OCR
Oxford Cambridge and RSA

F

Date – Morning/Afternoon

GCSE (9–1) Mathematics

J560/03 Paper 3 (Foundation Tier)

SAMPLE MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 100

DRAFT

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
   A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
   B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
   SC marks are for special cases that are worthy of some credit.

2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

   Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

   Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, e.g. FT 180 × (*their* '37' + 16), or FT 300 – √(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by e.g. FT 3 × *their* (a).

   For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.

5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.

   - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point e.g. 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
   - **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
   - **nfww** means **not from wrong working**.
   - **oe** means **or equivalent**.
   - **rot** means **rounded or truncated**.
   - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.

- **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.

7. In questions with a final answer line following working space:

(i) If the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

(ii) If the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

(iii) If the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

8. In questions with a final answer line:

(i) If one answer is provided on the answer line, mark the method that leads to that answer.

(ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

(iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9. In questions with no final answer line:

(i) If a single response is provided, mark as usual.

(ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

12. Ranges of answers given in the mark scheme are always inclusive.

13. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

14. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Question			Answer	Marks	Part marks and guidance	
1	(a)	(i)	9	**1** **1 AO1.3a**		
		(ii)	3	**1** **1 AO1.3a**		
		(iii)	45	**1** **1 AO1.3a**		
	(b)	(i)	13	**2** **2 AO1.3a**	**M1** for $12 \times 4 - 5 \times 7$ or better	
		(ii)	$r = \frac{p+q}{4}$	**2** **2 AO1.3a**	**M1** for $4r = p + q$	Allow correct equivalents of $\frac{p+q}{4}$
2			Pie chart drawn with angles of 78°, 180°, 60°, 42° Correct labelling	**4** **1** **1 AO1.3a** **1 AO2.3a** **3 AO2.3b**	**B1** for at least three of 13, 30, 10, 7 **seen** And **B2** for two sectors correct Or **B1** for one sector correct	

Question			Answer	Marks	Part marks and guidance	
3	(a)		35 000	**2** **1 AO1.3a** **1 AO3.1c**	**M1** for 7000 × 5 oe	
	(b)		No, following correct working and estimates	**4** **1 AO1.3a** **1 AO2.4a** **1 AO3.1d** **1 AO3.3**	**M2** for $\frac{\textit{their}\ '35000' \times 5}{1000}$ or **M1** for *their* '35 000' × 5 and **B1** for valid estimate of weight a person can carry (5 kg–75 kg) Allow estimates for *their* '35 000'	£7000 of 5 g coins weigh 175 kg 'No' may be implied by seeing mass of coins and estimate of carry weight identified Accept any valid alternate argument
	(c)		Valid comment about how a change in the assumption would influence their decision.	**1** **1 AO3.5**	**FT** from part **(b)**	
4			(£)255	**6** **2 AO1.3a** **4 AO3.1d**	**M1** for 6.5 [hours] **M1** for 19.5 [hours] or *their* '6.5' × 3 **M1** for *their* '19.5' × 10 **M1** for [£]15 **M1** for *their* '15' × 4	
5			He has assumed he can run 800 m at the same speed as he can run 100 m, but he will run 800 m at a slower speed, therefore it will take him more than 120 s	**3** **1 AO2.1a** **1 AO3.4a** **1 AO3.5**	**B1** for correct reference to Darren's assumption OR $\frac{100}{15} = \frac{800}{120}$ **soi** **B1** for 'his speed will be slower over 800 m' **oe**	

Question			Answer	Marks	Part marks and guidance	
6	(a)		40	**1** **1 AO1.3a**		
	(b)		Correct reasoning leading to 36.9	**4** **1 AO1.3b** **2 AO2.2** **1 AO3.1b**	**M2** for $\pi \times 1^2$ Or **M1** for $\frac{1}{2} \times \pi \times 1^2$ And **M1** for *their* '40' – $\pi \times 1^2$	
	(c)		7.38 or better	**3** **1 AO1.3a** **2 AO3.1b**	**M1** for 2 mm = 0.2 cm **soi** **M1** for 36.9 × *their* '0.2' **oe**	
7	(a)		125	**1** **1 AO1.2**		
	(b)		20	**4** **2 AO2.1a** **2 AO2.4a**	**B1** for PAB = SAD = 45 **B1** for BAD = 90 **M1** for 360 – (*their* '125' + *their* '90' + 125)	May be seen on diagram
8	(a)		$\frac{21-5}{3}$ is not an integer	**2** **1 AO1.3a** **1 AO2.4a**	**M1** for $\frac{21-5}{3}$ Or **M1** for 20 and 23 seen	

Question			Answer	Marks	Part marks and guidance	
	(b)	**(i)**	Any valid rule Correct next two terms **FT** *their* rule	**1** **1** **1 AO1.3a** **1 AO2.1a**		For example, 'Add one more to the difference each time' 7 11 'Doubling' 8 16
		(ii)	Any valid rule Correct next two terms **FT** *their* rule	**1** **1** **1 AO1.3a** **1 AO2.1a**		For example, 'Add one more to the difference each time' 7 11 'Doubling' 8 16 Answer must be different to part **(b)(i)**
9	**(a)**	**(i)**	ACB, BAC, BCA, CAB, CBA	**2** **2 AO1.3a**	**B1** for at least three more ways of seating listed	
		(ii)	$\frac{2}{3}$ **oe**	**1** **1 AO2.1b**	**FT** on answer to part **(a)(i)**	
		(iii)	$\frac{1}{6}$ **oe**	**1** **1 AO2.1b**	**FT** on answer to part **(a)(i)**	
	(b)		2 nights	**4** **1 AO1.3b** **2 AO3.1d** **1 AO3.3**	**M1** for $\frac{500}{50} = 10$ **M1** for £40 **M1** for *their* '12.5' – 10 and rounding **down**	12.5 can be implied from $\frac{500}{\textit{their}\ '40'}$

Question			Answer	Marks	Part marks and guidance	
10	(a)		56	**1** **1 AO1.3a**		
	(b)		5	**1** **1 AO1.3a**		
	(c)		$\frac{1}{25}$ or 0.04	**1** **1 AO1.3a**		
11	(a)		Explanation, e.g. there should be 4 dp in the answer or the answer should be smaller than 0.38 (or 0.26) or because $0.4 \times 0.3 = 0.12$	**1** **1 AO2.5a**	Clear sensible reason (**not** just giving the actual answer with no working or explanation)	Condone: multiplying two decimals means a smaller number **oe**
	(b)		Explanation, e.g. the answer should be bigger than 1 because both $\frac{3}{4}$ and $\frac{2}{3}$ are bigger than $\frac{1}{2}$ **oe** or the answer should be bigger than $\frac{3}{4}$ but $\frac{5}{7}$ is smaller than $\frac{3}{4}$ **oe**	**1** **1 AO2.5a**		Exemplars for 1 mark: • "you don't add fractions by adding tops and bottoms" • "you don't add the denominators" • "you have to find a common denominator first" • $\frac{3}{4}+\frac{2}{3}$ is obviously > 1
12			Vertical axis is not consistent The line does not represent the days when he doesn't use the internet	**2** **2 AO2.5b**	**B1** for each valid comment	
13	(a)		22.5	**1** **1 AO1.3a**		
	(b)	(i)	$4.125 \leq y < 4.135$	**2** **1 AO1.2** **1 AO1.3a**	**B1** for either limit with correct inequality sign	Condone using x instead of y

Question			Answer	Marks	Part marks and guidance	
		(ii)	$4650 \leq z < 4750$	**2** **1 AO1.2** **1 AO1.3a**	**B1** for either limit with correct inequality sign	Condone using x instead of z
14	**(a)**		$\frac{8}{50}$ **oe**	**2** **1 AO2.3a** **1 AO3.1c**	**B1** for $\frac{n}{50}$	
	(b)		Any comment with valid reason	**1** **1 AO3.4b**		
15	**(a)**		Angles at B and D are right angles Angles ACB and ECD are vertically opposite **oe** Three equal angles (angle sum of a triangle), hence triangles are similar **oe**	**1** **1** **1** **2 AO1.3b** **1 AO2.4a**		
	(b)		10.5	**2** **2 AO1.3a**	**M1** for 3.5×3 **oe**	

Question			Answer	Marks	Part marks and guidance	
16			Correct answer (264) with complete correct working, e.g. (3 + 1) × 6 × 11	**4** **1 AO1.3a** **3 AO3.1a**	**M3** for correct working but no final answer stated (3 + 1) × 6 × 11 or the working is poorly communicated but is clear, e.g. (3 + 1) × 6 × 11 = 264 or number greater than 200 with complete correct working Or **M2** for 264 with no (or incomplete) working or for acceptable number over 200 with poorly communicated working Or **M1** for number greater than 200 with no, or incomplete, working or for (3 × 6) × 11 [× 1] condoning error in calculation or for two trials leading to numbers below 200 (condone poor communication) or acceptable calculation with their answer minimum 200 but error in evaluation For 1 or 2 marks 'acceptable' implies number, minimum 200, that can be made	Working correctly communicated in stages is acceptable for 4 marks, e.g. 3 + 1 = 4, 4 × 6 = 24, 24 × 11 = 264 Full written explanation is also acceptable
17	**(a)**		20	**2** **1 AO1.1** **1 AO2.3a**	**M1** for $D = \frac{M}{V}$ **soi**	Can be implied by an answer of 2

Question			Answer	Marks	Part marks and guidance	
	(b)		$8\frac{1}{7}$ or 8.14[…]	**4** **2 AO1.3b** **2 AO3.1d**	**M1** for 15 or 105 ÷ 7 And **M2** for $\frac{180+105}{their(20+15)}$ or $\frac{18+10.5}{their\ '(2+1.5)'}$ Or **M1** for some attempt to find $\frac{\text{total mass}}{\text{total volume}}$	
18	**(a)**	**(i)**	$x > 3$	**3** **3 AO1.3a**	**M1** for $4x$ **soi** **M1** for 12 **soi**	
		(ii)	2	**1** **1 AO1.3a**		
	(b)		[+]5 ⁻5	**2** **2 AO1.3a**	**M1** for $x^2 = 25$ If zero scored **SC1** for 5 seen as answer	
	(c)		[x =] 2 [y =] ⁻1	**3** **3 AO1.3b**	**M1** for eliminating one variable **M1** for correct substitution of *their x* or *y*	

Question			Answer	Marks	Part marks and guidance	
19	(a)		(Account) A (by) 103[p]	**5** **3 AO1.3b** **2 AO3.1d**	**B2** for 10 927.27 and **B2** for 10 926.24 or **B1** for 10 400 or 10 712 If zero scored **M1** for 1.03^3 **oe** used **M1** for 1.04, 1.03 and 1.02 used **oe**	
	(b)		He may not want to leave it there for 3 years	**1** **1 AO2.3a**	Accept any valid reason	

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)(i)	1			1
1(a)(ii)	1			1
1(a)(iii)	1			1
1(b)(i)	2			2
1(b)(ii)	2			2
2	1	4		5
3(a)	1		1	2
3(b)	1	1	2	4
3(c)			1	1
4	2		4	6
5		1	2	3
6(a)	1			1
6(b)	1	2	1	4
6(c)	1		2	3
7(a)	1			1
7(b)		4		4
8(a)	1	1		2
8(b)(i)	1	1		2
8(b)(ii)	1	1		2
9(a)(i)	2			2
9(a)(ii)		1		1
9(a)(iii)		1		1
9(b)	1		3	4
10(a)	1			1
10(b)	1			1
10(c)	1			1
11(a)		1		1
11(b)		1		1
12		2		2
13(a)	1			1
13(b)(i)	2			2
13(b)(ii)	2			2
14(a)		1	1	2
14(b)			1	1
15(a)	2	1		3
15(b)	2			2
16	1		3	4
17(a)	1	1		2
17(b)	2		2	4
18(a)(i)	3			3
18(a)(ii)	1			1
18(b)	2			2
18(c)	3			3
19(a)	3		2	5
19(b)		1		1
Totals	**50**	**25**	**25**	**100**