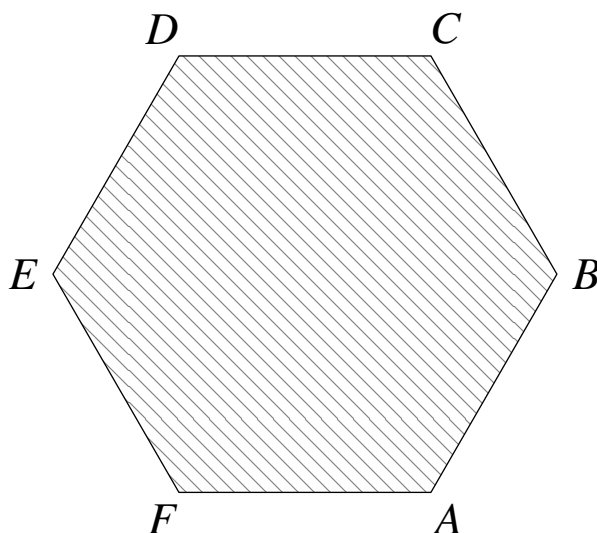
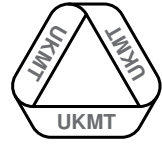
**STATION 1**

A regular hexagon has vertices A , B , C , D , E and F .

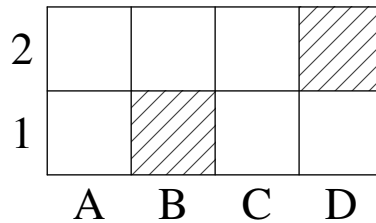
How many non-congruent polygons can be drawn by joining 3, 4 or 5 vertices from this regular hexagon?

Two polygons are congruent if they have both the same shape and the same size.



**STATION 2**

In the 4×2 grid, the squares B1 and D2 are shaded, as shown.

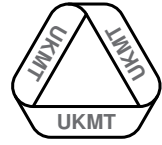


Megan and Julie take turns shading some of the unshaded squares. At each turn the unshaded squares that they shade must be in the shape of a square or a rectangle.

The person who has no squares left to shade loses the game.

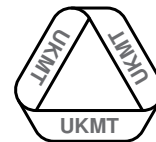
Megan starts first and shades just one square.

Which square should Megan shade in order that she can force a win?

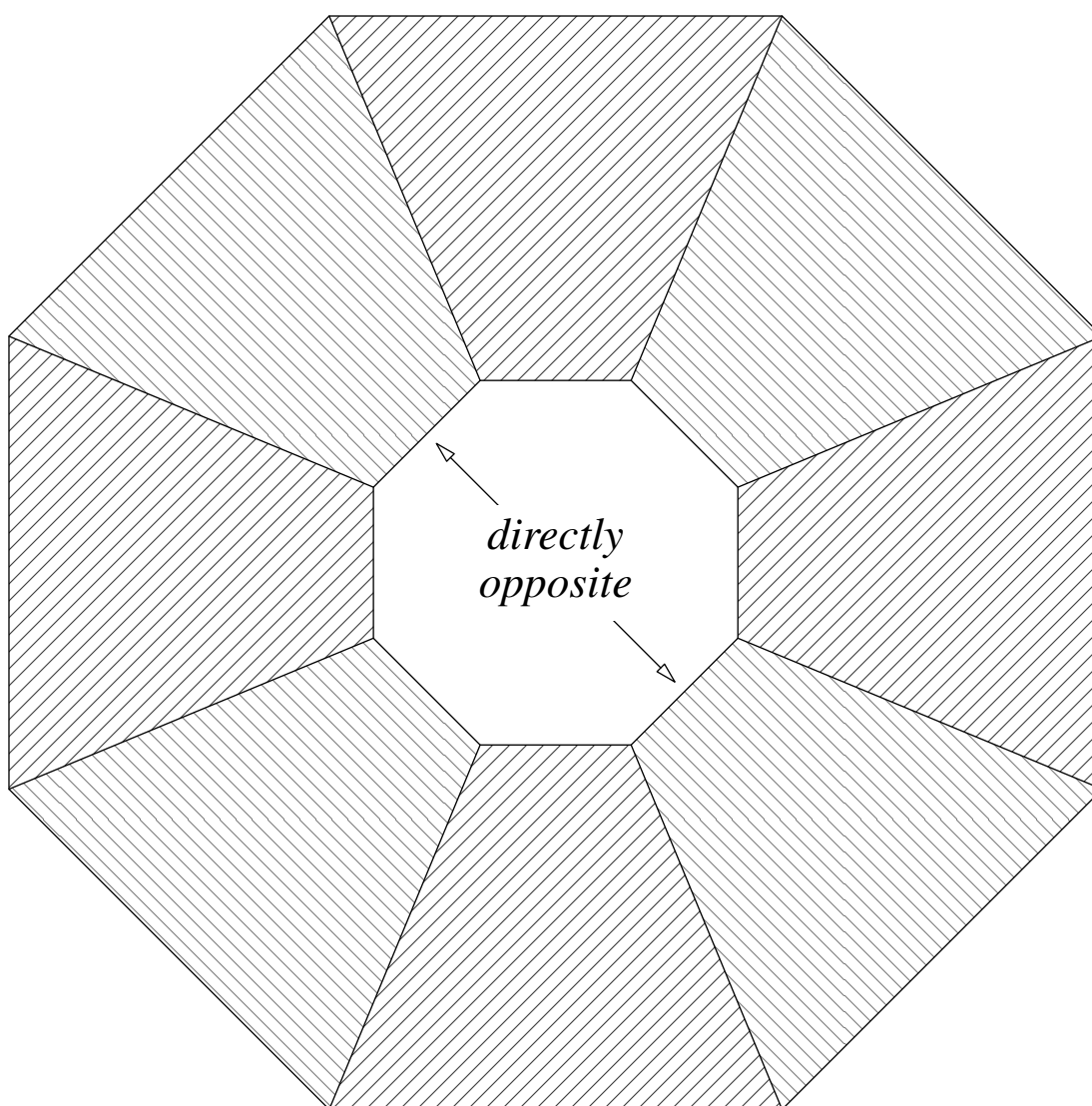
**STATION 3**

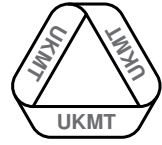
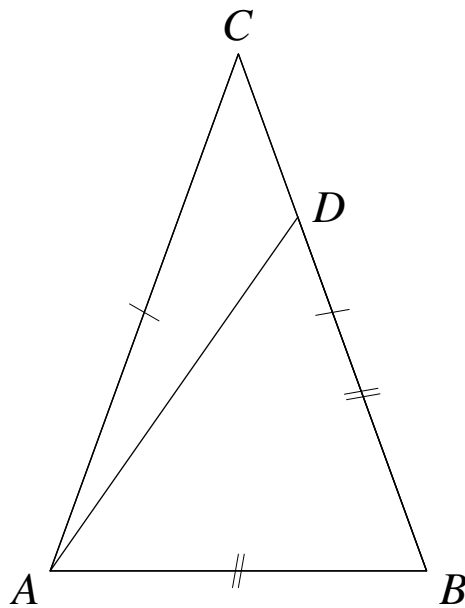
Place the eight cards on the grid, one in each blank space, so that *all* the following are true.

- (a) Each pair of *adjacent* numbers differs by more than 1.
- (b) Each of the four pairs of *directly opposite* numbers differs by more than 1.
- (c) Each of the four pairs of *directly opposite* numbers add up to a prime number.



STATION 3

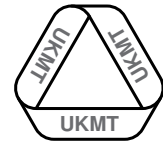


**STATION 4**

The triangle ABC is isosceles with $AC = BC$, as shown.

The point D lies on the line BC such that the triangle ABD is isosceles with $AB = BD$, as shown.

Given that $\angle BAC = 2 \times \angle BCA$, what is the value of $\angle ADC$?

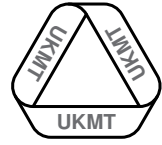


STATION 5

In a quiz, the Smith family scored twelve points fewer than the winning team.

If they had scored 10% more than they actually did, they would have beaten the winning team by six points.

What was the winning team's score?

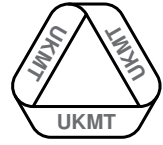


STATION 6

- (a) Arrange the four pieces of red card into a rectangle which is not a square.

- (b) Arrange the four pieces of blue card into a square.

In each case, the pieces of card should not overlap, and there should be no gaps between them.

**STATION 7**

Place *exactly* three common mathematical operations (which need not all be different) between the digits below so that the result equals 100.

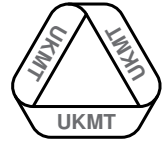
You are not allowed to rearrange the order of the digits.

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

For example,

$$1234 \times 5 - 67 \times 89.$$

We know this example is wrong because the result is 207.

**STATION 8**

Each of the letters J , K , L , M and N is used to represent a single digit in the two statements below.

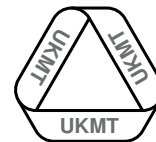
The same letter always stands for the same digit.

In the second statement, ' NJ ' stands for the two-digit number formed by replacing each of N and J by a single digit.

Find the value of $K + M$.

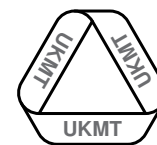
$$J + K = L$$

$$L + M = 'NJ'$$



STATION 1 WORKSHEET

NUMBER OF POLYGONS:

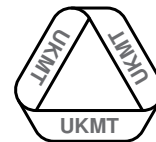


STATION 2 WORKSHEET

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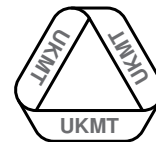
Ring the square that Megan should shade:

A1	A2	B2	C1	C2	D1
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STATION 4 WORKSHEET

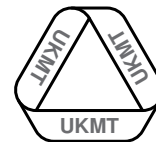
$\angle ADC:$



STATION 5 WORKSHEET

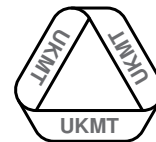
WINNING TEAM'S SCORE:

points



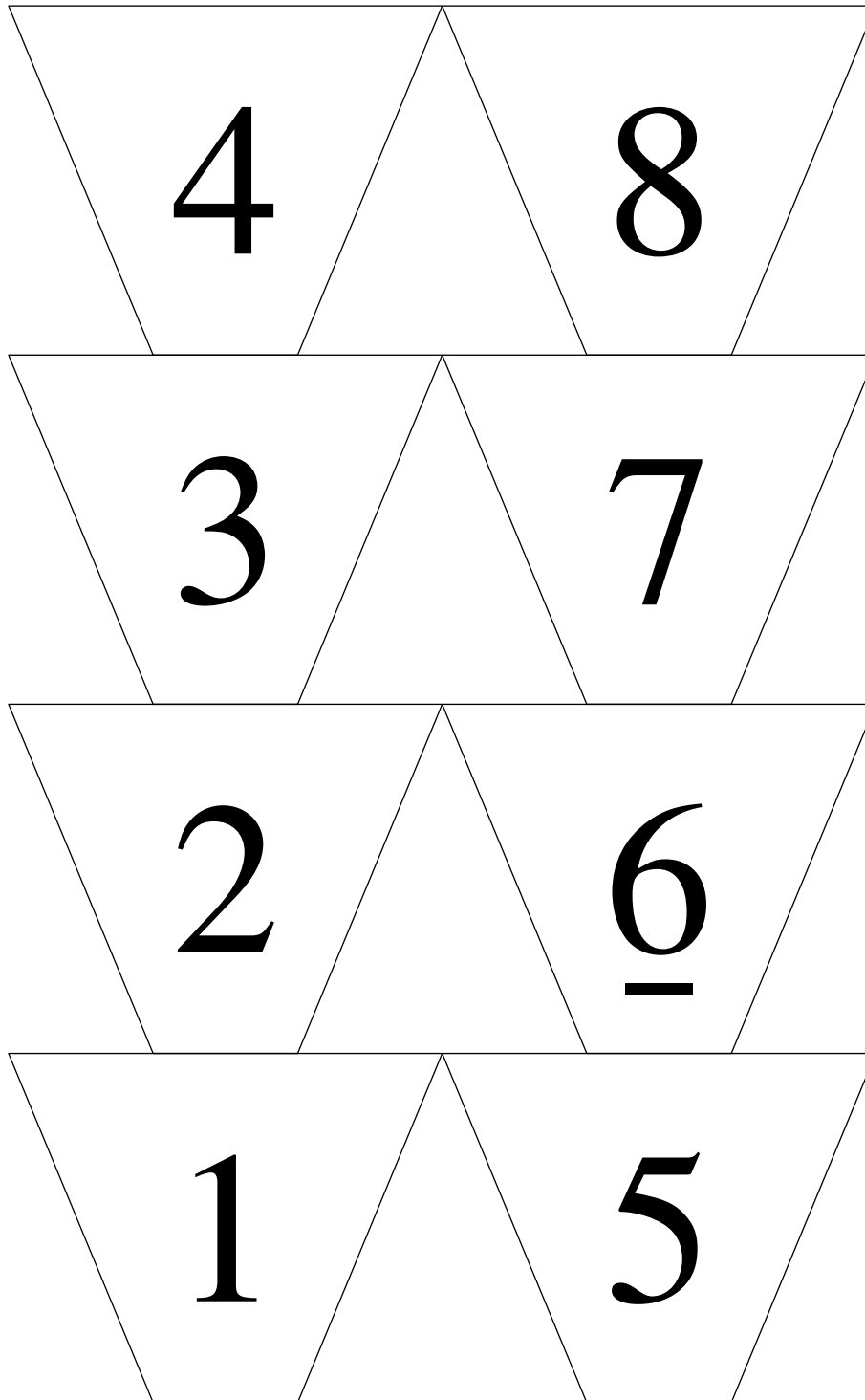
STATION 7 WORKSHEET

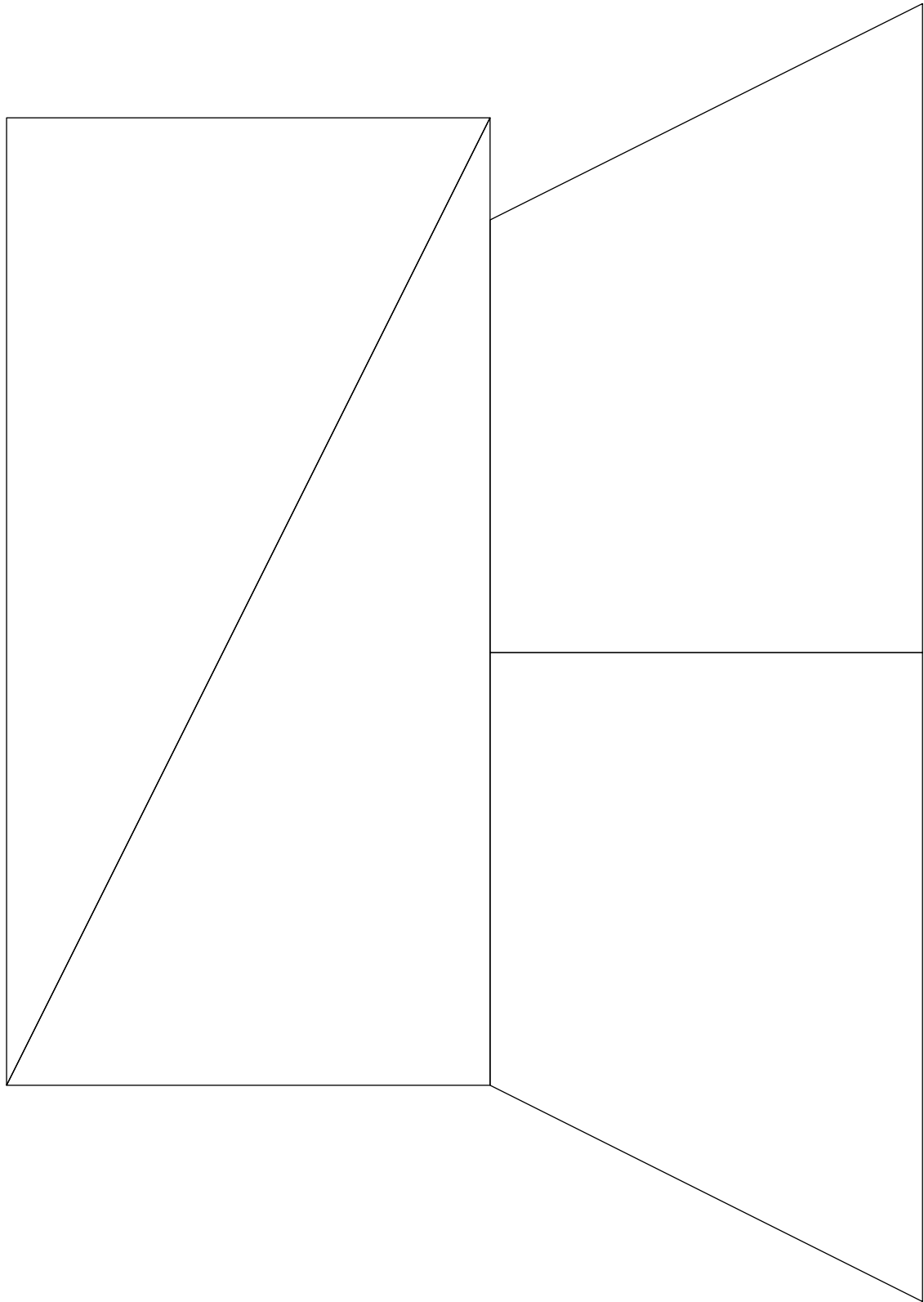
NINE DIGITS WITH
OPERATIONS:



STATION 8 WORKSHEET

VALUE OF $K + M$:





TEAM NUMBER SCHOOL NAME **Station 1** Number of polygons

Complete the worksheet and
show it to the supervisor.

0 6

Station 5 Winning team's score

Complete the worksheet and
show it to the supervisor.

0 6

Station 2 Square that Megan should shade

Complete the worksheet and
show it to the supervisor.

0 6

Station 6

Show your answer(s) to the
supervisor.

0 3 6

Station 3

Show your answer(s) to the
supervisor.

0 6

Station 7 Nine digits with operations

Complete the worksheet and
show it to the supervisor.

0 6

Station 4 $\angle ADC$

Complete the worksheet and
show it to the supervisor.

0 6

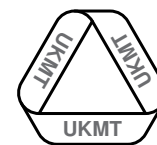
Station 8 Value of $K + M$

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

7

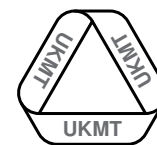
MARKS TO
AWARD

6 correct solution
0 otherwise

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

RESOURCES

Question paper
Worksheet



SUPERVISOR

STATION 2

A2

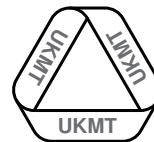
MARKS TO
AWARD

6 correct solution
0 otherwise

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

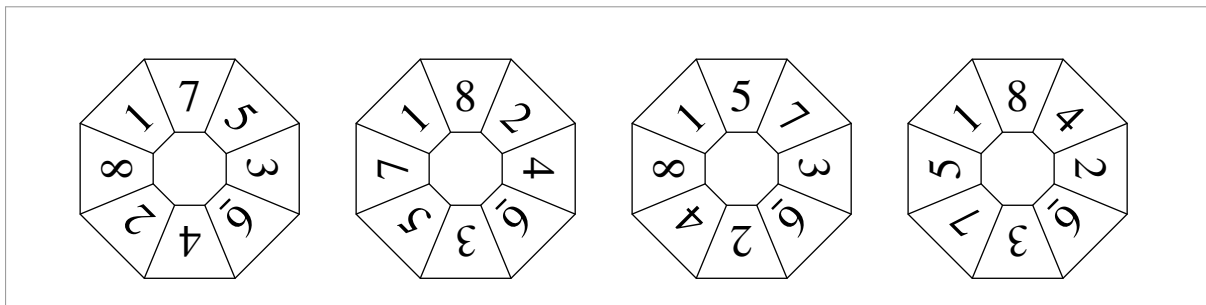
RESOURCES

Question paper
Worksheet



SUPERVISOR

STATION 3

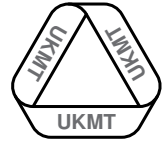


MARKS TO
AWARD

6 correct solution
0 otherwise

RESOURCES

- Question paper
- Laminated grid
- Number cards



SUPERVISOR

STATION 4

126 ◦

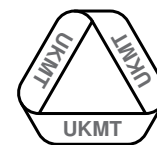
MARKS TO
AWARD

6 correct solution
0 otherwise

Ensure any completed answer sheets and scrap paper are cleared away before the next team arrives.

RESOURCES

Question paper
Worksheet



SUPERVISOR

STATION 5

192 points

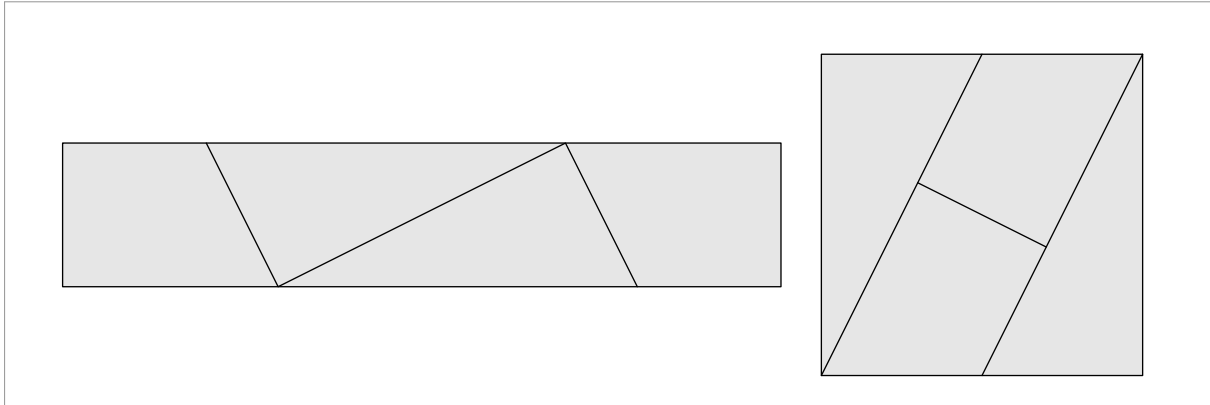
MARKS TO
AWARD

6 correct solution
0 otherwise

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

RESOURCES

Question paper
Worksheet
Scrap paper

SUPERVISOR**STATION 6**

MARKS TO
AWARD

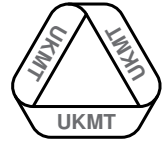
6 correct solutions to both parts
3 only one part correct
0 otherwise

- (a) There is essentially only one solution, shown on the left above. A reflection of the arrangement shown is also a solution.
- (b) There is essentially only one solution, shown on the right above. A reflection of the arrangement shown is also a solution.

Ensure that any pieces of card and scrap paper are cleared away before the next team arrives.

RESOURCES

Question paper
Four pieces of red card
Four pieces of blue card

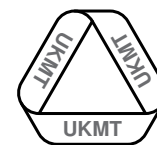
**SUPERVISOR****STATION 7**

$$123 - 45 - 67 + 89$$

MARKS TO
AWARD**6** correct solution
0 otherwise

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

RESOURCESQuestion paper
Worksheet
Scrap paper



SUPERVISOR

STATION 8

10

MARKS TO
AWARD

6 correct solution
0 otherwise

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

RESOURCES

Question paper
Worksheet
Scrap paper