Station 1

(a) The letters p, q, r and s represent different digits.

$p = 2r$ and $3(p + q + r) = s$.

What is the four-digit number '$pqrs$'?

[3 marks]

(b) The letters e, f and g represent different digits and h is the largest number that can satisfy the equations below.

$e = 2g$ and $3(e + f + g) = h$.

What is the value of $e + f + g + h$?

[3 marks]

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Station 2

Nikita and her three children all have their birthdays on the same day.

When the ages of her three children were in the ratio $1 : 2 : 3$ the sum of their ages equalled her age.

Thirty-six years later the sum of the ages of Nikita's three children was twice her age.

What was the ratio of the ages of her three children at that time? Give your answer in its simplest form.

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Station 3

Three different sized cubes have sides of integer length.

The three cubes are each split into cubes with sides of length one.

All these cubes with sides of length one are then put together to form a larger cube.

(a) What is the smallest possible side length of the larger cube?

[3 marks]

(b) What is the second smallest possible side length of the larger cube?

[3 marks]

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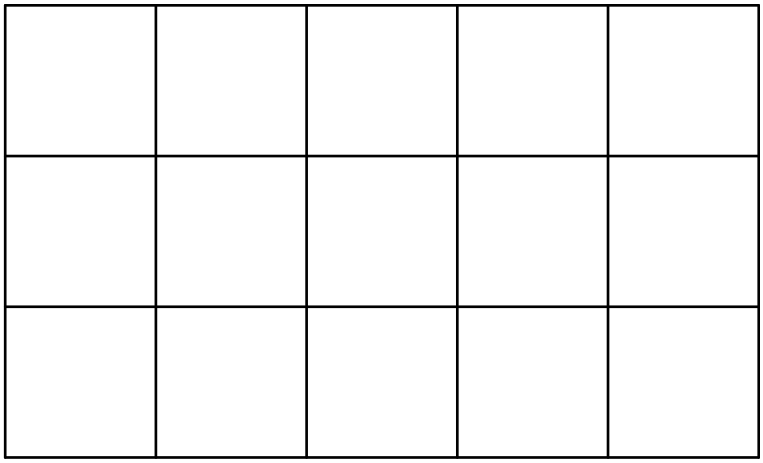
Station 4

How many rectangles, that are *not* squares, are formed by the lines of the 3×5 rectangular grid of squares below?



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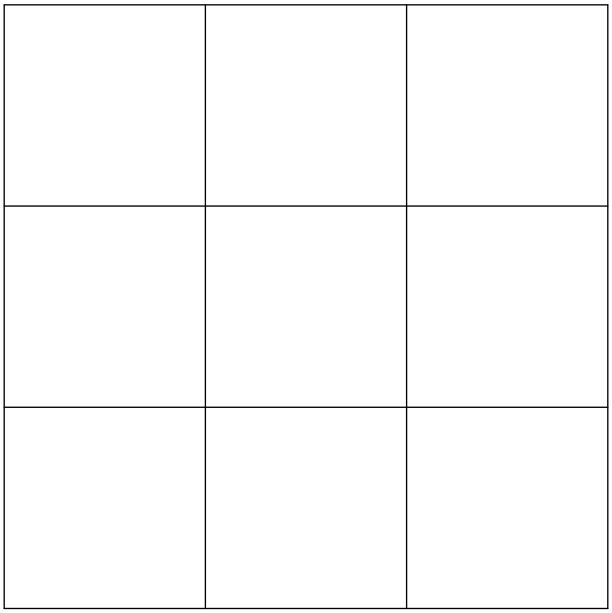
Station 5

The word *facetious* contains the five vowels in alphabetical order.

Place the letters F, A, C, E, T, I, O, U and S, with one in each blank cell, so that adjacent letters horizontally are a prime number of letters apart in the alphabet.



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Station 6

(a) An 18×8 grid is drawn on a green piece of paper.

Without folding, cut the paper along the gridlines into smaller rectangular pieces of paper.

Rearrange the pieces to form a square.

These pieces cannot overlap at all.

On the worksheet write down the least number of cuts needed in order to form a square. [3 marks]

(b) An 16×9 grid is drawn on a yellow piece of paper.

Without folding, cut the paper along the gridlines into smaller rectangular pieces of paper.

Rearrange the pieces to form a square.

These pieces cannot overlap at all.

On the worksheet write down the least number of cuts needed in order to form a square. [3 marks]

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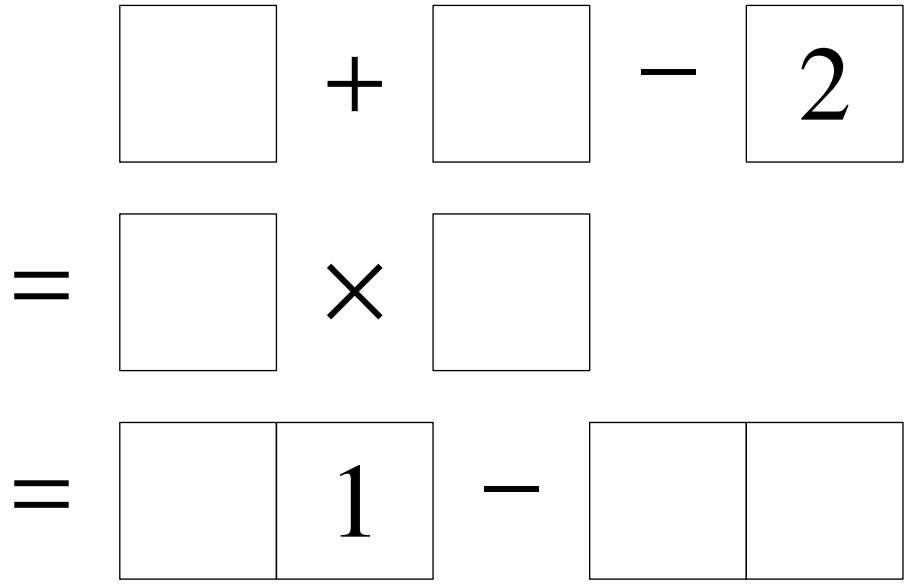
Station 7

The numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9 are to be placed, once each in a blank cell, such that the equations below are correct.

The numbers 1 and 2 are already placed.



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Station 8

All of the non-zero digits are multiplied by a non-zero digit.

The digits of each of the nine products are added separately.

This is repeated until nine digits remain.

For example, each of the positive digits are multiplied by 7.

The positive digits:	1	2	3	4	5	6	7	8	9
Multiplied by 7:	7	14	21	28	35	42	49	56	63
Sum of digits:	7	5	3	10	8	6	13	11	9
Sum of digits:	7	5	3	1	8	6	4	2	9

It can be seen that the nine digits are 1, 2, 3, 4, 5, 6, 7, 8 and 9, in some order.

When all of the positive digits are multiplied by each of the positive digits, including 7, how many times are the nine digits equal to

1, 2, 3, 4, 5, 6, 7, 8 and 9, in some order?

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Station 1 Worksheet

(a) Number

(b) Number:

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Station 2 Worksheet

Ratio:

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Station 3 Worksheet

(a) Number

(b) Number:

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Station 4 Worksheet

Number:

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Station 6 Worksheet

(a) Number

(b) Number:

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Station 8 Worksheet

Number:

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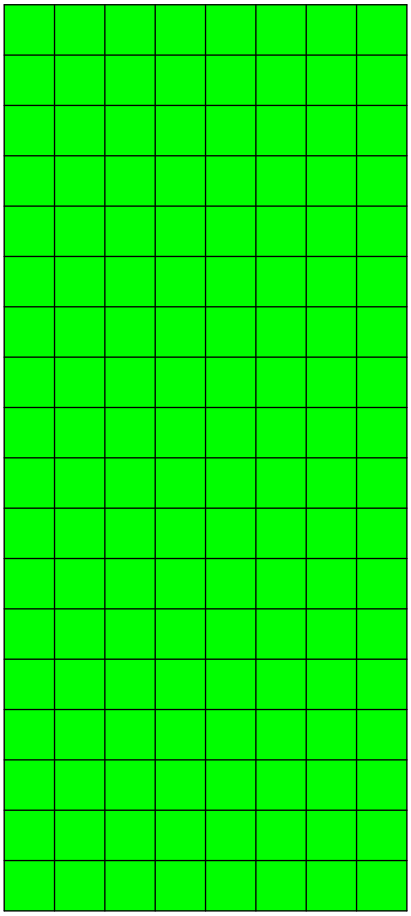
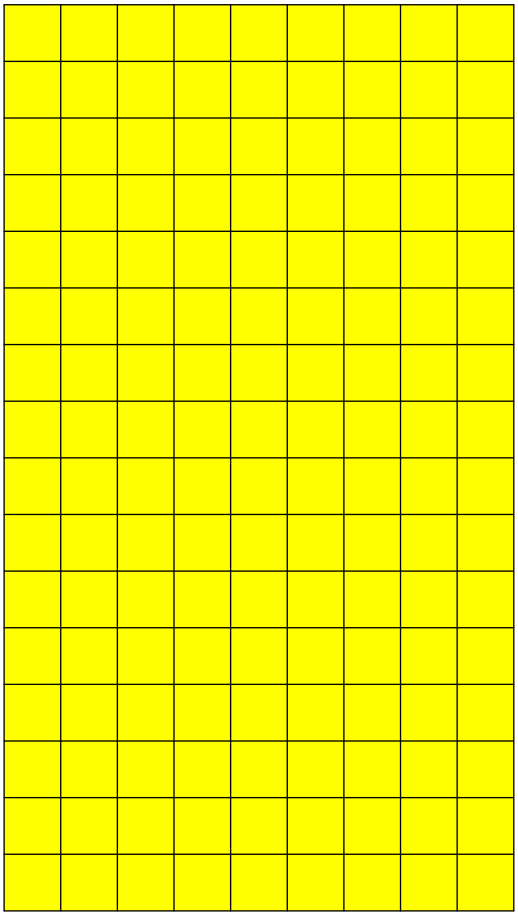
S	T	U
F	I	O
A	C	E





9
8
7
6
5
4
3

TEAM NUMBER SCHOOL NAME

Station 1 (a) Number (b) Number

Complete the worksheet and show it to the supervisor.

(a) 0 3

(b) 0 3

Station 2 Ratio

Complete the worksheet and show it to the supervisor.

0 6

Station 3 (a) Number (b) Number

Complete the worksheet and show it to the supervisor.

(a) 0 3

(b) 0 3

Station 4 Number

Complete the worksheet and show it to the supervisor.

0 6

Station 5

Show your answer(s) to the supervisor.

0 6

Station 6 (a) Number (b) Number

Complete the worksheet and show it to the supervisor.

(a) 0 3

(b) 0 3

Station 7

Show your answer(s) to the supervisor.

0 6

Station 8 Number

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

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SUPERVISOR

STATION 1

(a) 2019 (b) 84

Ensure that 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

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SUPERVISOR

STATION 2

7 : 8 : 9

The numbers 7, 8 *and* 9 *may be 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
	0 otherwise

RESOURCES

Question paper
Worksheet
Scrap Paper

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SUPERVISOR

STATION 3

(a) 6 (b) 9

Ensure that the worksheet and any scrap paper used 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

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SUPERVISOR

STATION 4

64

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

MARKS TO AWARD	
	6 correct solution
	0 otherwise

RESOURCES

Question paper
Worksheet
Scrap Paper

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STATION 5

A	*C*	*E*
F	*S*	*U*
I	*T*	*O*

Middle column is C, T and S in any order.

A and E either side of C.

I and O either side of T.

F and U either side of S.

Ensure that 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

Laminated Grid
Question paper
9 Cards with a Letter on
Scrap paper

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SUPERVISOR

STATION 6

(a) 2 (b) 3

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

MARKS TO AWARD

6 correct solution
3 one mark correct
0 otherwise

RESOURCES

Question paper
18 × 8 grid of green paper
16 × 9 grid of yellow paper
Scissors
Worksheet
Scrap Paper

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SUPERVISOR

STATION 7

$$6 + 8 - 2 = 3 \times 4 = 71 - 59$$

The numbers 3 *and* 4 *are interchangeable as are* 6 *and* 8.

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

MARKS TO AWARD	
	6 correct solution
	0 otherwise

RESOURCES

Question Paper
Cards numbered 3 - 9
Scrap Paper

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SUPERVISOR

STATION 8

6

Ensure any evidence of each team's solution is removed before the next team arrives.

MARKS TO AWARD	
	6 correct solution
	0 otherwise

RESOURCES

Question paper
Worksheet
Scrap paper

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