

**United Kingdom
Mathematics Trust**

TEAM MATHS CHALLENGE
2019

NATIONAL FINAL

SUPERVISOR'S BOOKLET

Please ensure that students do not have access to this booklet, and take care to hold it so that answers cannot be seen.

Please ensure that students use blue or black ink to write their answers; teachers are asked to use red ink for marking.

SUPPORTED BY

LETTER  ONE

Mark the answers only when you are given **all four answers**, or at the end of the round.

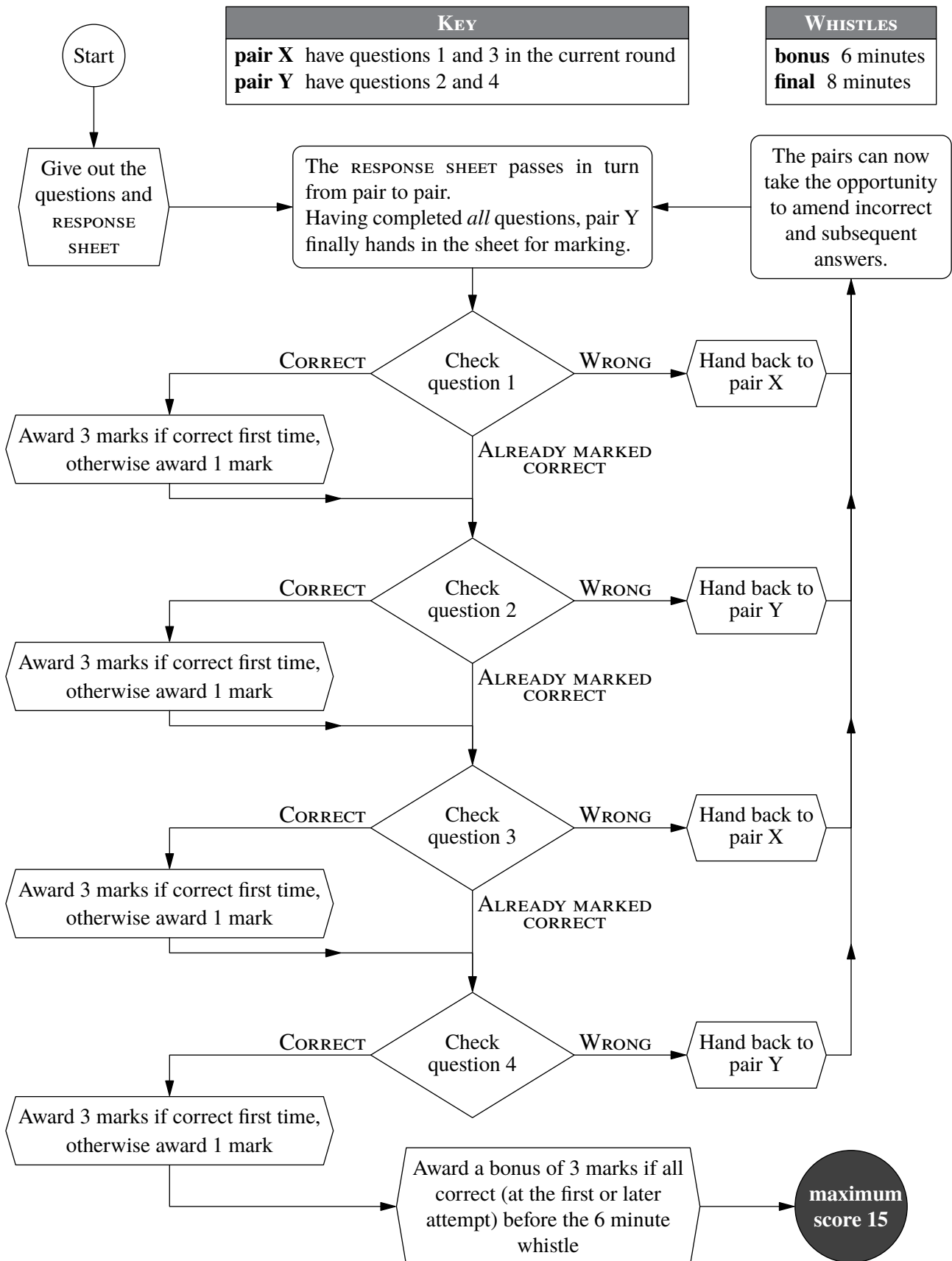
Stop marking when an answer is wrong. If the round hasn't ended, hand the ANSWER SHEET back for correction.

A1 10	B1 9	C1 8	D1 2019
A2 50	B2 3	C2 240	D2 10
A3 42	B3 12	C3 4	D3 60
A4 11	B4 5	C4 37	D4 4

On the RESPONSE SHEET:

Circle the mark awarded for each question and cross out the others.
At the end of the round, either circle the bonus mark or cross it out.

The flowchart explains the order in which questions should be marked.



CROSSNUMBER

1		2				3		4
		5		6				
7	8					9		
			10		11			
12							13	
		14		15				
16						17		18
		19						
20						21		

ACROSS

- x , where

$$\frac{19 \text{ ACROSS}}{17 \text{ DOWN} - x} = 503 \times 12 \text{ ACROSS}$$
(3)
- 10 DOWN minus a square (3)
- The product of 337 and the 21st prime (5)
- A Fibonacci number (3)
- x , where 11 DOWN $- x$ is a cube (3)
- A palindromic cube (4)
- The number of digits in $4^{11} \times 5 \times 125^7$ (2)
- A cube (2)
- A multiple of 7 (4)
- The mean of 17 DOWN and 18 DOWN (3)
- 21 ACROSS minus $\sqrt{17 \text{ DOWN}}$ (3)
- The number of degrees in an exterior angle of a 30-sided regular polygon plus the product of 14 ACROSS and $(8 \text{ DOWN} - 2 \text{ DOWN})$ (5)
- The sum of the digits of this number equals the sum of the digits of 6 DOWN (3)
- $\sqrt[3]{8 \text{ DOWN}} \times 13 \text{ ACROSS}$ (3)

DOWN

- The number of degrees of an interior angle of a regular polygon with $(8 \text{ DOWN} - 2 \text{ DOWN})$ sides (3)
- The product of two consecutive primes (3)
- The remainder when 14 ACROSS is divided by 1748 (4)
- The sum of 13 ACROSS plus the product of 7 ACROSS and 100 (5)
- x , where

$$\frac{16 \text{ ACROSS}}{x - 1 \text{ ACROSS}} = \frac{8 \text{ DOWN} - 7 \text{ ACROSS}}{110}$$
(3)
- A palindromic cube (3)
- The product of the digits of 13 DOWN (3)
- A Fibonacci number (3)
- 12 ACROSS plus the product of 100 and the mean of 9 ACROSS, 13 DOWN and 15 DOWN (5)
- $10 \text{ ACROSS} \div 17 \text{ DOWN} \times 13 \text{ ACROSS}$ (3)
- A cube and a power of 2 (4)
- $\sqrt[3]{10 \text{ ACROSS}} \times$ the mean of 12 ACROSS and 13 ACROSS (3)
- The number of digits in $16^{30} \times 125^{40}$ (3)
- The sum of 2 DOWN, 7 ACROSS and 8 DOWN (3)

CROSSNUMBER

¹ 1	1	² 3				³ 1	2	⁴ 2
6		⁵ 2	4	⁶ 6	0	1		3
⁷ 2	⁸ 3	3		2		⁹ 3	1	3
	4		¹⁰ 1	3	¹¹ 3	1		2
¹² 2	3		2		7		¹³ 2	7
9		¹⁴ 4	6	¹⁵ 2	7		9	
¹⁶ 5	1	0		7		¹⁷ 1	7	¹⁸ 8
2		¹⁹ 9	2	5	5	2		9
²⁰ 3	2	6				²¹ 1	8	9

Marking Instructions—a reminder

- Pairs should write their own answers in the Answer Grid; teachers should not do this on their behalf.
- Pairs may only communicate through the teacher, and only to request that the other pair work on a particular clue.
- When a pair enters an answer in the Answer Grid, the teacher checks each digit of the answer:
 - if it is correct, place a tick in the dotted circle and award one mark
 - if it is wrong, cross it out, write in the correct digit, and place a cross in the dotted circle
 - show the correct answer to both pairs so that they are up-to-date.
- A pair may enter just one digit if they wish, rather than a complete answer.
- A pair may sacrifice a square, by guessing, if they wish.

Station 1

(a) 2019 (b) 84

Station 5

<i>A</i>	<i>C</i>	<i>E</i>
<i>F</i>	<i>S</i>	<i>U</i>
<i>I</i>	<i>T</i>	<i>O</i>

Station 2

7 : 8 : 9

Station 6

(a) 2 (b) 3

Station 3

(a) 6 (b) 9

Station 7

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

Station 4

64

Station 8

6

On the RESPONSE SHEET:

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

TEAM NUMBER SCHOOL NAME

A1 2019 <input type="radio"/> 0 <input type="radio"/> 2	A5 24 <input type="radio"/> 0 <input type="radio"/> 2	A9 12 <input type="radio"/> 0 <input type="radio"/> 2
B1 0 <input type="radio"/> 0 <input type="radio"/> 2	B5 62 <input type="radio"/> 0 <input type="radio"/> 2	B9 1920 <input type="radio"/> 0 <input type="radio"/> 2
A2 8181 <input type="radio"/> 0 <input type="radio"/> 2	A6 3 <input type="radio"/> 0 <input type="radio"/> 2	A10 117 <input type="radio"/> 0 <input type="radio"/> 2
B2 9 <input type="radio"/> 0 <input type="radio"/> 2	B6 2696 <input type="radio"/> 0 <input type="radio"/> 2	B10 17 <input type="radio"/> 0 <input type="radio"/> 2
A3 12 <input type="radio"/> 0 <input type="radio"/> 2	A7 624 cm ² <input type="radio"/> 0 <input type="radio"/> 2	A11 501 <input type="radio"/> 0 <input type="radio"/> 2
B3 11 <input type="radio"/> 0 <input type="radio"/> 2	B7 12 cm <input type="radio"/> 0 <input type="radio"/> 2	B11 2550 <input type="radio"/> 0 <input type="radio"/> 2
A4 28 <input type="radio"/> 0 <input type="radio"/> 2	A8 8 <input type="radio"/> 0 <input type="radio"/> 2	A12 108 <input type="radio"/> 0 <input type="radio"/> 2
B4 82 <input type="radio"/> 0 <input type="radio"/> 2	B8 1500 <input type="radio"/> 0 <input type="radio"/> 2	B12 76 <input type="radio"/> 0 <input type="radio"/> 2

Correct answers score 2 points: circle 2 or 0 for each question and cross out the other number.
At the end of the round, draw a line under the last question attempted.

FINAL SCORE /48

BACK

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