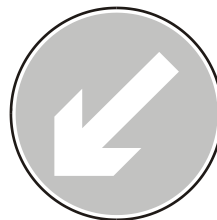


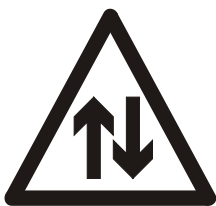
1. Here are four road signs.



A



B



C



D

Two of these road signs have one line of symmetry.

(a) Write down the letters of each of these **two** road signs.

..... and

(2)

Only **one** of these four road signs has rotational symmetry.

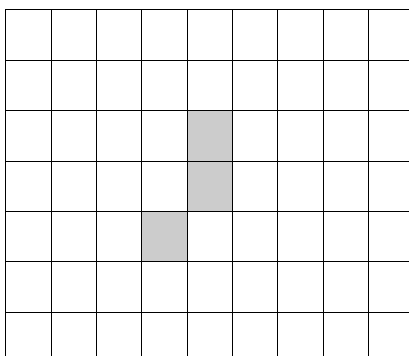
(b) (i) Write down the letter of this road sign.

.....

(ii) Write down its order of rotational symmetry.

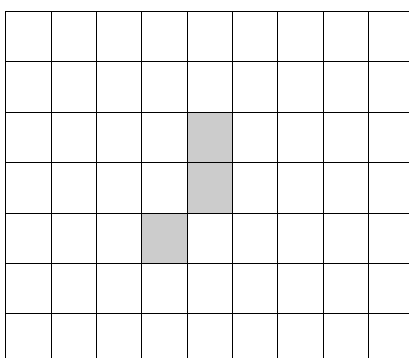
(2)
(Total 4 marks)

2. (a) On the diagram below, shade **one** square so that the shape has exactly **one** line of symmetry.



(1)

- (b) On the diagram below, shade **one** square so that the shape has rotational symmetry of order 2.



(1)

(Total 2 marks)

3. Here is a list of 8 numbers.

11 16 18 36 68 69 82 88

- (a) Write down **two** numbers from the list with a sum of 87

.....,

(1)

(b) Write down a number from the list which is

(i) a multiple of 9,

.....

(ii) a square number.

.....

(2)

cube	multiple	factor	product
------	----------	--------	---------

(c) Use a word from the box to complete this sentence correctly.

11 is a of 88

(1)

Here are the same 8 numbers drawn larger.

11 16 18 36
68 69 82 88

(d) From these numbers, write down a number which has

(i) exactly **one** line of symmetry,

.....

(ii) 2 lines of symmetry **and** rotational symmetry of order 2,

.....

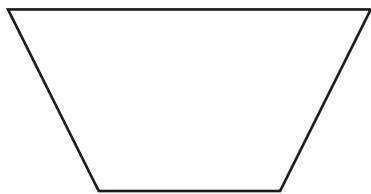
(iii) rotational symmetry of order 2 but **no** lines of symmetry.

.....

(3)

(Total 7 marks)

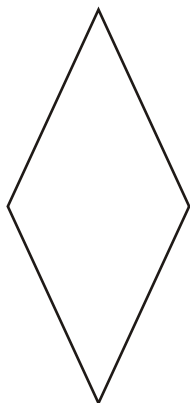
4. Here are five shapes.



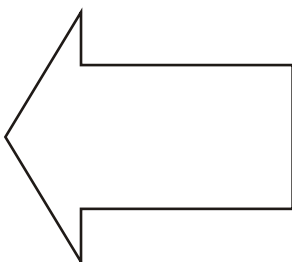
A



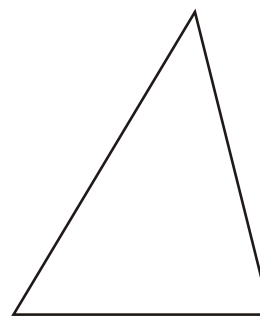
B



C



D



E

Two of these shapes have only **one** line of symmetry,

(a) Write down the letter of each of these **two** shapes.

.....and.....

(2)

Two of these shapes have rotational symmetry of order 2.

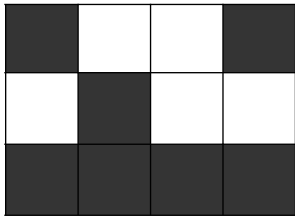
(b) Write down the letter of each of these **two** shapes.

.....and.....

(2)

(Total 4 marks)

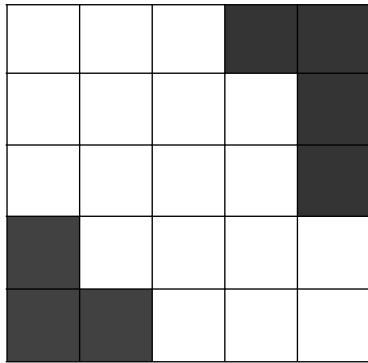
5. (a)



Shade **one** more square to make a pattern with 1 line of symmetry.

(1)

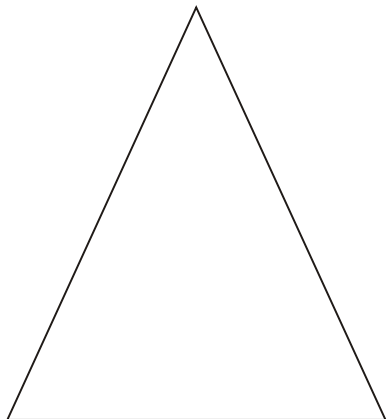
(b)



Shade **one** more square to make a pattern with rotational symmetry of order 2

(1)
(Total 2 marks)

6. Here is a triangle.

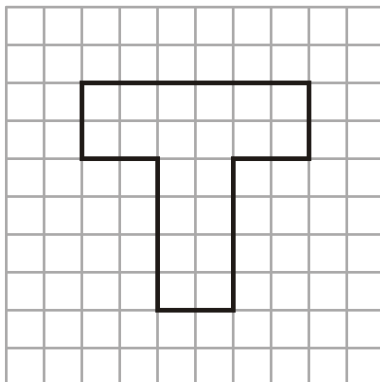


Draw a line of symmetry on the triangle.

(Total 1 mark)

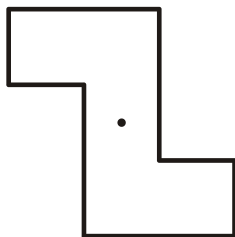
7. The shape below has one line of symmetry.

(a) On the grid, draw this line of symmetry.



(1)

The shape below has rotational symmetry.

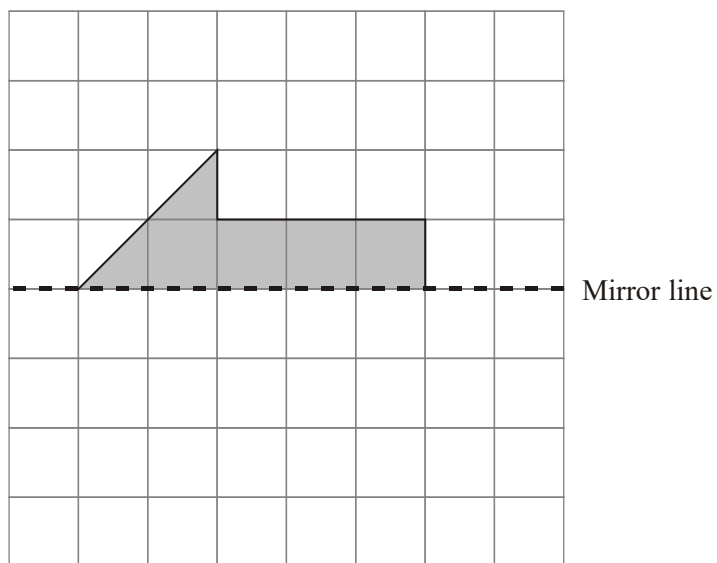


(b) Write down the order of rotational symmetry.

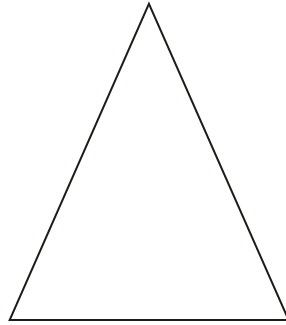
.....

(1)
(Total 2 marks)

8.



- (a) Reflect the shaded shape in the mirror line.



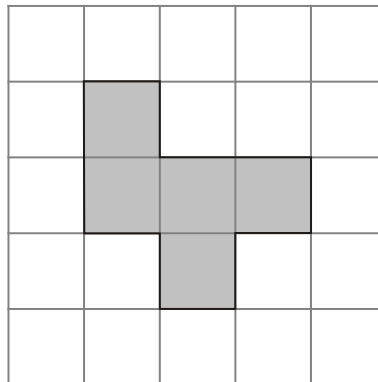
(1)

- (b) Draw the line of symmetry on this triangle.

(1)

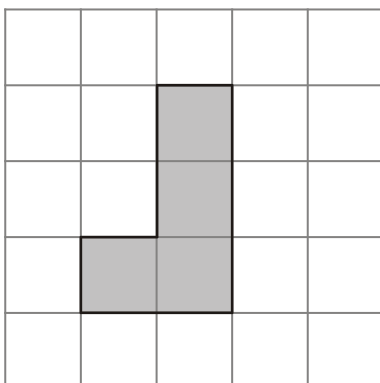
(Total 2 marks)

9. (a) On the diagram below, shade **one** square so that the shape has exactly **one** line of symmetry.



(1)

- (b) On the diagram below, shade **one** square so that the shape has rotational symmetry of order 2



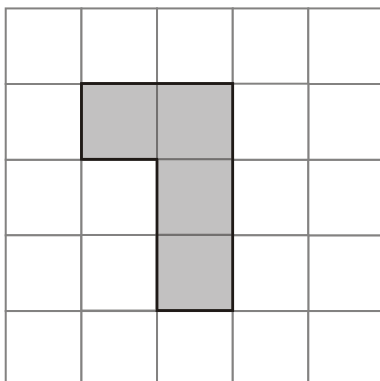
(1)
(Total 2 marks)

- (b) Write down the order of rotational symmetry.

.....

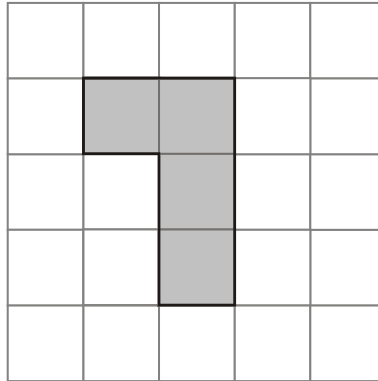
(1)
(Total 2 marks)

10. (a) Shade **one** more square to make a pattern with 1 line of symmetry.



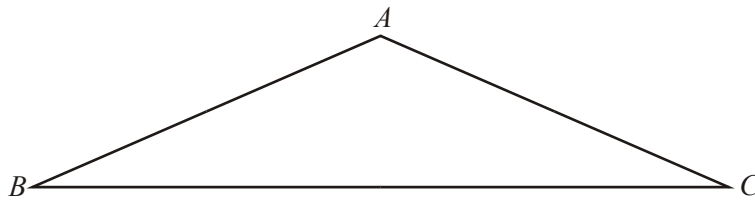
(1)

- (b) Shade **one** more square to make a pattern with rotational symmetry of order 2



(1)
(Total 2 marks)

11.



- (a) Measure the length of BC .

..... cm

(1)

- (b) (i) Measure the size of angle B in triangle ABC .

.....°

- (ii) Write down the special name given to this type of angle.

.....

(2)

In the triangle ABC , $AB = AC$.

- (c) Draw the line of symmetry of the triangle.

(1)
(Total 4 marks)

12. Here is a rectangle.



- (a) Write down the order of rotational symmetry of the rectangle.

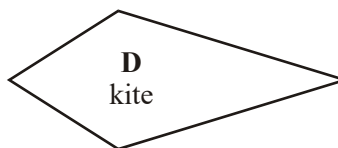
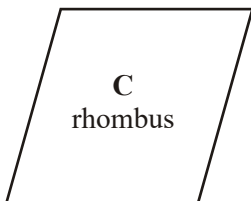
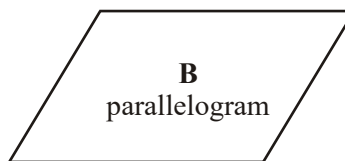
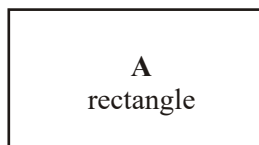
.....

(1)

- (b) On the rectangle, draw all the lines of symmetry.

(2)
(Total 3 marks)

13. Here are four quadrilaterals labelled A, B, C and D.



(a) Write down the letter of the quadrilateral which has

(i) exactly **one** line of symmetry,

(ii) **no** lines of symmetry,

(iii) **both** diagonals as lines of symmetry.

(3)

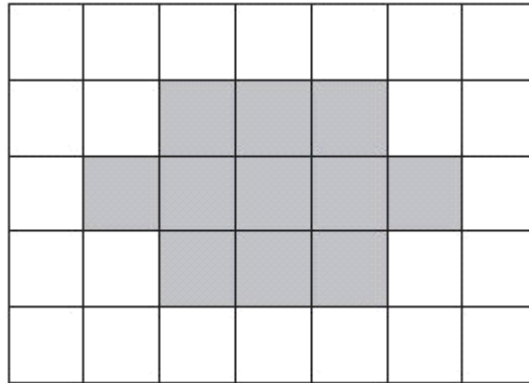
(b) Write down the letter of the quadrilateral which **does not** have rotational symmetry of order 2.

.....

(1)

(Total 4 marks)

14. A shaded shape has been drawn on the centimetre grid.

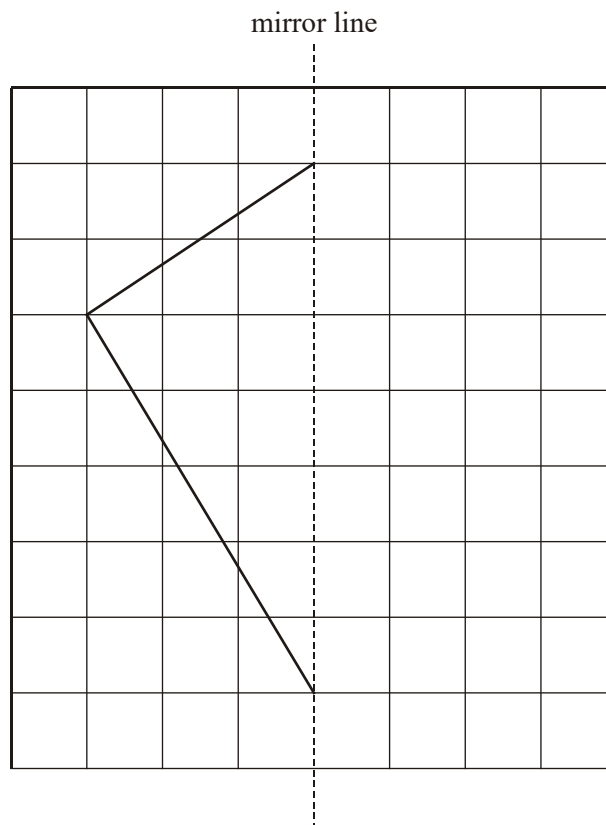


The shaded shape has **two** lines of symmetry.

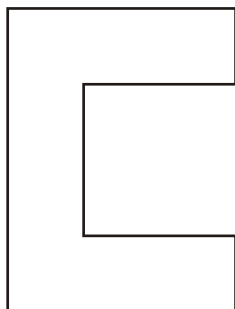
Draw the **two** lines of symmetry on the shaded shape.

(Total 2 marks)

- 15.



- (i) Draw the reflection of the shape above in the mirror line.

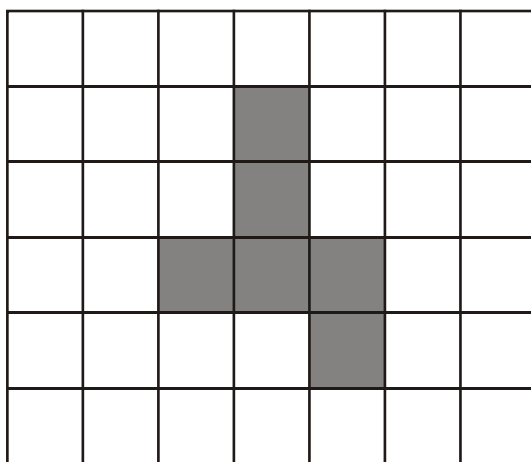


- (ii) Draw in the line of symmetry of this shape.

(Total 2 marks)

16. (a) On the grid below, 6 squares are shaded.

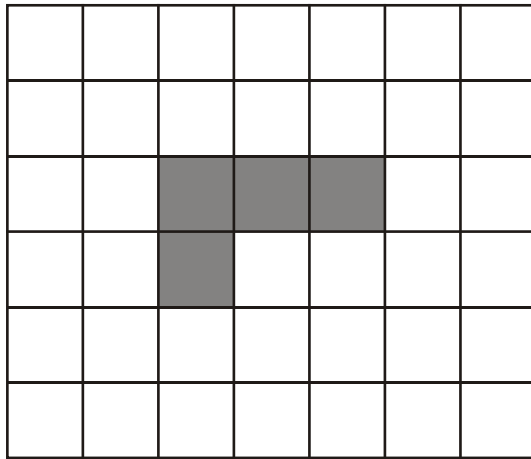
Shade one more square so that the shaded shape has one line of symmetry.



(1)

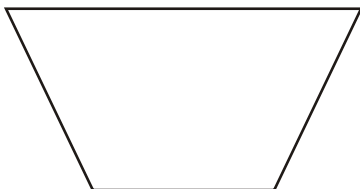
(b) On the grid below, 4 squares are shaded.

Shade one more square so that the shaded shape has rotational symmetry of order 2.

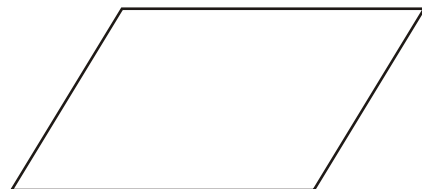


(1)
(Total 2 marks)

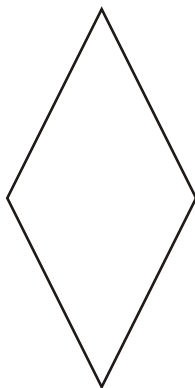
17. Here are five shapes.



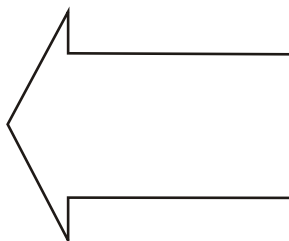
A



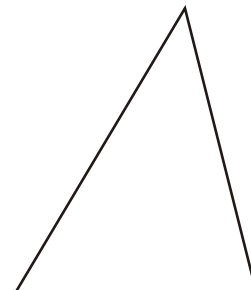
B



C



D



E

Two of these shapes have only **one** line of symmetry.

(a) Write down the letter of each of these **two** shapes.

..... and.....

(2)

Two of these shapes have rotational symmetry of order 2

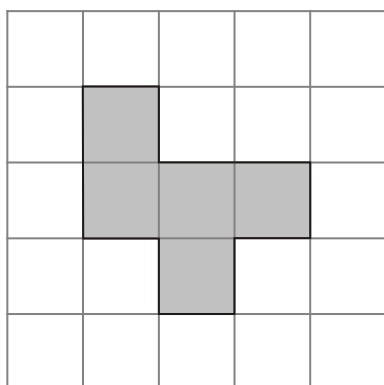
(b) Write down the letter of each of these **two** shapes.

..... and.....

(2)

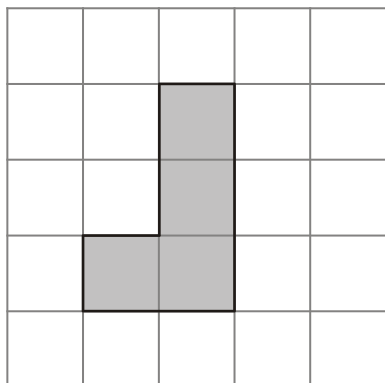
(Total 4 marks)

18. (a) On the diagram below, shade **one** square so that the shape has exactly **one** line of symmetry.



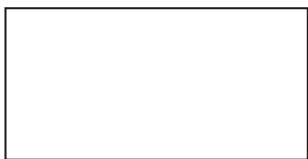
(1)

- (b) On the diagram below, shade **one** square so that the shape has rotational symmetry of order 2



(1)
(Total 2 marks)

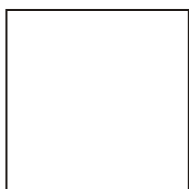
19. Here are four shapes.



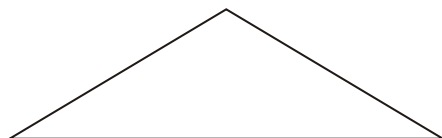
A



B



C



D

Write down the letter of the shape which has

(i) exactly **one** line of symmetry,

.....

(ii) **no** lines of symmetry,

.....

(iii) exactly **two** lines of symmetry.

.....

(Total 3 marks)

20. Here are five shapes.



A



B



C



D



E

Write down the letter of a shape that has

(i) **no** lines of symmetry,

.....

(ii) exactly **one** line of symmetry,

.....

(iii) exactly **two** lines of symmetry,

.....

(iv) rotational symmetry of order two.

.....

(Total 4 marks)

1. (a) B and D 2
Bl, Bl (-1 each extra)
- (b) (i) A 2
Bl for A
- (ii) 3
Bl for 3
- [4]**
2. (a) Correct shape 1
Bl
- (b) Correct shape 1
Bl
- [2]**
3. (a) 18, 69 1
Bl
- (b) (i) 18 or 36 1
Bl
- (ii) 16 or 36 1
Bl
- (c) factor 1
Bl
- (d) (i) 18 3
Bl cao
- (ii) 11 or 88
Bl
- (iii) 69
Bl cao
- [7]**
4. (a) A and D 2
B2 for both correct
(Bl for 1 correct)

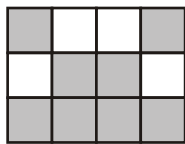
(b) B and C

2

*B2 for both correct
(B1 for 1 correct)*

[4]

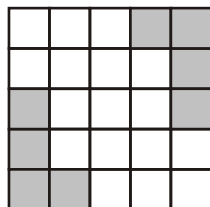
5. (a)



B1 cao

1

(b)



B1 cao

1

[2]

6. One line of symmetry

1

B1 within 2mm of centre of base / 2mm of vertex

[1]

7. (a) Correct line

1

B1 cao

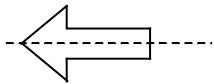
(b) 2

1

B1 cao

[2]

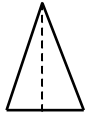
8. (a)



B1 for completed shape cao

1

(b)

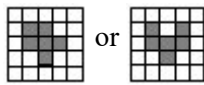


B1 for line of symmetry drawn

1

[2]

9. (a)



or

B1 cao

1

(b)



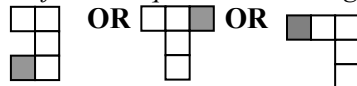
B1 cao

1

[2]


10. (a) Shading

B1 for one square shaded to get one of



1

(b) Shading

B1 for one square shaded to get 

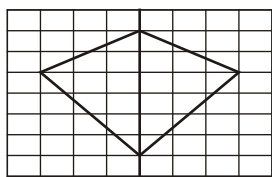
1

[2]

11. (a) 9.0 to 9.4
BI 1
- (b) (i) 22 to 26
BI 2
- (b) (ii) Acute
BI
- (c) Symmetry line
BI (within overlay) 1
- [4]**
12. (a) 2
BI 1
- (b) 2 correct lines
B2 (B1 for one line correct, no extras or both correct and 1 or 2 extra lines) 2
- [3]**
13. (a) (i) **D**
kite
BI 3
- (ii) **B**
parallelogram
BI
- (iii) **C**
rhombus
BI
- (b) **D**
Kite
BI 1
- [4]**
14. Correct lines 2
See diagram
B2 cao for both lines correct
(B1 for one line correct)
- [2]**

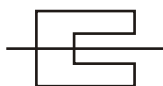
15. (i)

2



Correct reflection
B1 for a correct kite

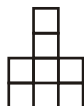
(ii)



Correct line
B1 for correct line of symmetry

[2]

16. (a)



B1

1

(b)



B1

1

[2]

17. (a) A and D

2

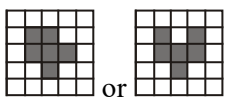

*B2 for both correct
 (B1 for 1 correct)*

(b) B and C

2

*B2 for both correct
 (B1 for 1 correct)*

[4]

18.	(a)		or		1	
				<i>Bl cao</i>		
	(b)				1	
				<i>Bl cao</i>		[2]
19.	(i)	D		<i>Bl cao</i>	3	
	(ii)	B		<i>Bl cao</i>		
	(iii)	A		<i>Bl cao</i>		[3]
20.	(i)	E or C		<i>Bl for E or C or both</i>	1	
	(ii)	B		<i>Bl cao</i>	1	
	(iii)	A		<i>Bl cao</i>	1	
	(iv)	C or A		<i>Bl for C or A or both</i>	1	[4]

1. This question, though set in a context of road signs that all candidates should have seen, was not well answered. Only a third of candidates were able to write down the signs that had line symmetry but two thirds were able to identify rotational symmetry.

2. Mathematics A Paper 2

There was wide variation in the success achieved on this question. Line symmetry appeared to be a more familiar concept than rotational symmetry and the answers to the two parts were quite often reversed.

Mathematics B Paper 15

Most candidates had an idea of symmetry although some candidates appeared confused between distinguishing between a line of symmetry and rotational symmetry. As a result many candidates transposed their two answers.

3. Specification A

Most candidates achieved some success but few gained full marks. Part (b)(i) (multiple of 9) was well answered but it was not unusual for candidates to then give “multiple” as their answer to part (c). In the final part (symmetry), candidates performed best on part (ii), perhaps helped by the fact that there were two possible answers.

Specification B

Most candidates were able to successfully access at least 4 marks on this question. In part (a) and (b) they were able to write down two numbers from the list with a sum of 87 and write down a number which was a multiple of 9 but found providing a square number a more challenging task. Although candidates clearly understood the term ‘multiple’, they very often went on to state that 11 was a *multiple* of 88.

Many candidates could identify the number with 2 lines of symmetry in (d) they had more trouble recognising that 18 was the required answer to (i) and 69 was the answer to (iii).

4. This question was well understood, with 90% of candidates scoring at least one of the two marks in each part.
5. Candidates understood what they had to do in this question but they often made mistakes. The reflection in part (a) was almost always correct but there were often mistakes in the rotation in part (b). The most common mistake was to put the extra square on the bottom row and make a shape with reflective symmetry along the diagonal from top left to bottom right.
6. The line of symmetry was accurately drawn with a ruler by most candidates to secure the mark for a correct answer to this question. Less than 10% of responses were unacceptable either because the line did not fall within acceptable bounds or because (and this was very rare), the candidate could not identify the correct position for the line of symmetry.
7. Nearly all candidates were able to draw the correct line of symmetry but only a small proportion were able to give the correct order of rotational symmetry in part (b). Many answers given consisted of angles or directions (eg 90, clockwise, left).

8. Only a few candidates failed to reflect the shaded shape correctly in part (a) and most drew the correct line of symmetry in part (b). Occasionally this line was drawn very carelessly and the mark could not be awarded.
9. Over 80% of candidates were able to shade one square so that the shape had exactly one line of symmetry. A few candidates created a shape with rotational symmetry of order 2. Part (b) was less well attempted with a substantial proportion of candidates creating a shape with line rather than rotational symmetry. Only about a half of candidates were successful in this part.
10. **Specification A**
- Part (a) was answered correctly by the majority of candidates. Part (b) was less well done, with some candidates trying to identify a further case of reflective symmetry. A significant minority of students answered (a) and (b) the wrong way around.

Specification B

Adding a square to achieve a pattern with one line of symmetry and a pattern with rotational symmetry of order two appeared to be well understood and with over 60% getting both fully correct. The most common error was to reverse the question with the solution to (a) appearing in (b) and vice-versa.

11. Most candidates were able to measure BC within the acceptable tolerances but the measuring of angle B in the triangle was poorly done. There seemed to be many types of response to the type of angle, the most frequent being *obtuse* and *isosceles*.
Nearly all candidates could draw the line of symmetry correctly.
12. About a third of candidates got part (a) correct with 4 as a common incorrect response. Others talked about a turn of 2, which was accepted for the mark. Many of the candidates who responded with 4 in this part of the question drew 4 lines of symmetry in part (b).
Candidates are to be encouraged to use a ruler when drawing lines of symmetry although most freehand lines were accepted. The most common response in (b) was to draw a “Union Jack”... drawing in the two diagonals of the rectangle as well as the correct two lines of symmetry.

13. Over 60% of the candidates recognised the shape with exactly one line of symmetry but found it harder to cope with the other two parts of section (a). Less than half the candidates recognised that the parallelogram did not have any lines of symmetry and only 25% recognised that the rhombus had both diagonals as lines of symmetry. Candidates often do not fully understand the concept of rotational symmetry so it was pleasing to note that 44% of the candidates were able to successfully respond to part (b).
14. The two lines of symmetry were dealt with accurately by placing a horizontal and vertical line on the shape. Very few incorrect responses were seen.
15. The vast majority of candidates successfully drew the reflection of the shape in (i) with only a few drawing a rectangle instead. Quite a number of the candidates knew what to do in part (ii) but lost the mark by not drawing the line of symmetry long enough. There were also some attempts to draw reflections of the shape either to the right or left and adding their own vertical mirror line to show this.
16. In part (a) adding one more square to the given shape produced over 70% correct results. Some went on to check the symmetry by drawing a vertical line on the diagram. For part (b) the instruction of adding in another square to give the shape 'rotational symmetry of order 2' proved rather more challenging with just over a third of the candidates adding the square in the correct position. Rotational symmetry is more difficult when compared with line symmetry and the added square was often placed just below the extreme right shaded square so that this shape also had one line of reflection symmetry.
17. Over 90% of the candidates were able to identify a correct shape in each part and nearly half the candidates were able to identify all four shapes correctly. This was extremely encouraging.
18. This question was well answered. In part (b) the only common error was to shade the square at the bottom right.
19. Most parts of this question were well attempted, but parts (i) and (ii) were sometimes confused.

20. Parts (i) and (ii) were done well by virtually all the candidates. Part (iii) was done well. Common incorrect answers here were D and C.
- Only about half the candidates were able to get part (iv) correct. A common incorrect answer here was B.