

TEAM MATHS CHALLENGE
2016

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.

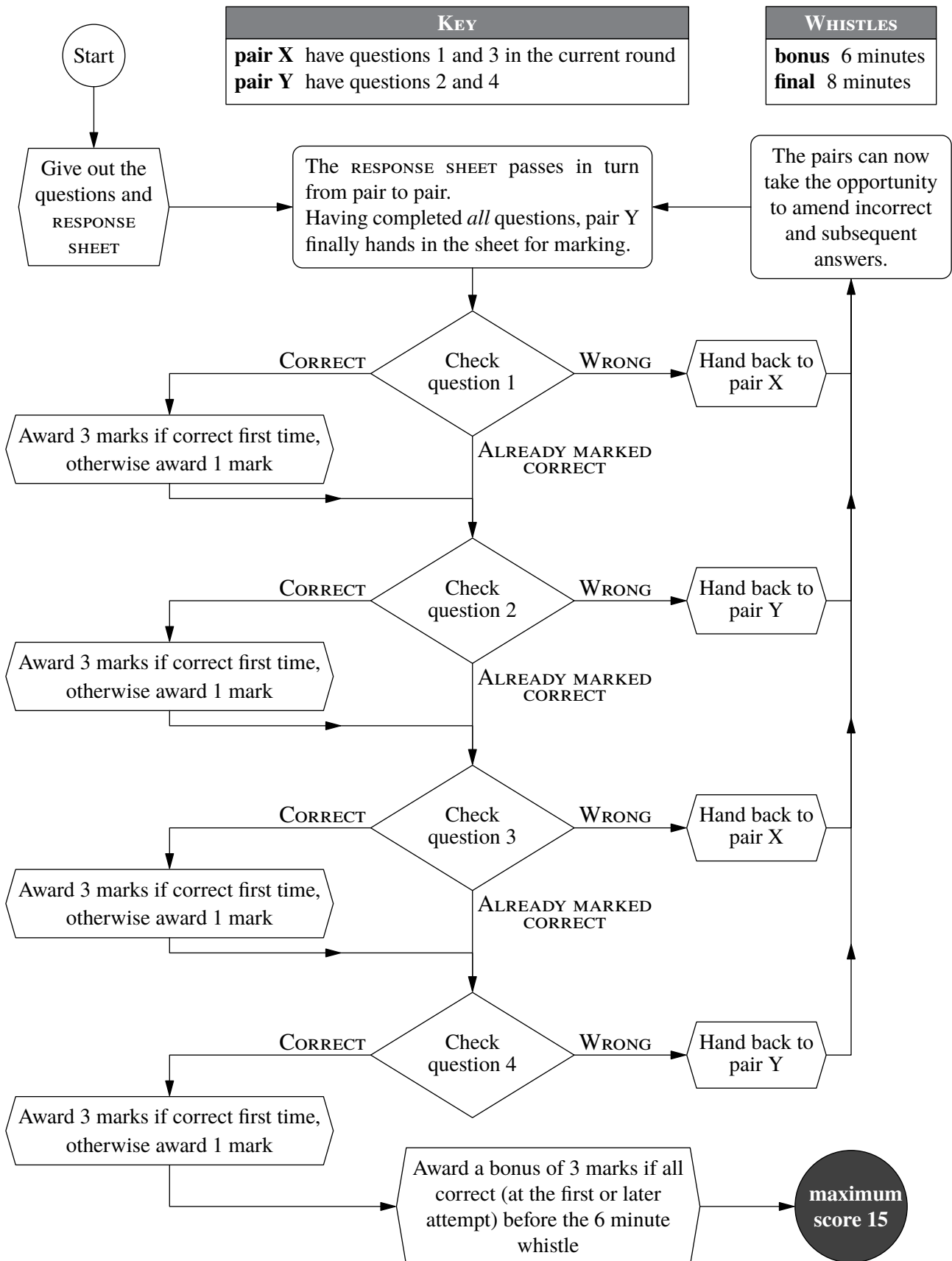
Please ensure that students use blue or black ink to write their answers; teachers are asked to use red ink for marking.

A1 12	B1 20	C1 1	D1 10
A2 62	B2 9	C2 6	D2 5
A3 120	B3 27	C3 2	D3 6
A4 6	B4 -2016	C4 8	D4 55

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				22		
		23						
24						25		

ACROSS

1. 7 ACROSS minus 11 DOWN (3)
3. The square root of $23^3 + 24^3 + 25^3$ (3)
5. A palindromic number whose digits have a sum of 33 (5)
7. The difference between two consecutive Fibonacci numbers (3)
8. A number less than 3 DOWN (3)
10. A multiple of 18 DOWN (4)
13. The largest two-digit factor of 2 DOWN (2)
15. 43 plus the square root of 12 DOWN (2)
17. $4 + 10 \times 12^2$ (4)
20. 21 DOWN minus a cube (3)
22. $n^n + 1$ for some n (3)
23. A factor of 5 ACROSS (5)
24. The mean of 14 DOWN and 1 ACROSS (3)
25. 4994 minus 19 DOWN (3)

DOWN

1. A palindromic number whose digits have a sum of 41 and which consists of two different digits (5)
2. 88×77 (4)
3. A number greater than 8 ACROSS (3)
4. A square that is $8 \text{ ACROSS} \times 3 - 102$ (3)
6. A Fibonacci number that is a multiple of 13 (3)
9. $15 \text{ ACROSS} \times 11 + 11 \text{ DOWN}$ (3)
11. A multiple of 19 (3)
12. A square (3)
14. A multiple of 13 ACROSS (3)
16. $5^5 + 4^5 + 7^5 + 4^5 + 8^5$ (5)
18. A factor of 10 ACROSS (3)
19. The product of its digits is 432 (4)
20. The mean of 20 DOWN and 21 DOWN (3)
21. A power of 2 (3)

CROSSNUMBER

¹ 8	1	² 6				³ 2	0	⁴ 4
8		⁵ 7	8	⁶ 3	8	7		4
⁷ 9	8	7		7		⁸ 1	⁹ 8	1
8		¹⁰ 6	¹¹ 1	7	¹² 4		8	
¹³ 8	¹⁴ 8		7		8		¹⁵ 6	¹⁶ 5
	8		¹⁷ 1	¹⁸ 4	4	¹⁹ 4		4
²⁰ 1	0	²¹ 1		4		²² 2	5	7
2		²³ 2	6	1	2	9		4
²⁴ 8	4	8				²⁵ 6	9	8

Marking Instructions—a reminder

- Pairs may only communicate through the teacher, and only to request that the other pair works on a particular clue.
- When a pair enters an answer in the grid on the response sheet, 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
 - the correct answer is then shown 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.

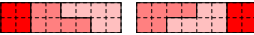
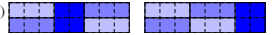
Station 1

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

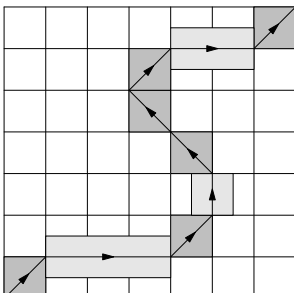
Station 5

(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

Station 2

(a)  (b) 

Station 6



Station 3

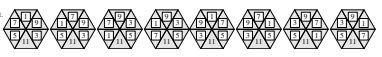
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Station 7

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

Station 4

Two of these solutions — but the second must not reflect the first.



Station 8

36

On the RESPONSE SHEET: Circle the mark awarded for each question and cross out the others.

TEAM NUMBER SCHOOL NAME

A1 $A C B$ 0 2	A6 7.5 or $7\frac{1}{2}$ or $\frac{15}{2}$ 0 2	A11 25 square units 0 2
B1 324 cm ² 0 2	B6 12 0 2	B11 24 0 2
A2 2061 0 2	A7 $\frac{5}{9}$ 0 2	A12 315 days 0 2
B2 37 sweets 0 2	B7 6 cm 0 2	B12 £2160 £ 0 2
A3 2 minutes 0 2	A8 11 £ 0 2	A13 8 0 2
B3 $\frac{9}{5}$ 0 2	B8 (0, 5) 0 2	B13 7.5 or $7\frac{1}{2}$ or $\frac{15}{2}$ 0 2
A4 5 0 2	A9 (8,4) 0 2	A14 4.32 litres 0 2
B4 £95.00 0 2	B9 5 0 2	B14 $3x^2$ square units 0 2
A5 9 sweets 0 2	A10 96 metres 0 2	A15 55 hours 15 minutes 0 2
B5 15.23 0 2	B10 162 0 2	B15 41 paces 0 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 /60

BACK

PAGE