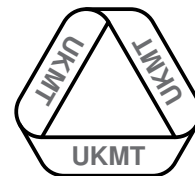


## STATION 1

A friend has a box with four balls in it - two are red, one is black and one is white. She takes two balls out at random and shows me that one of them is red.

What is the probability that both of them are red?

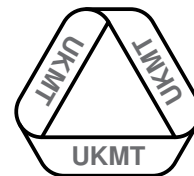
**STATION 2**

- (a) You are provided with a large red square divided into 16 congruent small squares.

Cut the large square into three pieces, just one of which is a square, and rearrange them to make an  $8 \times 2$  rectangle, without gaps or overlaps. Cuts may only be made along grid lines and *you are allowed* to turn pieces over. [3 marks]

- (b) You are provided with a large blue square divided into 16 congruent small squares.

Cut the large square into five pieces, one of which is a square and the other four are congruent, and rearrange them to make an  $8 \times 2$  rectangle, without gaps or overlaps. Cuts may only be made along grid lines and *you are not allowed* to turn pieces over. [3 marks]

**STATION 3**

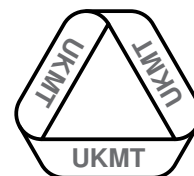
Three buses, numbered 117, 127 and 137, arrived together at my local bus station at 05:43.

The number 117 buses then arrive at this bus station every 18 minutes.

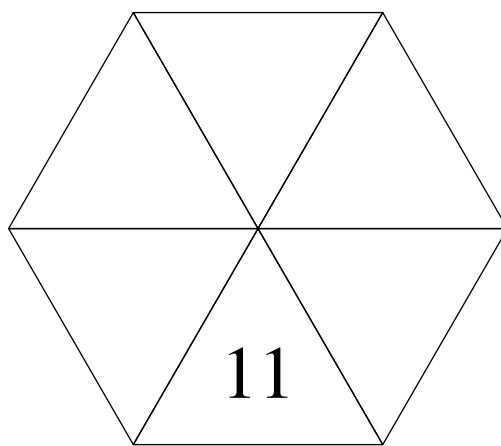
The number 127 buses then arrive at this bus station every 12 minutes.

The number 137 buses then arrive at this bus station every 14 minutes.

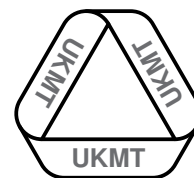
What will be the next time that three buses numbered 117, 127 and 137 arrive together at my local bus station?

**STATION 4**

You are provided with two hexagons each divided into six triangles, like the one shown.



- (a) Place one of the number cards 1, 3, 5, 7, and 9 in each triangle on one hexagon so that the sum of the numbers in any three adjacent triangles is prime. The number 11 is already in place. Show your solution to the supervising teacher. [3 marks]
- (b) Using the second hexagon find a second solution to the task given in part (a) and show it to your supervising teacher. Your second solution must not be a reflection of the first one. [3 marks]

**STATION 5**

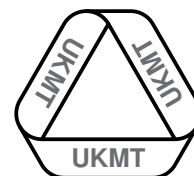
The number of days in a non-leap year is equal to the sum of two squares.

(a) Find two squares which give one solution. [2 marks]

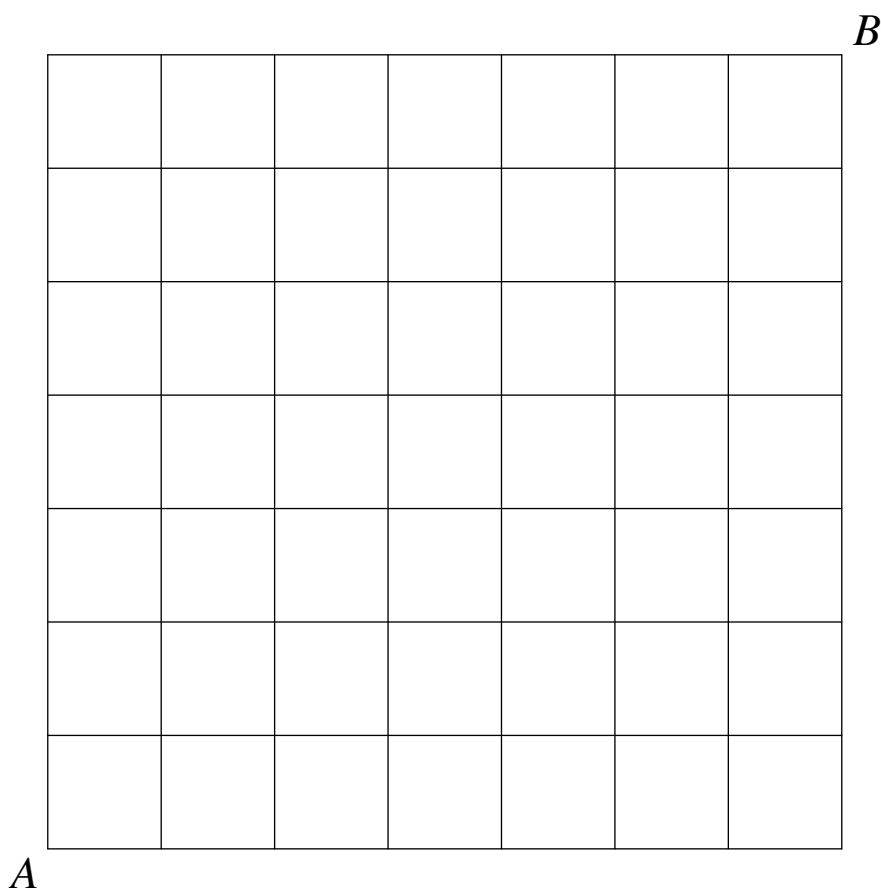
(b) Find two other squares which give a second solution. [2 marks]

The number of days in a leap year is equal to the sum of two cubes and one square.

(c) Find these three numbers. [2 marks]

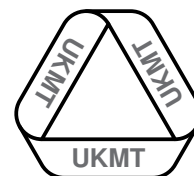
**STATION 6**

You are provided with the  $7 \times 7$  grid of squares below and nine cards with arrows on them.



Place the cards so that:

- (i) the arrows form a continuous route starting at corner *A* of the grid and ending at corner *B*;
- (ii) all of the cards are used;
- (iii) the cards do not overlap;
- (iv) no part of a card lies outside the grid;
- (v) the edges of each card are parallel to the lines of the grid.

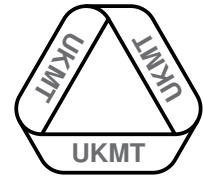
**STATION 7**

- (a) A rectangle has a perimeter of 38 cm and an area of  $48 \text{ cm}^2$ .

What are the dimensions of the rectangle? [3 marks]

- (b) An equilateral triangle has a perimeter of 48 cm. The area of the triangle can be written in the form  $a^2\sqrt{b} \text{ cm}^2$ , where  $a$  and  $b$  are single-digit numbers.

What are the values of  $a$  and  $b$ ? [3 marks]



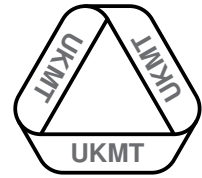
## STATION 8

How many different answers can be obtained using only the digits 1, 2, 3 and 4 once each, in any order, together with a single  $\times$  sign?

For example,  $31 \times 24$  and  $2 \times 413$  give two of the answers.

The numbers you use as factors in the calculations must all be integers.

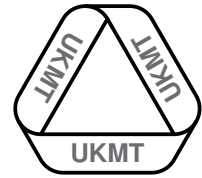




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**STATION 1 WORKSHEET**

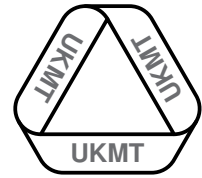
PROBABILITY:



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**STATION 3 WORKSHEET**

TIME:

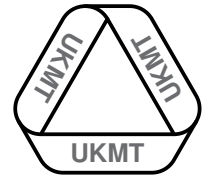


# STATION 5 WORKSHEET

(a) 2 SQUARES:

(b) 2 SQUARES:

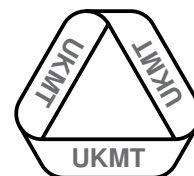
(c) 2 CUBES, 1 SQUARE:



# STATION 7 WORKSHEET

(a) RECTANGLE DIMENSIONS:

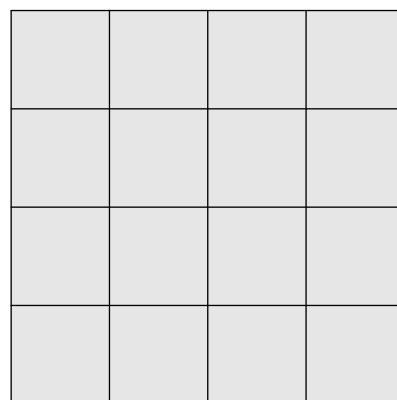
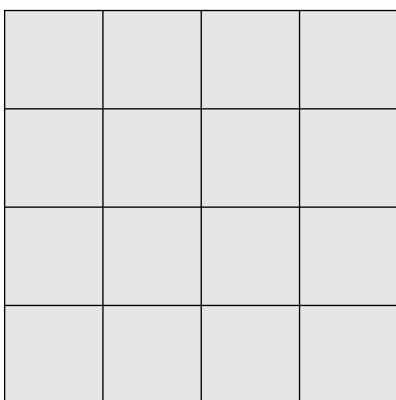
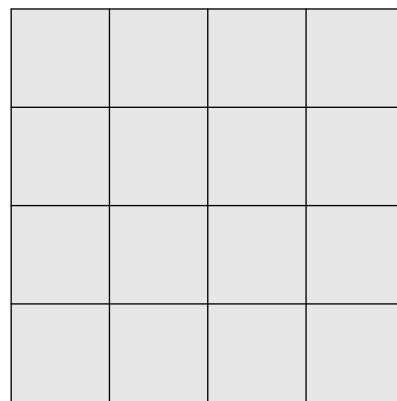
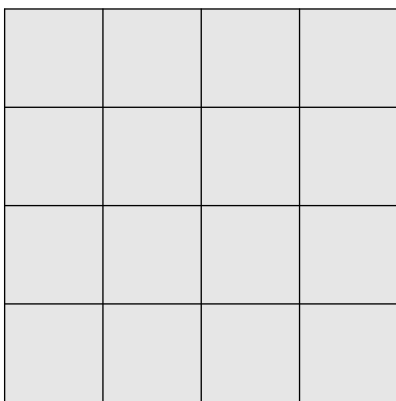
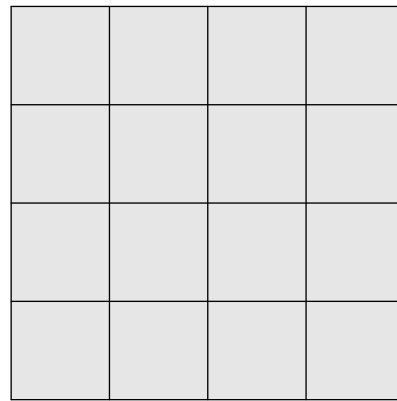
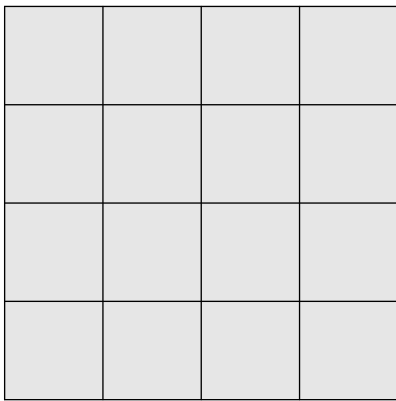
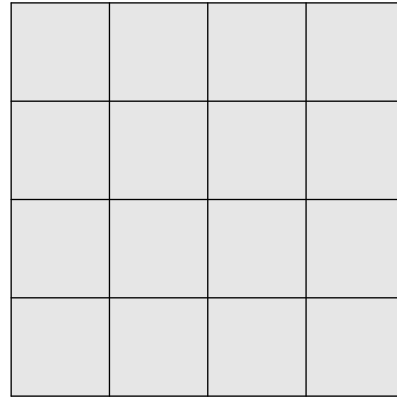
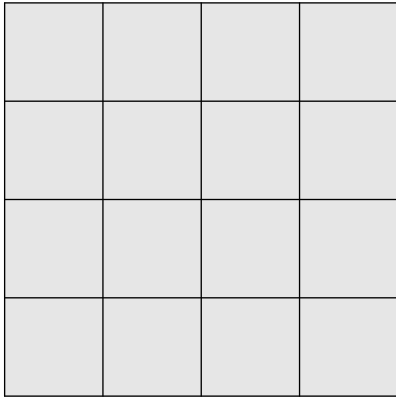
(b)  $a$  AND  $b$ :

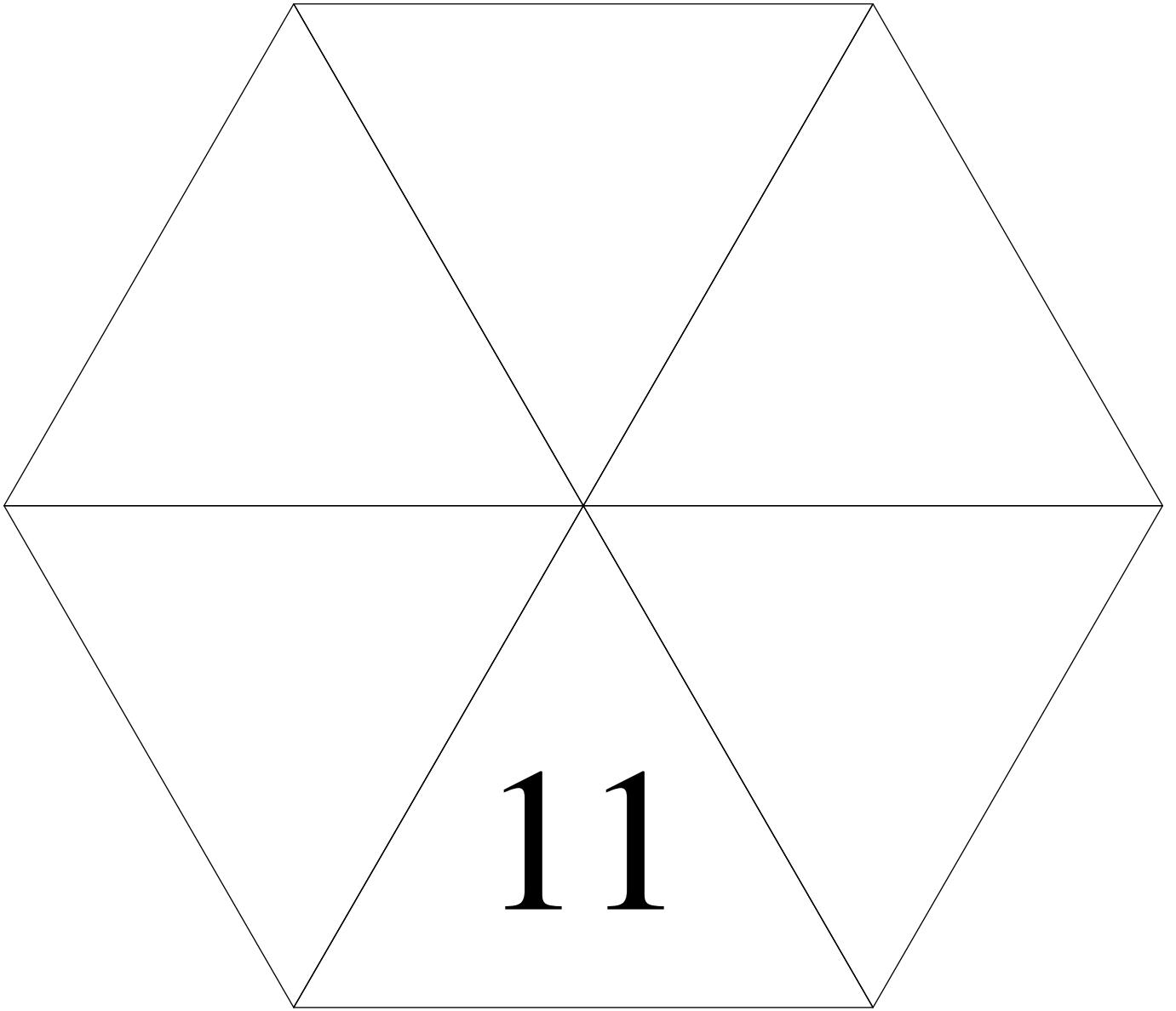


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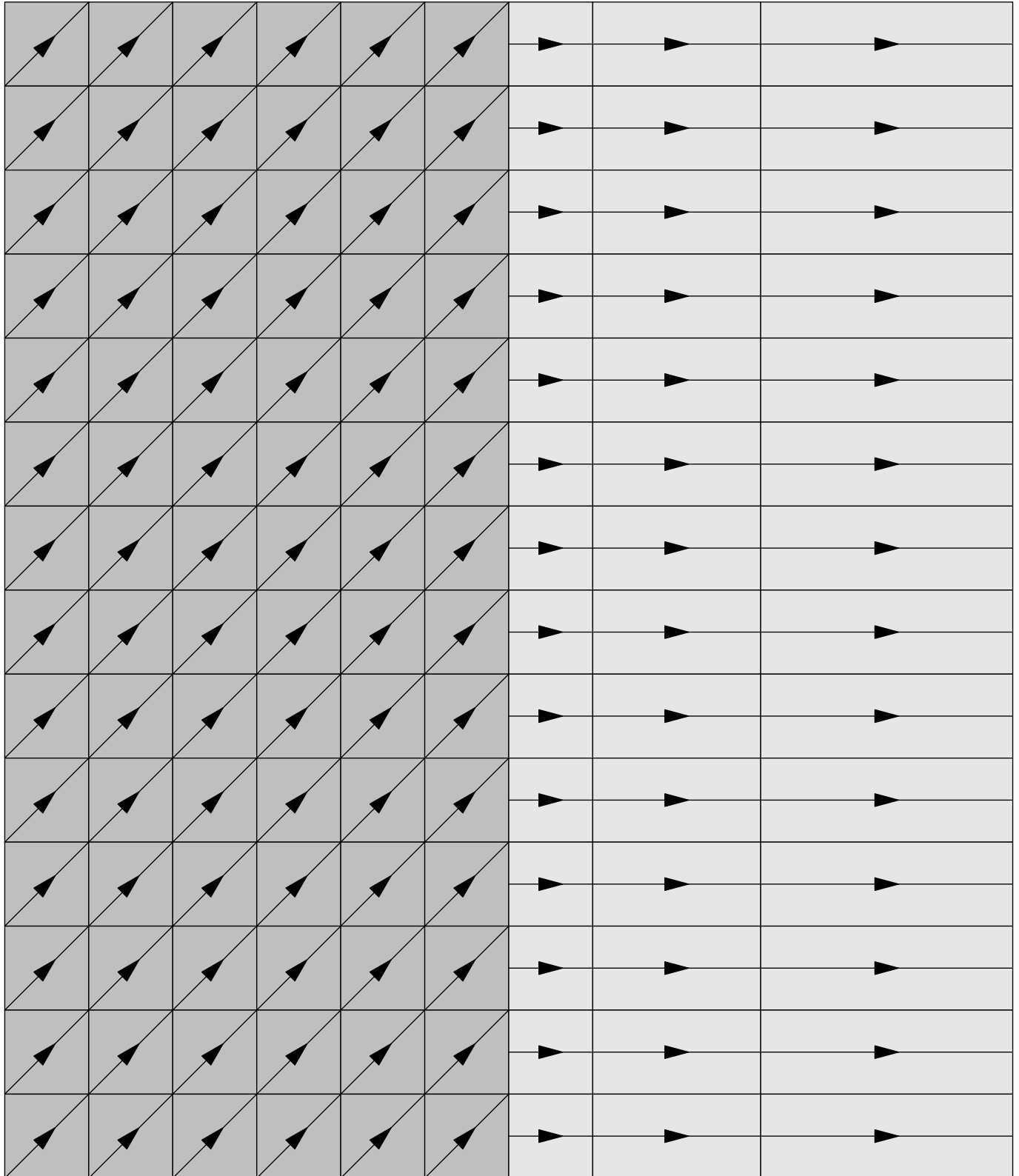
**STATION 8    WORKSHEET**

NUMBER OF ANSWERS:





1	3	5	7	9
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TEAM NUMBER 

SCHOOL NAME 

**Station 1**

Complete the worksheet and show it to the supervisor.

0 6

**Station 5**

Complete the worksheet and show it to the supervisor.

- (a) 0 2
- (b) 0 2
- (c) 0 2

**Station 2**

Show your answer(s) to the supervisor.

0 3 6

**Station 6**

Show your answer(s) to the supervisor.

0 6

**Station 3**

Complete the worksheet and show it to the supervisor.

0 6

**Station 7**

Complete the worksheet and show it to the supervisor.

- (a) 0 3
- (b) 0 3

**Station 4**

Show your answer(s) to the supervisor.

0 3 6

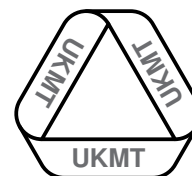
**Station 8**

Complete the worksheet and show it to the supervisor.

0 6

Circle the mark awarded for each question and cross out the others.

FINAL SCORE /48 



**SUPERVISOR**

**STATION 1**

0.2 or  $\frac{1}{5}$  or equivalent

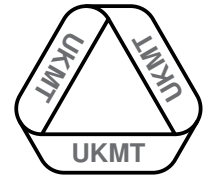
*Ensure that the worksheet and any scrap paper are cleared away before the next team arrives.*

**MARKS  
TO AWARD**

**6** correct solution  
**0** otherwise

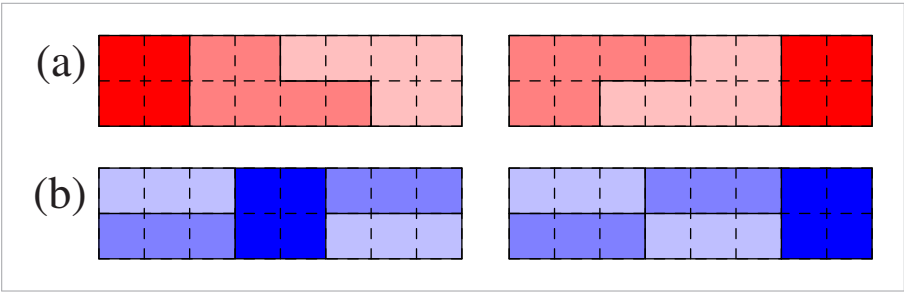
**RESOURCES**

Question paper  
Worksheet  
Scrap paper



**SUPERVISOR**

**STATION 2**



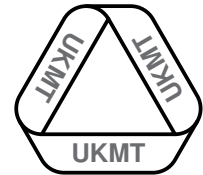
Please check carefully as there are other solutions as well as those shown above.

Three marks to be awarded in each part for the correct presentation of an  $8 \times 2$  rectangle with no gaps or overlaps and judged by eye. *Poor cutting of the pieces should not be penalised.*

*Ensure any evidence of each team's solutions and any scrap paper are cleared away before the next team arrives.*

<p><b>MARKS TO AWARD</b></p>	<b>6</b> correct solution
	<b>3</b> one part correct
	<b>0</b> otherwise

- RESOURCES**
- Question paper
  - Red and blue square grids on card
  - Scissors
  - Practice grids on paper



**SUPERVISOR**

**STATION 3**

09:55

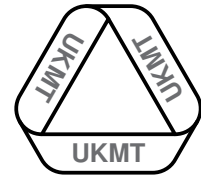
*Ensure that the worksheet and any scrap paper are cleared away before the next team arrives.*

**MARKS  
TO AWARD**

**6** correct solution  
**0** otherwise

**RESOURCES**

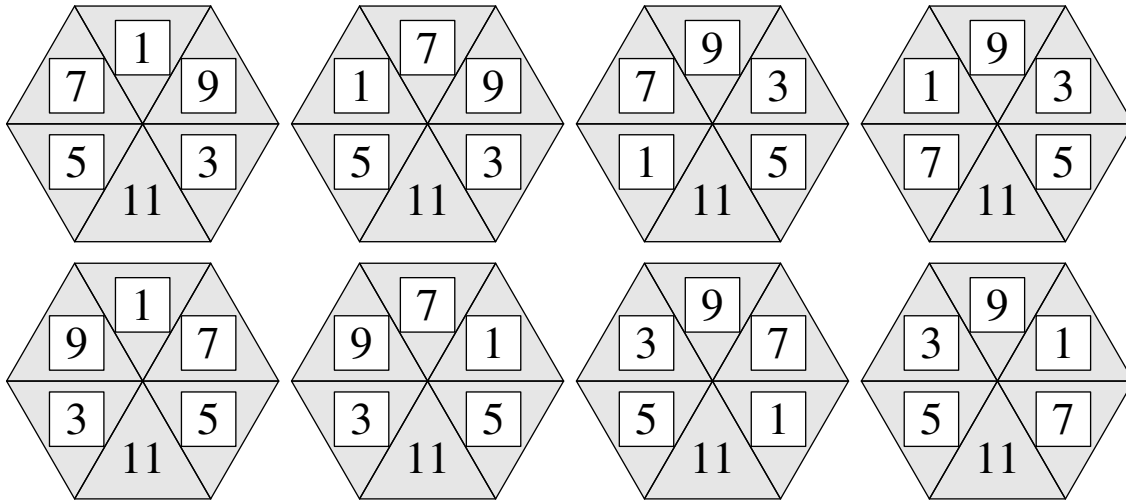
Question paper  
Worksheet  
Scrap paper



**SUPERVISOR**

**STATION 4**

Two of these solutions - but not two from the same column.

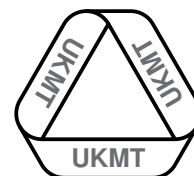


*Ensure any evidence of each team's solutions and any scrap paper are cleared away before the next team arrives.*

<b>MARKS TO AWARD</b>	<b>6</b> correct solution
	<b>3</b> one part correct
	<b>0</b> otherwise

**RESOURCES**

- Question paper
- Two laminated hexagons
- Two sets of laminated number cards

**SUPERVISOR****STATION 5**

- (a) 169 or  $13^2$ , 196 or  $14^2$   
(b) 4 or  $2^2$ , 361 or  $19^2$   
(c) 125 or  $5^3$ , 216 or  $6^3$ , 25 or  $5^2$

Answers (a) and (b) are interchangeable. Accept answers such as  $19^2$  or  $5^3$ , but do not accept answers such as 19 or 5.

The numbers in each of the three parts can be given in any order.

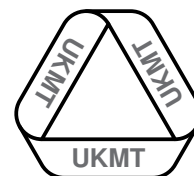
*Ensure that the worksheet and any scrap paper used are cleared away before the next team arrives.*

**MARKS  
TO AWARD**

- 6** correct solution  
**4** two parts correct  
**2** one part correct  
**0** otherwise

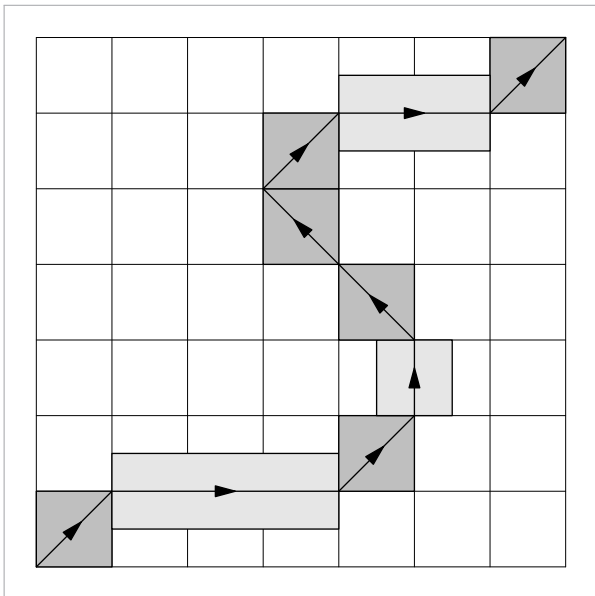
**RESOURCES**

Question paper  
Worksheet  
Scrap paper



**SUPERVISOR**

**STATION 6**

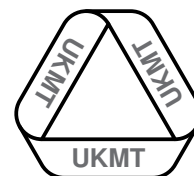


Please check carefully as there are other solutions as well as that shown above.

*Ensure that all nine cards are moved off the grid before the next team arrives.*

MARKS TO AWARD	<b>6</b> correct solution
	<b>0</b> otherwise

<p><b>RESOURCES</b></p> <p>Question paper (4 copies)</p> <p>Nine laminated cards (4 sets)</p>
---

**SUPERVISOR****STATION 7**

(a)  $16 \text{ cm} \times 3 \text{ cm}$     (b)  $a = 8, b = 3$

*Ensure any evidence of each team's solutions and any scrap paper are cleared away before the next team arrives.*

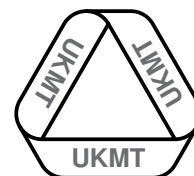
**MARKS  
TO AWARD**

**6** correct solution  
**3** one part correct  
**0** otherwise

**RESOURCES**

Question paper  
Worksheet  
Scrap paper





**SUPERVISOR**

**STATION 8**

36

*Ensure any evidence of each team's solutions and any scrap paper are cleared away before the next team arrives.*

**MARKS  
TO AWARD**

**6** correct solution  
**0** otherwise

**RESOURCES**

Question paper  
Worksheet  
Scrap paper