

Station 1

A domino has two parts, each containing one number.



A complete set of dominoes containing the numbers 0, 1, 2, 3, 4, 5 and 6, part of which is shown, has a total of 28 dominoes.

Part A

How many dominoes does a complete set containing the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 have?

Part B

A similar complete set of dominoes containing the numbers 0, 1, 2, 3, ..., n has a total of 91 dominoes. What is the value of n ?



Station 1 Worksheet

Part A

Number of Dominoes = _____

Part B

The value of n = _____



Station 1 Supervisor's Sheet

Resources:

A complete set of dominoes

Question paper

Worksheet

Marking:

Part A - 3 Marks for an answer of **55**.

Part B – 3 Marks for an answer of **12**.

Ensure that the worksheet is cleared away before the next team comes.



Station 2

In a certain code the vowels A, E, I, O and U represent the five smallest positive square numbers in increasing order. All the other letters in the alphabet, B, C, D, \dots, X, Y, Z represent the twenty-one smallest positive even integers that are not square numbers, again in increasing order.

Thus, $A = 1, B = 2, C = 6, D = 8$ etc

When the letters in

‘TEAM MATHS FINAL’

are changed into numbers, using the code shown above, what is their sum?



Station 2 Worksheet

Sum = _____



Station 2 Supervisor's Sheet

Resources:

Question paper

Worksheet

Scrap paper

Marking:

An answer of **246** scores **6** marks.

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



Station 3

Place the eight cards, each bearing a prime number, one in each square such that the sums of the 3 prime numbers in 1 down and in 2 down are both equal to 53 and the sums of the 3 prime numbers in 1 across and in 3 across are equal to the same prime number.



Station 3 Worksheet

1		2
3		



Station 3 Number Cards

3	5
7	11
17	19
37	43



Station 3 Supervisor's Sheet

Resources:

Question paper

Laminated grid

Number cards: 3, 5, 7, 11, 17, 19, 37 and 43

11	17	3
37		43
5	19	7

5	19	7
37		43
11	17	3

3	17	11
43		37
7	19	5

7	19	5
43		37
3	17	11

Marking:

Any of the 4 correct solutions above – 6 marks.

Ensure that number cards are cleared away before the next team comes.



Station 4

How many regular polygons have an internal angle α° such that $160^\circ \leq \alpha^\circ < 170^\circ$?



Station 4 Worksheet

Number of regular polygons = _____



Station 4 Supervisor's Sheet

Resources:

Question paper

Worksheet

Marking:

6 marks for an answer of **18**.

Notes:

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



Station 5

Using the 16 cards (4 Aces, 4 Kings, 4 Queens and 4 Jacks), arrange the cards in four rows of four so that in each complete horizontal, vertical and diagonal line you have one of each suit and also one of each denomination.



Station 5 Supervisor's Sheet

Resources:

16 playing cards (4 Aces, 4 Kings, 4 Queens and 4 Jacks)

Question paper

Scrap paper

Marking:

Correct placement of the cards scores 6 marks.

Notes:

Please carefully check each horizontal, vertical and diagonal line. There are many different solutions to this.

Ensure any evidence of the previous placement and any scrap paper are cleared away before the next team arrives. The cards should be shuffled around between teams but may remain face up.

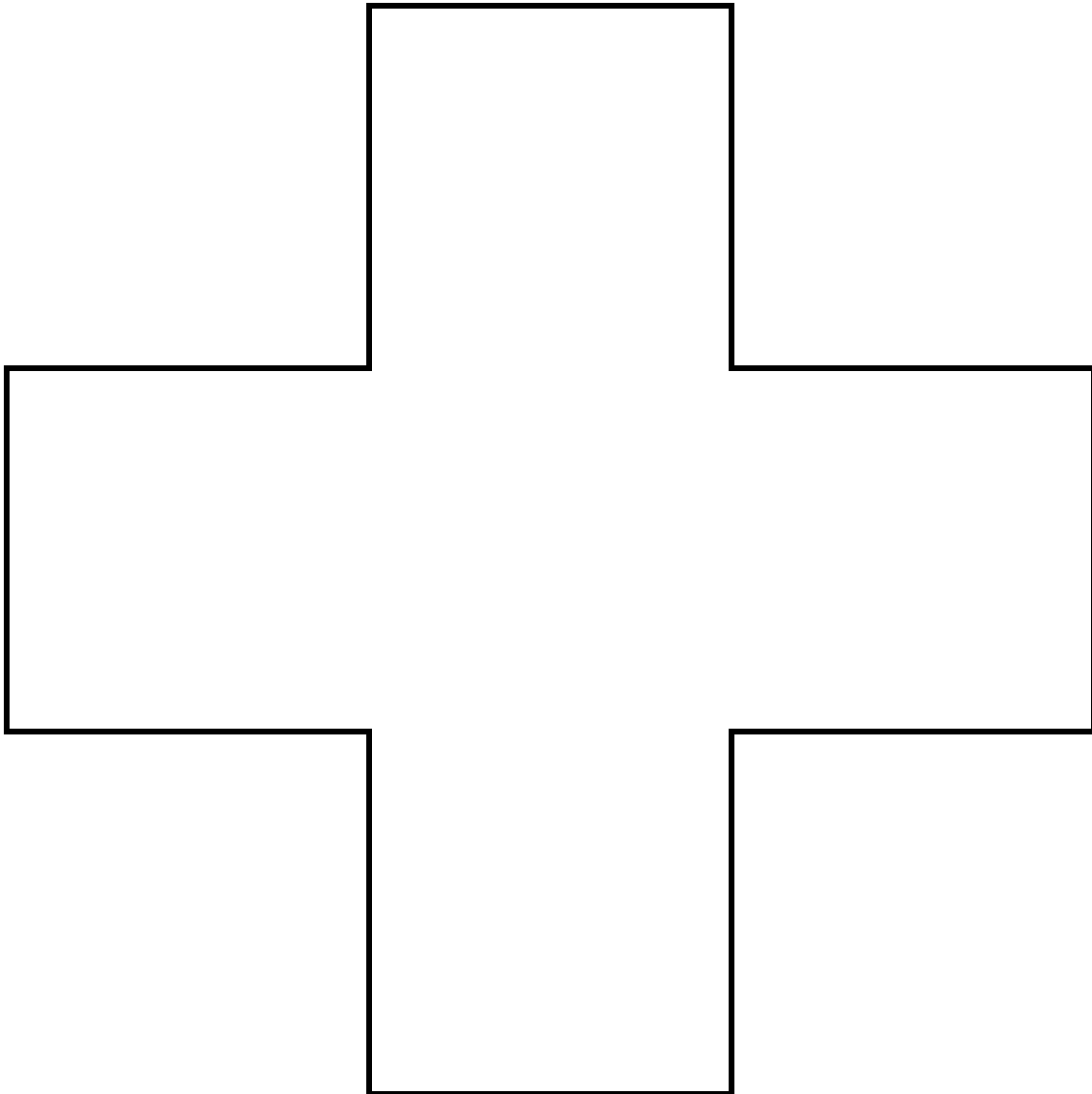


Station 6

Draw two straight lines on the cross provided (after first cutting it out from the worksheet) in such a way that when you cut along those lines you can rearrange the pieces of the cross into a square. No overlapping of, or gap between, the separate pieces is allowed.



Station 6 Worksheet



Station 6 Supervisor's Sheet

Resources:

Question paper

Several worksheets in thin card consisting of crosses

Scrap paper

Scissors

Ruler

Marking:

6 marks to be awarded for the correct presentation of a square with no overlaps or gaps and judged by eye.

Notes:

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

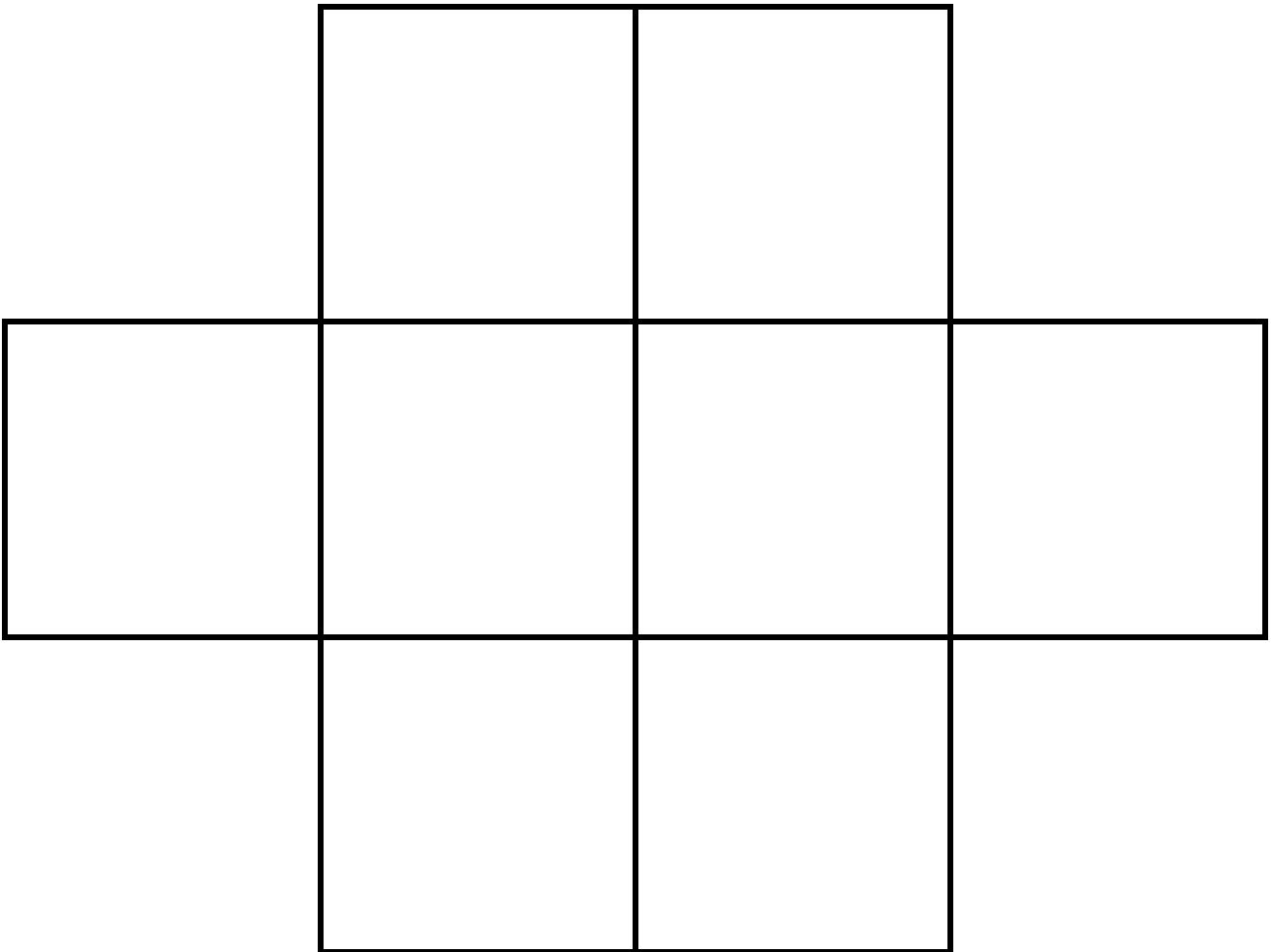


Station 7

Arrange the number cards 1 to 8 on the grid, one number in each square, so that no number is in contact on any side or diagonal with any number that is one greater or one less than it. So, for example, 4 cannot be next to 3 or 5.



Station 7 Worksheet



Station 7 Number Cards

1	2
3	4
5	6
7	8



Station 7 Supervisor's Sheet

Resources:

Question paper

Copy of laminated worksheet containing grid of squares

8 laminated number cards (1- 8)

Scrap paper

Marking: 6 marks for one of these correct solutions.

	6	4	
2	8	1	7
	5	3	

	4	6	
7	1	8	2
	3	5	

	5	3	
2	8	1	7
	6	4	

	3	5	
7	1	8	2
	4	6	

Notes:

Collect the number cards back together in a bunch away from the worksheet and remove any scrap paper before the next team arrives.



Station 8

A Harshad number is an integer that is exactly divisible by the sum of its digits. For example 1729 is a Harshad number because $1 + 7 + 2 + 9 = 19$ and 1729 can be divided exactly by 19.

Find the smallest positive Harshad number with a digit sum of 13.



Station 8 Worksheet

Smallest Harshad number = _____



Station 8 Supervisor's Sheet

Resources:

Question paper

Worksheet

Scrap paper

Marking:

6 marks are awarded for a correct solution of **247**.

Notes:

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

