



Annual Examinations for Secondary Schools 2014

FORM 4 MATHEMATICS TRACK 2 MARKING SCHEME

Notes for Marking of Scripts

Types of Marks

- **M**(ethod) marks are awarded for knowing a correct method of solution and attempting to apply it. Method marks cannot be lost for arithmetic mistakes. They can only be awarded if the method used would have led to the correct answer had not an arithmetic mistake been made. In general a correct method is implied by a correct answer and therefore **when a correct answer is given and no work is shown, no method marks are lost**.
- **A**(ccuracy) marks are given for correct answer only (c.a.o.) Incorrect answers, even though nearly correct, score no marks. Accuracy marks are also awarded for incorrect answers which are correctly followed through (f.t.) from an incorrect previous answer, **provided that f.t. is indicated in the marking scheme**. No method (M) or accuracy (A) marks are awarded when a wrong method leads to a correct answer.
- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

Misreading

M marks can still be earned (unless that part of the question is trivialized) but the final A marks are lost.

Crossed out working

An answer or working that is crossed out and not replaced is marked as if it was not crossed out. If the answer or working is replaced, then the crossed out answer or working is ignored and should not be considered for marking.

Units

In general, missing or inaccurate units are not penalised unless otherwise indicated in the marking scheme.

Other

- Incorrect working or statement following a correct answer is ignored.
- Marks are not sub-divisible; no half marks may be awarded.
- Other abbreviations used:
 - o.e. (or equivalent)
 - e.e.o.o. (each error or omission)
- Markers are advised to indicate the M, A or B marks awarded in the body of the script and then write their total in the margin. The total mark for each question should be written in the table included at the top of page 1 of the main paper. This measure facilitates the moderation of papers.

Non Calculator Paper (20 marks)

Each question carries **one** B mark except for question no. 18 which carries **two** B marks.

No. 1	No. 2	No. 3	No. 4	No. 5
3.75×10^5	33	$27\frac{8}{9}$	B or 200	1
No. 6	No. 7	No.8	No. 9	No. 10
D or 11 is a multiple of 44	-11	10	30°	D or $\frac{8}{15}$
No. 11	No. 12	No. 13	No. 14	No. 15
$x = 5$	Any three numbers that have a mean of 7	C or PQRS has rotational symmetry of order 2	385	-5
No. 16	No. 17	No. 18	No. 19	
7	20	$x = 80^\circ$ $y = 60^\circ$	1.5	

Main Paper (80 marks)

Quest.	Requirements	Marks	Additional Guidance												
1	a) $1000 \times 18 \div 600 = 30$	M1 A1													
	b) (i) $9 \times 4 = 36$ hours (ii) $36 \div 6 = 6$ hours	B1 M1 A1													
2	a) $495 \div 220 = 2.25$ h $= 2$ h 15 min	M1 A1	For 2 h 15 min only Correct conversion of units												
	b) $3 \times 22000 \div 60 = 1100$ m	M1 M1 A1													
3	a) <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>Design Number</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>7</td> </tr> <tr> <td>Number of hexagons</td> <td></td> <td></td> <td></td> <td>13</td> <td>22</td> </tr> </tbody> </table>	Design Number	1	2	3	4	7	Number of hexagons				13	22	B2	-1 e.e.o.o.
	Design Number	1	2	3	4	7									
	Number of hexagons				13	22									
b) Number of hexagons = $3n + 1$	B1														
c) No Valid reason supported by working	A1 M1														

4	a)	Sum of interior angles = $(2n - 4) \times 90^\circ$ $= (2 \times 5 - 4) \times 90^\circ$ $= 540^\circ$	M1 M1	8	Formula seen or implied Substitution and correct answer obtained Accept any other valid method
	b)	(i) $1 + 4 + 4 + 1 + 8 = 18$ $540 \div 18 = 30^\circ$ $a = d = 1 \times 30^\circ = 30^\circ$ $b = c = 4 \times 30^\circ = 120^\circ$ $e = 8 \times 30^\circ = 240^\circ$	M1 M1 A2		Finding the value of 1 share Multiplying by 4 or by 8 -1 e.e.o.o.
		(ii) RT 60 FD 200	B1 B1		
5	a)	1.5	B1	4	
	b)	2.75	B1		Accept answers in the range $2.6 \leq x \leq 2.8$
	c)	-0.3 and 3.3	B1 B1		
6			M1 M1 M1 M1 M1 M1	7	Shape X Correct image Correct position Shape Y Correct image Correct position Shape Z Correct image Correct position Labelling all images
7	a)	200	B1	5	
	b)	$202 - 197 = 5$	B1		
	c)	$\frac{(197 \times 7) + (198 \times 15) + \dots + (201 \times 22) + (202 \times 9)}{100}$ $= 199.7$	M1 M1 A1		For multiplying For $\div 100$ Ignore rounding

8	a)	$7p(3q - 5r)$	M1 A1	10	Deduct 1 mark if not completely factorised																																										
	b)	(i) Error: $8x + 20 - 15 - \underline{9x}$	B1		The minus sign is the error																																										
		(ii) $8x + 20 - 15 + 9x$ $5 + 17x$	M1 A1		Correct expansion																																										
	c)	$14a + 21 = 63$ $14a = 42$ $a = 3$	M1 A1																																												
d)	$\frac{3(x+2)}{15} - \frac{2x}{15}$ $\frac{x+6}{15}$	M1	Correct LCM and numerator																																												
		M1 A1	Correct simplifying																																												
9	a)	<p style="text-align: center;">DIE</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <th>R</th> <td></td> <td>R, 2</td> <td>R, 3</td> <td>R, 4</td> <td>R, 5</td> <td>R, 6</td> </tr> <tr> <th>Y</th> <td>Y, 1</td> <td></td> <td></td> <td>Y, 4</td> <td>Y, 5</td> <td>Y, 6</td> </tr> <tr> <th>B</th> <td>B, 1</td> <td>B, 2</td> <td>B, 3</td> <td>B, 4</td> <td></td> <td>B, 6</td> </tr> <tr> <th>G</th> <td>G, 1</td> <td></td> <td>G, 3</td> <td>G, 4</td> <td>G, 5</td> <td></td> </tr> <tr> <th>W</th> <td></td> <td></td> <td>W, 3</td> <td>W, 4</td> <td></td> <td></td> </tr> </tbody> </table>		1	2	3	4	5	6	R		R, 2	R, 3	R, 4	R, 5	R, 6	Y	Y, 1			Y, 4	Y, 5	Y, 6	B	B, 1	B, 2	B, 3	B, 4		B, 6	G	G, 1		G, 3	G, 4	G, 5		W			W, 3	W, 4			B1 B1	7	Correct attempt All entries correct
		1	2	3	4	5	6																																								
	R		R, 2	R, 3	R, 4	R, 5	R, 6																																								
	Y	Y, 1			Y, 4	Y, 5	Y, 6																																								
B	B, 1	B, 2	B, 3	B, 4		B, 6																																									
G	G, 1		G, 3	G, 4	G, 5																																										
W			W, 3	W, 4																																											
b)	$\frac{1}{2}$	B1	o.e.																																												
c)	$\frac{6}{30} = \frac{1}{5}$	M1 A1	6 seen or implied																																												
d)	$\frac{9}{30} = \frac{3}{10}$	M1 A1	9 seen or implied																																												
10	a)	Shaded area = $\frac{1}{4}\pi r^2 = \frac{1}{4}\pi \times 30^2$ $= 706.858\dots = 706.9 \text{ cm}^2$	M1 A1	5	Correct substitution																																										
	b)	Unshaded area = $3600 - (\pi \times 30^2)$ $= 3600 - 2827.433\dots$ $= 772.566\dots$ $= 772.6 \text{ cm}^2$	M1 M1 A1		Accept any other valid method f.t.																																										
11		<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>$n + 3$</td> <td></td> <td></td> </tr> <tr> <td></td> <td>n</td> <td></td> </tr> <tr> <td>$n - 1$</td> <td></td> <td></td> </tr> </tbody> </table>	$n + 3$				n		$n - 1$			B2	2	-1 e.e.o.o.																																	
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12	a)	$\tan 11^\circ = \frac{BE}{1143}$ $BE = 1143 \times \tan 11^\circ = 222.1766 \dots$ $BE = 222.2 \text{ m}$	M1 M1 A1	11	Ignore rounding
	b)	$\cos 11^\circ = \frac{1143}{AB}$ $AB = 1143 \div \cos 11^\circ$ $AB = 1164.393\dots = 1164.4 \text{ m}$	M1 A1		Accept any other valid method Ignore rounding f.t. if result obtained in part (a) is used
	c)	$396 - 222.1766\dots = 173.8233\dots$ $\tan \hat{B} = \frac{173.8233\dots}{714} = 0.243\dots$ $\hat{B} = 13.68\dots^\circ = 13.7^\circ$	M1 M1 A1		f.t. Ignore rounding
	d)	Using Pythagoras Theorem $BC^2 = 173.823\dots^2 + 714^2$ $BC = \sqrt{540010.541 \dots}$ $BC = 734.85\dots = 734.9 \text{ m}$	M1 M1 A1		Accept any other valid method f.t.
13	a)	(i) 150° (ii) 245°	B1 B1	6	
	b)	(i) Drawing angles 30° and 65° Drawing line AB to scale (7 cm) Drawing line BC to scale (10 cm) (ii) 12.7×20 $= 254 \text{ m} \pm 2 \text{ m}$	B1 B1 M1 A1		Both AB and BC correct f.t. from distance AC measured in part (i)