfully answered with some errors of 2, 1 and 90°.
		iii	56	3	**B1** for identifying length 4 [cm] and **M1** for (7 + 3 + *their 4*) × 4 oe	May be seen on diagram *Their 4* must be between 3 and 7 Examiner's Comments Part (iii) proved challenging for many students and a range of incorrect methods were used. Many students calculated 4 × 21 from the four rectangles making up the shape. Others knew how to calculate the perimeter though relatively few worked out the key missing length. A common misconception was to measure the diagram ignoring the 'not to scale' information. Others avoided multiplication by showing all sides in an addition of 7 + 3 + 4…, a significant number missed off a side.
			Total	5		

Question			Answer/Indicative content	Marks	Part marks and guidance	
2	a		Diagonals are equal	1	See exemplars Because not all the diagonal bisects are equal refers to diagonals(1)/ On a square all the diagonals bisect are equal(1)/ Because the diagonals are not equal(1)/ Diagonals are not equal so it can't be a square(1)/ Diagonals are not equal(1)/ A square is equal in every way including the diagonals(1)/ Diagonals that bisect at 90° on a square are equal(1)/ The diagonals of a square that bisect at 90° should be equal as 4 corners to square = 90 × 4 = 360°(1)/ She is wrong because the diagonals are not equal(1)/ Because a square would have equal diagonals(1)/ Do not accept: Not all quadrilaterals are the same length sides A square would be bisected at 90 and equal but they aren't A square would bisect equally All angles are equal in a square All sides are equal in a square Everything should be equal in a square All the sides aren't the same length The angles would all bisect at 90 In a square all the diagonals would bisect at 90	Examiner's Comments Only a minority commented on the diagonals as required and many failed to score because they simply referred to sides and angles of a square being equal. In other responses the word 'bisect' was incorrectly used instead of 'diagonal' and failed to gain credit. Failure to provide a coherent written explanation was a barrier for many students.

Question			Answer/Indicative content	Marks	Part marks and guidance	
					The diagonals on a square would make them both equal 90 Angles in a square do not bisect Because all the diagonals aren't the same angle Diagonals bisect at 90 A square has equal bisects If it was a square, the bisect should be equal Wrong because a square doesn't have diagonals bisect at 90°	
	b		Rhombus	1		**Examiner's Comments** Better students correctly identified the rhombus but a large majority stated parallelogram, kite, trapezium or rectangle.
			Total	**2**		

Question			Answer/Indicative content	Marks	Part marks and guidance	
3	a	i	4	1	Examiner's Comments This question was quite well answered by many candidates. More candidates understood lines of symmetry than rotational symmetry although some did not attempt to draw lines on the diagram after a correct response to part (a)(i).	
		ii	4 lines drawn and no extras	1		Accept good freehand and mark for intention
		iii	150	3	**B1** for 90 or 60 seen and **M1** for 360 – *their* 90 – 2 × *their* 60 Examiner's Comments Many candidates scored a mark for finding either 90° or 60° but were unsure how to proceed. Few recognised "angles at a point".	May be on diagram. Can be symbol. Allow the mark unless clearly for the wrong angle. Angles must clearly be understood to be for the square and triangle
	b		Rhombus only indicated	1	Examiner's Comments Parallelogram was the common wrong answer although each response was favoured by a reasonable number of candidates.	
			Total	6		

Question			Answer/Indicative content	Marks	Part marks and guidance	
4			35	3FT	**M2** for 180 – *their* (c) – 90 or **B1** for 55 or *their* (c) marked as bottom-left angle in either triangle and **B1** for 90 or *their* (a) marked as bottom-right angle in either triangle Examiner's Comments Most candidates gained marks on this question. However, this was often by following through a wrong answer but using the correct method in the next response. A number gave completely unsuitable responses such as angle *a* is 125°.	Check using their values Accept symbol
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
5			55	2	M1 for 180 – 125 or clear indication that ∠BCD = 125 Examiner's Comments This was reasonably answered but a common error was 125°. Some wrote 125 against all the angles in the parallelogram. Both responses indicated the same misunderstanding of the magnitude of angles. Again, some wrote 180 – 125 but could not get 50. In both parts the weaker candidates appear to have measured the angles on the diagram.	
			Total	2		
6			ABCD drawn	1	Mark intention, accept freehand Examiner's Comments Most candidates completed the rectangle but a few drew only a triangle.	D at (7, 5)
			Total	1		

Question			Answer/Indicative content	Marks	Part marks and guidance	
7			48	3	**M1** for 360 – (90+108+30) soi by 132 and **M1 dep** for 180 – *their* 132 **Examiner's Comments** Very few were awarded all 3 marks. Finding the sum of 108, 90 and 30 was common but then knowing to and correctly subtracting from 360 was a step too far for many. The next step of subtracting from 180 was attempted by even fewer candidates.	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
8	a		A	1	**Examiner's Comments** A majority of candidates identified the kite as the quadrilateral having one line of symmetry.	
	b		B and H	1	**Examiner's Comments** The two parallelograms were identified by most candidates.	
	c		E	1	**Examiner's Comments** Many candidates failed to find the trapezium that also contained a right angle. Some gave quadrilateral G, the other quadrilateral containing a right angle, as an answer This suggests that many candidates were unsure as to how to identify the trapezium.	
	d		D and F	1	**Examiner's Comments** Congruency was not understood by most candidates. Some candidates gave the two parallelograms as an answer.	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
9	a		5	1	Examiner's Comments Few obtained the correct answer in part (b); many only recognised the vertical line of symmetry and gave an answer of 1.	
	b		5	1	Examiner's Comments Rotational symmetry was not understood by all, with a small number giving answers such as ‘clockwise’ or ‘360’ in part (c). Those who understood the concept often gave a correct answer.	
			Total	2		

Question			Answer/Indicative content	Marks	Part marks and guidance		
10			Angle BXC = 50 [Angles in a] isosceles [triangle] Angles in a triangle add up to 180	2 1 1	**B1** for Angle XCB = 65 Accept Alternate angles [are equal] **and** Angles on a [straight] line =180	XCB may be seen on the diagram Accept C for XCB, X for BXC Condone isos for isosceles [Angles in a] isosceles triangle add up to 180 scores final 2 marks Key words for 1 mark in 'Angles in a triangle add up to 180' are 'triangle' and '180'	
			Total	4			

Question			Answer/Indicative content	Marks	Part marks and guidance		
11	a		1	1	condone 3		
	b		4	1			
	c		isosceles	1		ignore spelling providing intention is clear	
	d		Valid explanation	1	Such as 'it does not have 2 lines of symmetry'	Any incorrect statement scores 0. See Appendix	

Examiner's Comments

Many candidates struggled with all parts of this question; in (a) many drew only the vertical line of symmetry leading to the answer of 1 which was more common than the correct answer of 3. Candidates were more successful at identifying the order of rotational symmetry in part (b). Some answers of 'clockwise 90°' were seen and incorrect orders such as 1 or 0 were not uncommon. Some thought this part was still about lines of symmetry. In part (c) many candidates gave the correct answer of isosceles, however equilateral was a common error. Other incorrect answers varied between right-angled and scalene. Some struggled with spelling but generally the intention was very clear. A small number named shapes other than triangles. Candidates found the explanation in (d)

Question			Answer/Indicative content	Marks	Part marks and guidance	
					challenging with few identifying that in general parallelograms have no line symmetry unless they are also squares, rectangles or rhombuses. Some specified that squares had four lines of symmetry for example. Vague comments such as 'not all parallelograms have two lines of symmetry' were more common than precise explanations. Many thought that parallelograms did not have rotation symmetry of order 2. Often answers referred to all parallelograms having more or less lines/order than stated in the question. Some answers appeared to replace parallelogram with quadrilateral and reference to a trapezium was seen numerous times.	
			Total	4		