OCR
Oxford Cambridge and RSA

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Date – Morning/Afternoon

GCSE (9-1) MATHEMATICS

J560/04 Paper 4 (Higher Tier)

PRACTICE PAPER (SET 2) MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 100

FIRST 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, i.e. 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 (i.e. **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.

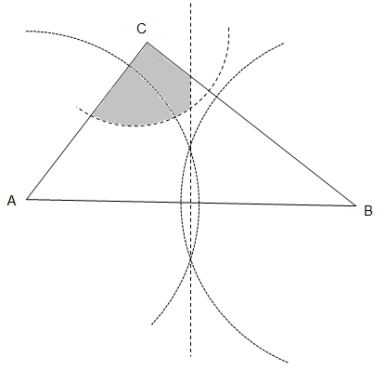
10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation.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

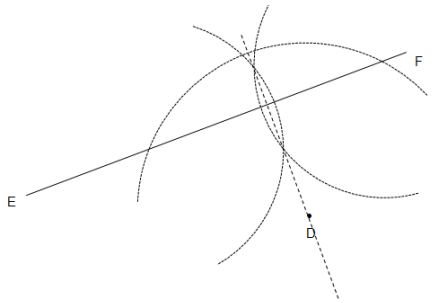
11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or 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)		C	**1** **1 AO2.1a**		
	(b)		54	**2** **1 AO1.1** **1 AO1.3a**	**M1** for $36 \times \frac{24}{16}$ **oe**	
2	(a)		Any two correct factors from 9, 18, 21, 22, 33, 42, 49, 63, 98, 99, 154, 198, 231, 294, 441, 462, 539 and 1078	**2** **1 AO2.1a** **1 AO3.1a**	**B1** for one correct	
	(b)		42	**3** **1 AO1.1** **2 AO1.3b**	**M2** for factors 2, 3, 5, 7 or $2 \times 3 \times 7$ Or **M1** for at least three correct prime factors of 210	
	(c)		Any correct reason	**1** **1 AO2.4a**		e.g. 5 is a factor of 45 but not of 9702 e.g. multiples of 45 end in 0 or 5 e.g. 9702 ÷ 45 is not an integer
3	(a)			**5** **1 AO2.1a** **2 AO2.3b** **2 AO3.1b**	**B2** for the correct bisector with supporting arcs Or **B1** for correct bisector of AB AND **B2** for an arc centre C radius 3 cm and reaching CA and CB Or **B1** for any arc centre C AND **B1** for correct region shaded	Tolerance ± 2 mm and ± 2° Tolerance ± 2 mm Dep. on attempt at bisector and arc

Question			Answer	Marks	Part marks and guidance	
	(b)		 Correct measurement ± 2 mm	**3** **1 AO1.3a** **2 AO2.3b**	**B1** for correct perpendicular from D to EF **B1** for correct supporting arcs for perpendicular bisector from D to EF **B1** for correct measurement of *their* line	Note to centres: This answer will depend on the actual size of the printed question paper
4	**(a)**		Both points correctly plotted	**1** **1 AO2.3b**		
	(b)		27	**4** **1 AO1.3a** **1 AO2.1a** **1 AO3.1c** **1 AO3.2**	**B2** for $\frac{4}{15}$ **oe** Or **B1** for 4 AND **M1** for $\frac{\textit{their } 4}{15} \times 100$	Accept any correct method
	(c)	**(i)**	Correct ruled line of best fit	**1** **1 AO2.3b**		Accept any reasonable line of best fit
		(ii)	32 - 36	**1** **1 AO2.1b**	Allow in this range or FT *their* ruled line of best fit	

Question			Answer	Marks	Part marks and guidance	
		(iii)	Allow any correct response	1 1 AO3.4b		e.g. she could be [much] better (or worse) in the theory part
5	(a)		216 324 108	4 1 AO1.3b 2 AO3.1d 1 AO3.3	**B1** for 30 cm by 20 cm **soi** **M1** for 270 ÷ 30 or 240 ÷ 20 **soi** by 9 or 12 **oe** **M1** for 9 × 12 **soi** by 108	
	(b)		Any fully correct argument	2 1 AO2.4a 1 AO3.1c	**B1** for 370 and 30 **oe**	e.g. (3 × 10) does not divide exactly into (3.7 × 100) All units must be consistent
6	(a)		$(x + 8)(x – 3)$	2 2 AO1.3a	**M1** for $(x \pm 8)(x \pm 3)$ or any pair of brackets which give two correct terms	
	(b)		$1\frac{1}{2}$	1 1 AO1.3a	Accept any number equivalent to $1\frac{1}{2}$	condone $y^{1.5}$
7			$\frac{25}{31}$ **oe**	4 1 AO1.3b 1 AO2.3b 2 AO3.1d	**B3** for 25 Or **M2** for (28 + 31 + 12) – 46 or correct diagram with 3 out of 4 correct elements Or **M1** for $\frac{n}{31}$, $n < 31$	Accept any correct method
8	(a)		7.72[5…] or 7.726 or 7.73	4 3 AO1.3b 1 AO2.1a	**M1** for 6 × 6 or 36 **M1** for $0.25 \times \pi \times 6^2$ or 28.27[…] **M1** for *their* 36 – *their* 28.27[…]	

Question			Answer	Marks	Part marks and guidance	
	(b)		$2 \times \pi \times 4$ $360 - (180 \div 3)$ **oe** $\frac{their\,300}{360} \times their\ 2 \times \pi \times 4$ $3 \times$ *their* arc length 62.83[…]	**M1** **M1** **M1** **M1** **A1** **3 AO2.2** **2 AO3.1b**		
9	**(a)**		$138 \div 120$ 1.15	**M1** **A1** **1 AO1.3a** **1 AO2.2**		
	(b)		558	**2** **2 AO1.3a**	**M1** for 120×1.15^{11}	
	(c)		Any correct reason	**1** **1 AO3.5**		e.g. it may not continue to hold for that length of time e.g. the island may not be large enough for that number of birds e.g. there may not be enough food e.g. the original assumption may be wrong
10	**(a)**	**(i)**	16	**1** **1 AO2.3a**		
		(ii)	[0].8	**2** **1 AO1.3a** **1 AO2.3a**	**M1** for 'rise' ÷ 'run' e.g. 24 ÷ 30	

Question			Answer	Marks	Part marks and guidance	
		(iii)	840	**3** **2 AO1.3b** **1 AO2.3a**	**M2** for 24 × (20 + 50) ÷ 2 Or **M1** for an attempt to find the area under the graph e.g. [0].5 × 24 × 30 or 20 × 24	
		(iv)	60.48 or 60.5	**3** **2 AO1.3a** **1 AO3.1c**	**M1** for *their* 840 ÷ 50 or 16.8 **M1** for *their* 16.8 × 60^2 ÷ 1000	
	(b)	**(i)**	14	**2** **1 AO1.3a** **1 AO2.3a**	**M1** for 560 ÷ 40	
		(ii)	Tangent drawn in the interval 20 ≤ time ≤ 25 *Their* change in distance ÷ *their* change in time based on this interval e.g. (400 – 220) ÷ (25 – 20) or 36 Conversion e.g. *their* 36 × 60^2 ÷ 1000 or 129.6 *Their* '129.6' ÷ 1.6 or 81 A correct comparative statement	**M1** **M2** **M1** **M1** **B1** **1 AO2.1b** **1 AO2.4a** **2 AO3.1d** **1 AO3.2** **1 AO3.3**	 **M1** for any 'rise' ÷ 'run'	Accept any correct method
11	**(a)**		[At x = 1] -2 [At x = 2] 7 and statement of 'change of sign'	**2** **1 AO2.2** **1 AO2.4a**	**M1** for attempt to substitute both 1 and 2 into the expression	

Question			Answer	Marks	Part marks and guidance	
	(b)		One correct evaluation between 1 and 2 Two correct evaluations, between 1 and 2, one which gives a positive value and the other giving a negative value A correct evaluation at 1.35 or any value between 1.32 and 1.35 which gives a positive value 1.3	**M1** **M1** **M1** **A1** **3 AO1.3b** **1 AO2.4a**	Allow any correct <u>systematic</u> sign-change method e.g. decimal search or interval bisection Dependent on achieving **M2**	1.1 -1.469 1.2 -0.872 1.3 -0.203 1.4 0.544 1.5 1.375 1.6 2.296 1.7 3.313 1.8 4.432 1.9 5.659 1.35 0.160375
12	**(a)**		Correct bar of width 40 (years) and height 0.6	**5** **1 AO1.3b** **1 AO2.3b** **3 AO3.1d**	**M2** for 20 × [0].5 + 10 × 1.1 + 10 × 1.9 + 20 × 1 or better e.g. 60 Or **M1** for two correct frequencies calculated AND **M1** for 84 – 60 or 24 **M1** for 24 ÷ 40 or [0].6	
	(b)		Any correct statement	**1** **1 AO3.4b**		e.g. unlikely to be a random sample e.g. small sample
13	**(a)**	**(i)**	-13	**1** **1 AO1.3a**		
		(ii)	15	**1** **1 AO1.3a**		
		(iii)	$\frac{x+3}{5}$ **oe**	**2** **1 AO1.1** **1 AO1.3a**	**M1** for correct first step $5x = y + 3$ or a flow diagram with + 3 and ÷ 5	Accept equivalent flow diagram

Question			Answer	Marks	Part marks and guidance	
	(b)		3 2	**4** **1 AO1.3b** **3 AO3.1b**	**B1** for 17 or 42 **M2** for (128 – 53) ÷ (42 – 17) **oe** or 3 Or **M1** for 128 – 53 or 42 – 17 or 75 or 25	Alternative: **B1** for $17d + e = 53$ **B1** for $42d + e = 128$ **M1** for a subtraction with at most one error e.g. $25d = 75$
14			147	**4** **1 AO1.3b** **3 AO3.1d**	**M3** for 12 × 25 – (5 × 11 + 7 × 14) or better Or **M2** for two of 12 × 25, 5 × 11 and 7 × 14 Or **M1** for one of 12 × 25, 5 × 11 and 7 × 14	Accept any correct method e.g. **M3** for 5 × 14 + 7 × 11 or better Or **M2** for 5 × 14 and 7 × 11 Or **M1** for 5 × 14 or 7 × 11
15	**(a)**		$9\sqrt{3}$ 81 59049	**1** **1** **1** **1 AO1.2** **1 AO1.3a** **1 AO2.1a**		
	(b)		3 -1 4	**4** **1 AO1.2** **3 AO1.3b**	**M1** for [1st diffs] 8 14 20 and [2nd diffs] 6 6 AND **B1** for $3x^2$ or $a = 3$ Or **M1** for *their* 6 ÷ 2 AND **M1** for (6 14 28 48) – (3 12 27 48) or 3 2 1 0	Accept any correct method

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)	0	1	0	**1**
1(b)	2	0	0	**2**
2(a)	0	1	1	**2**
2(b)	3	0	0	**3**
2(c)	0	1	0	**1**
3(a)	0	3	2	**5**
3(b)	1	2	0	**3**
4(a)	0	1	0	**1**
4(b)	1	1	2	**4**
4(c)(i)	0	1	0	**1**
4(c)(ii)	0	1	0	**1**
4(c)(iii)	0	0	1	**1**
5(a)	1	0	3	**4**
5(b)	0	1	1	**2**
6(a)	2	0	0	**2**
6(b)	1	0	0	**1**
7	1	1	2	**4**
8(a)	3	1	0	**4**
8(b)	0	3	2	**5**
9(a)	1	1	0	**2**
9(b)	2	0	0	**2**
9(c)	0	0	1	**1**
10(a)(i)	0	1	0	**1**
10(a)(ii)	1	1	0	**2**
10(a)(iii)	2	1	0	**3**
10(a)(iv)	2	0	1	**3**
10(b)(i)	1	1	0	**2**
10(b)(ii)	0	2	4	**6**
11(a)	0	2	0	**2**
11(b)	3	1	0	**4**
12(a)	1	1	3	**5**
12(b)	0	0	1	**1**
13(a)(i)	1	0	0	**1**
13(a)(ii)	1	0	0	**1**
13(a)(iii)	2	0	0	**2**
13(b)	1	0	3	**4**
14	1	0	3	**4**
15(a)	2	1	0	**3**
15(b)	4	0	0	**4**
Totals	**40**	**30**	**30**	**100**