



UKMT Team Maths Challenge 2012

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.



UKMT Team Maths Challenge 2012

HEAD-TO-HEAD (MINI RELAY) ANSWERS AND SCORE SHEET

School number: School name: _____

A1	7
A2	36
A3	72
A4	24

B1	30
B2	15
B3	10
B4	8

C1	6
C2	25
C3	8
C4	96

D1	4
D2	9
D3	4
D4	12

MARKING REMINDERS:

Circle mark awarded (3 or 1) for each question:
 1st attempt = 3,
 any subsequent attempt = 1.

Cross out '3' if question answered incorrectly (only 1 mark now possible) - subsequent questions can still get 3 marks.

Award bonus of 3 marks to first team in pair to present a complete set of correct answers (whether on their first attempt or not).

Round A			Round B		
A1	3	1	B1	3	1
A2	3	1	B2	3	1
A3	3	1	B3	3	1
A4	3	1	B4	3	1
Bonus	3		Bonus	3	
Total	<input style="width: 100%; height: 20px;" type="text"/>		Total	<input style="width: 100%; height: 20px;" type="text"/>	

Round C			Round D		
C1	3	1	D1	3	1
C2	3	1	D2	3	1
C3	3	1	D3	3	1
C4	3	1	D4	3	1
Bonus	3		Bonus	3	
Total	<input style="width: 100%; height: 20px;" type="text"/>		Total	<input style="width: 100%; height: 20px;" type="text"/>	

Grand Total:



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HEAD-TO-HEAD (MINI RELAY) EXAMPLE OF MARKING

Only mark when all questions have been answered, or the time is up.

Handed in first time

Question A1 24 ✓	<i>Right on first attempt</i> 3 marks – circle ‘3’ against A1 on score sheet
Question A2 17 ✗	<i>Wrong - stop marking and return to team</i> 3 marks no longer available - cross out ‘3’ against A2 on score sheet
Question A3 8	<i>(Ignore answers to questions 3 and 4 – not counted as attempts)</i>
Question A4 5	



Handed in second time

Question A1 24 ✓	<i>Right on first attempt</i> 3 marks (<i>already awarded</i>)
Question A2 17 ✗ 16 ✓	<i>Right on second attempt</i> 1 mark – circle ‘1’ against A2 on score sheet
Question A3 8 7 ✓	<i>Right on first attempt</i> 3 marks – circle ‘3’ against A3 on score sheet
Question A4 5 6 ✗	<i>Wrong - return to team</i> 3 marks no longer available - cross out ‘3’ against A4 on score sheet

and so on, until all answers are right or the time is up

All questions right (at first or subsequent attempts) before the team you are paired with
= Bonus 3
(circle ‘3’ against Bonus on score sheet)



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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					26			

Across

- 1 The value of $2x^2 - 2x - 3$ when 22 Across is substituted for x . (4)
- 3 The difference between 16 Across and the sum of 21 Down and 22 Down (4)
- 5 The interior angle of a regular polygon with the number of sides equal to 10 Down (3)
- 6 Half a triangle number (2)
- 7 A square number (2)
- 9 Mean of 9 Across, 11 Across, 14 Across and 16 Across (2)
- 11 An even Fibonacci number (2)
- 13 Half the difference between 22 Down and 19 Down (2)
- 14 The difference between 23 Down and 24 Across (2)
- 16 The exterior angle of a regular polygon with (17 Down + 15 Down) sides (2)
- 18 A multiple of 9 (2)
- 20 The smaller solution of $\begin{cases} 5x - 4y = 42 \\ 7x - 5y = 87 \end{cases}$ (2)
- 22 The larger solution of $\begin{cases} 5x - 4y = 42 \\ 7x - 5y = 87 \end{cases}$ (2)
- 24 One of the angles of an isosceles triangle which has an angle of 17 Down° (3)
- 25 Twice a Fibonacci number (4)
- 26 Half the product of 18 Across and 16 Across (4)

Down

- 1 The sum of 23 Down and 24 Across (3)
- 2 A prime number (3)
- 3 The square root of 24964 (3)
- 4 The interior angle of a regular polygon with 17 Down sides (3)
- 6 A multiple of 79 and also of 109 (5)
- 8 The result of multiplying 100 more than the difference between 1 Across and 25 Across by eleven (5)
- 10 The highest common factor of 616 and 520 (1)
- 12 The square root of 13 Across (1)
- 15 The solution of $2x^3 + 14 = 700$ (1)
- 17 One less than the square root of 7 Across (1)
- 19 An odd cube number (3)
- 21 The sum of 3^2 , 22 Down and 24 Across (3)
- 22 The square of a Fibonacci number (3)
- 23 The product of 11 Across and 15 Down (3)



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CROSSNUMBER

Completed Grid

¹ 4	3	2	² 1		³ 1	0	3	⁴ 1
0			⁵ 1	3	5			3
2		⁶ 3	3		⁷ 8	⁸ 1		5
	⁹ 4	4		¹⁰ 8		¹¹ 3	4	
¹² 7		¹³ 4	9		¹⁴ 7	4		¹⁵ 7
	¹⁶ 2	4		¹⁷ 8		¹⁸ 9	9	
¹⁹ 3		²⁰ 4	²¹ 6		²² 4	7		²³ 2
4			²⁴ 1	6	4			3
²⁵ 3	1	9	4		²⁶ 1	1	8	8

Marking Instructions – a reminder

Pairs may only communicate through the teacher, for instance 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 a digit is correct, put a tick in the shaded box underneath it; if it is incorrect, cross it out and enter the correct digit alongside it in the white box. 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.

When totting up the score award one mark for each tick.



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GROUP CIRCUS ANSWERS

<p>1. Answer:</p> <p>8 metres</p> <p>6 marks (cao)</p>	<p>2. Answer:</p> <p>1024 rectangles</p> <p>6 marks (cao)</p>																		
<p>3. Answer:</p> <p>$40^\circ, 96^\circ, 108^\circ, 116^\circ$</p> <p>(in any order)</p> <p>6 marks</p>	<p>4. Answer:</p> <p>total of 26 in each circle</p> <p>6 marks</p>																		
<p>5. Answer:</p> <table border="1" style="margin-left: auto; margin-right: auto;"><tbody><tr><td>1</td><td>6</td><td>9</td></tr><tr><td>6</td><td>7</td><td>6</td></tr><tr><td>9</td><td>6</td><td>1</td></tr></tbody></table> or <table border="1" style="margin-left: auto; margin-right: auto;"><tbody><tr><td>9</td><td>6</td><td>1</td></tr><tr><td>6</td><td>7</td><td>6</td></tr><tr><td>1</td><td>6</td><td>9</td></tr></tbody></table> <p>6 marks</p>	1	6	9	6	7	6	9	6	1	9	6	1	6	7	6	1	6	9	<p>6. Answer:</p> <p>85 squares</p> <p>6 marks (cao)</p>
1	6	9																	
6	7	6																	
9	6	1																	
9	6	1																	
6	7	6																	
1	6	9																	
<p>7. Answer:</p> <p>$N = 6$</p> <p>6 marks (cao)</p>	<p>8. Answer:</p> <p>10, 15, 9, 20, 12 <u>in this order</u></p> <p>6 marks (cao)</p>																		

6 points for each correct answer.



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RELAY score sheet

Team number

School name

Correct answers score 2 points – circle 2 or 0 for each question.

A1	2 / 0	14	B8	2 / 0	4
B1	2 / 0	500	A9	2 / 0	£9
A2	2 / 0	30°	B9	2 / 0	4
B2	2 / 0	£4–50	A10	2 / 0	144
A3	2 / 0	120	B10	2 / 0	30 th
B3	2 / 0	503	A11	2 / 0	240
A4	2 / 0	34	B11	2 / 0	222°
B4	2 / 0	36°	A12	2 / 0	174°
A5	2 / 0	342	B12	2 / 0	5p, 20p
B5	2 / 0	140	A13	2 / 0	2p
A6	2 / 0	4	B13	2 / 0	54°
B6	2 / 0	85	A14	2 / 0	2 : 1
A7	2 / 0	8, 15	B14	2 / 0	5
B7	2 / 0	20, 12	A15	2 / 0	16
A8	2 / 0	65	B15	2 / 0	56

TOTAL SCORE = _____



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