Regional 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.

Senior Team Maths Challenge 2010

For information only: DO NOT USE!

HEAD-TO-HEAD (MINI-RELAY)

School number: ☐ School name:_____

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			Total		

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			Total		

Grand Total:

Senior Team Maths Challenge 2010

Mini-Relay : Marking Instructions – a reminder

Teams can hand in the Answer Sheet only when they have an answer to all four questions. The teacher starts marking at Q.1 and stops marking at the first incorrect answer, ignoring any subsequent answers. The teacher circles 3 marks on the Score Sheet by each correct answer and crosses out the 3 for the first incorrect answer. The Answer Sheet is then returned to the pair who gave that incorrect answer.

When the Answer Sheet is handed in again only 1 mark is available for any question previously answered incorrectly. Teams may have as many attempts as they wish at such a question. Correct answers to later questions will still earn 3 marks each.

There will be a whistle after 4 minutes. Handing in an Answer Sheet with four correct answers before this whistle will earn a bonus of 3 marks in addition to the maximum of 8 marks available for the individual answers. This bonus is circled on the Score Sheet.

A final whistle is blown after 6 minutes. Teams must stop working and hand in their Answer Sheet for marking.

MINI-RELAY ANSWERS

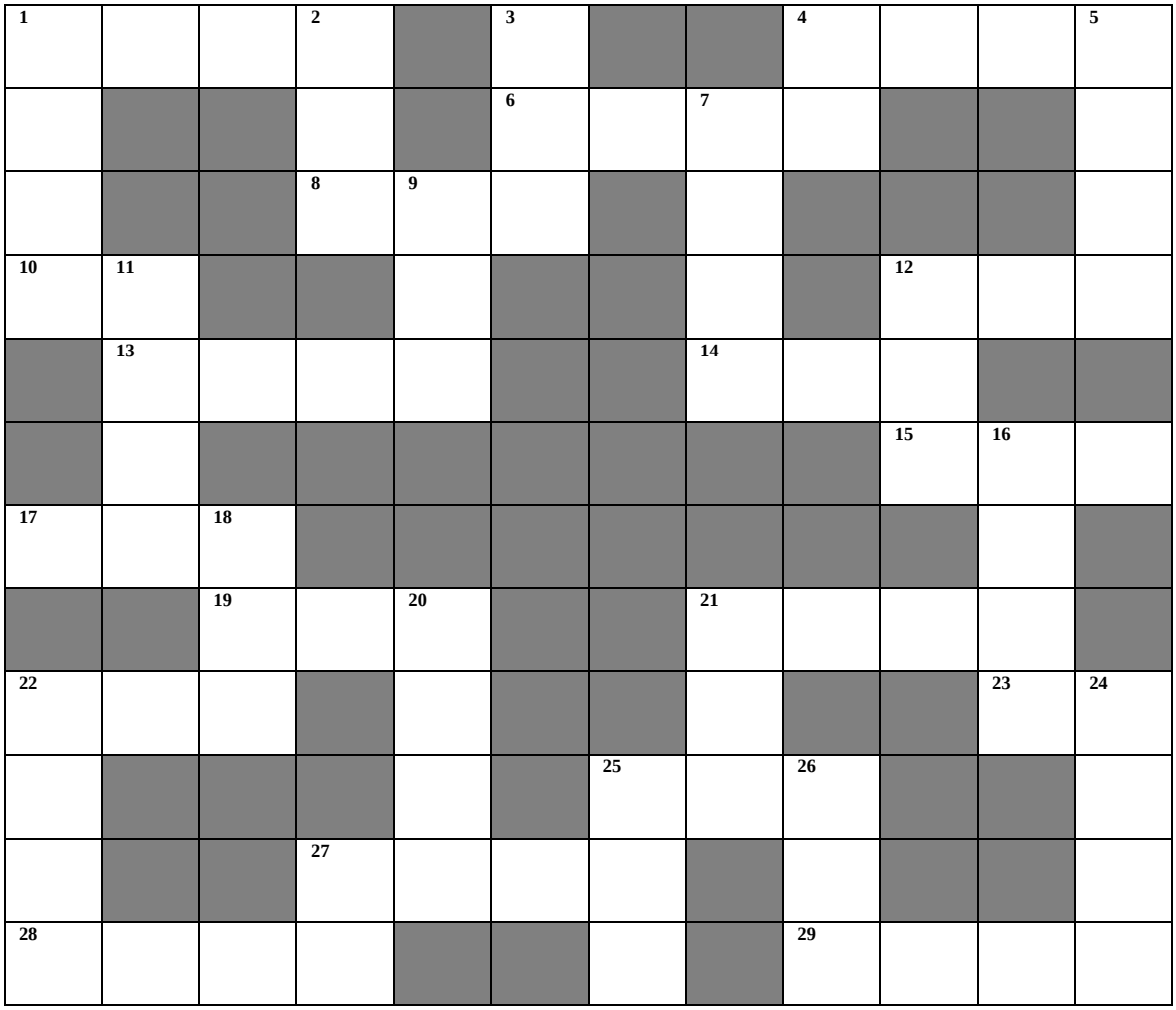
A1	**5**
A2	**12**
A3	**4**
A4	$x = \dfrac{4y+2}{y-3}$

C1	**20**
C2	**60**
C3	**41**
C4	**5.12 (*l*)**

B1	**6**
B2	**4**
B3	**6**
B4	**24**

D1	**2**
D2	**8**
D3	**4**
D4	**2**

Senior Team Maths Challenge 2010



Across

1 250 increased by 80%, then by 60% and then by 40%
4 Mean of 1 Across, 4 Across, 5 Down, 22 Down and 29 Across
6 Sum of 13 Across and 27 Across
8 Three more than one-sixth of 28 Across
10 The integer part of one-tenth of 26 Down
12 The sum of 19 Across and 18 Down
13 15 Across subtracted from half of 5 Down
14 The product of three and 25 Down
15 Five times the difference between the non-zero solutions of $x^5 + 96x^4 - 297x^3 = 0$
17 Power of eight
19 One more than the difference between 1 Across and 17 Across
21 Power of four
22 A power of 245
23 Twice the cube root of 21 Across
25 Product of the solutions of $11x + 2y = 153$, $17x - 3y = -62$
27 Nine multiplied by the difference between 3 Down and 27 Down
28 Rearrangement of the digits of 13 Across such that it has 521 as a factor
29 Difference between 27 Across and 13 Across

Down

1 A square number
2 Seven less than seven-eighths of 1 Across
3 Interior angle of a regular decagon
4 Multiple of 11
5 $91^2 - 19$
7 Double 4 Across
9 Four away from a square number
11 Power of 11
12 Multiple of 143
16 4 Down plus twice 12 Down
18 Product of the solutions of $4x + 3y = 161$, $3x + 2y = 119$
20 The reverse of the difference between 29 Across and 21 Across
21 Twice 25 Down
22 Difference between 13 Across and 1 Across
24 Mean of 4 Across, 15 Across and 24 Down
25 A prime number
26 Power of eight
27 Only number which can be written as both x^y and also y^x, where x and y are positive distinct integers

Senior Team Maths Challenge 2010

CROSSNUMBER

Completed Grid

1 1	0	0	2 8		3 1			4 3	5	8	5 8
2			7		6 4	7	7 7	3			2
2			8 5	9 2	4		1				6
10 5	11 1			2			7		12 7	4	2
	13 3	6	2	1			14 6	8	1		
	3								15 5	16 1	0
17 5	1	18 2								4	
		19 4	9	20 7			21 4	0	9	6	
22 2	4	5		2			5			23 3	24 2
6				6		25 2	4	26 5			0
1			27 1	1	5	2		1			4
28 3	1	2	6			7		29 2	4	6	9

Marking Instructions – a reminder

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, tick it and award one mark; if it is wrong, cross it out and enter the correct digit. 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.

Senior Team Maths Challenge 2010

GROUP ROUND ANSWERS

1. Value of $\|x - y\|$ = 30	**2.** Number of triangles: 56
3. Perimeter = $15(2 + \sqrt{2})$ cm	**4.** Number of possible scores: 155
5. Value = 11	**6.** Value of 10th term = 2010
7. α = $\frac{1}{2}(\beta + \gamma)$	**8.** Area(crescents) : area(square) 1 : 1
9. b = 505	**10.** Value of digit = 3

6 points for each correct answer.

TOTAL SCORE (/60)= _____

Senior Team Maths Challenge 2010

Volunteering Opportunities with the UK Mathematics Trust

** A CRB check undertaken by the Trust is required for activities marked by a *, and additional child protection checks may be required. Please see our Child Protection Policy on our website for further details.*

Setting Competition Questions

Involves generating mathematically challenging questions for multiple-choice, full written solutions format answers, and Team Challenges for 11-18 year olds.

Marking the Challenge follow on rounds

Involves spending a weekend with like-minded mathematicians marking solutions written by some of the best mathematicians of their generation. Sufficient mathematical understanding, an interest in problem solving and experience of marking secondary school student's work is preferred.

Assisting at Team Challenge and Senior Team Challenge Regional Finals *

Requires a commitment to attend the development weekend, together with sufficient mathematical understanding appropriate for the Team Challenge (12-14 year olds). Experience beyond higher GCSE maths is not required for the Senior Team Challenge (16-18 year olds). Some general administrative/organising assistance is also needed on the day.

Assisting at Teachers' Meetings

Use your administrative ability and face-to-face communication skills by assisting at training meetings for teachers.

Mentoring *

Assisting gifted secondary school students with mathematical problem solving.*

Manuscript Reading

Reading and commenting on potential UKMT publications or proof reading manuscripts at pre-printing stage.

Name _____ *Email* _____

Question setting □
Marking □
Team Challenge □
Senior Team Challenge □
Teachers' Meetings □
Mentoring □
Manuscript Reading □

*Address*_____

_____

_____

Phone number _____

Please also include a brief summary of relevant experience. If you are new to UKMT and wish to take part in * activities please also include the name and contact details of a referee, who can comment on your suitability.

Please return to UKMT, School of Maths, University of Leeds LS2 9JT or enquiry@ukmt.org.uk

BACK PAGE