

OCR

Oxford Cambridge and RSA

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Date – Morning/Afternoon

GCSE MATHEMATICS

J560/05 Paper 5 (Higher Tier)

PRACTICE PAPER MARK SCHEME

Duration: 1 hours 30 minutes

MAXIMUM MARK 100

DRAFT

This document consists of 12 pages

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, eg FT $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their} (a)$.

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 eg 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.

MARK SCHEME

Question		Answer	Marks	Part marks and guidance	
1	(a)	70	1 1AO1.3a		
	(b)	25	2 2AO1.3b	M1 for angle EDC = $180 - 95$ or angle DAE = 70 and angle AED = 85	
2		$180 \div (1 + 2 + 3) \times 3$ 90° and yes	M2 A1 1AO1.3b 1AO3.1a 1AO3.4b	M1 for $180 \div (1 + 2 + 3)$ soi	
3	(a)	She has calculated $8^2 - 6^2$ when she should have calculated $8^2 + 6^2$	1 1AO3.4a		
	(b)	10	2 2AO1.3b	M1 for $\sqrt{6^2 + 8^2}$	
4	(a)	42 to 44	1 1AO2.3a		
	(b) (i)	320 to 340	3 1AO2.1a 1AO2.3a 1AO3.1a	M2 for correct method Or M1 for an appropriate reading from the graph e.g. factor of 400	e.g. read £ conversion for 100 euros and then multiply by 4
	(ii)	Rate stays the same oe	1 1AO3.5		e.g. graph continues as a straight line or exchange rate is constant
	(c)	Straight line oe Passes through origin oe	1 1 2AO2.4a		

Question			Answer	Marks	Part marks and guidance
5			2%	5 2AO1.3b 1AO2.3b 2AO3.1d	B4 for answer 102% or 1.02 seen Or M3 for 1.2×0.85 OR M1 for 1.2 used correctly oe M1 for 0.85 used correctly oe Allow method marks if contained in correct method involving 400 e.g. $400 \times 1.2 \times 0.85$ oe
6			40	5 1AO1.3b 3AO3.1b 1AO3.3	M1 for $4(x - 2) = 5x - 20$ M1 for $4x - 8 = 5x - 20$ AND M2 for $x = 12$ Or M1 for one correct step solving equation
7	(a)	(i)	The points do not follow the same [linear] pattern Lewis is correct (no correlation)	M1 A1 1AO2.4a 1AO2.5a	Allow more sophisticated answers such as there is a type of non-linear correlation shown in sections of the graph Or allow Lewis is incorrect with the more sophisticated reasoning
		(ii)	The cars decrease in value initially to a certain point but then as the cars get (much) older the graph shows they increase in value Sebastian is correct	M1 A1 1AO2.4a 1AO2.5a	Allow equivalent reasoning but must state both parts of the pattern – decrease in value followed by increase in value
	(b)		11 - 14	2 2AO2.1b	M1 for car with greatest or least value identified on graph

Question		Answer	Marks	Part marks and guidance
8	(a)	$\frac{1}{4}$ oe	1 1AO1.3a	
	(b) (i)	Two from: <ul style="list-style-type: none"> There is only one way of making a total of 4 oe The total number of outcomes is incorrect oe The probability is $\frac{1}{16}$ 	2 1AO3.4a 1AO3.4b	B1 for one reason
	(ii)	$\frac{3}{16}$	3 1AO1.3b 2AO3.1d	M2 for sample space or list showing all 16 outcomes or for answer $\frac{k}{16}$ Or M1 for listing at least 10 correct outcomes or identifying 3 ways of getting a total of 6 or $\frac{1}{4} \times \frac{1}{4}$
9	(a)	$2\frac{1}{4}$	3 3AO1.3a	M2 for $\frac{19}{8} \times \frac{18}{19}$ or better Or M1 for $\frac{19}{8}$ or $\frac{19}{18}$ seen
	(b)	0.45	2 1AO1.2 1AO1.3a	M1 for 0.45 [.....]
	(c)	$\frac{4}{11}$	3 1AO1.2 2AO1.3b	B2 for $\frac{36}{99}$ Or M1 for 3.63... or 36.36... seen

Question		Answer	Marks	Part marks and guidance	
10	(a)	Angle A is common to both triangles oe Angle ADE is equal to angle ABC and corresponding Angle AED is equal to angle ACB and corresponding [Triangles are similar] equal angles oe	M2 A1 3AO2.4b	M1 for one pair of angles with a reason After 0 scored allow SC1 for two pairs of equal angles given/identified but no/incorrect reasons	Only two of the three reasons are required for M2 Condone identified on diagram for SC1
	(b)	17.4	2 1AO1.3b 1AO2.1a	M1 for $5.8 \times 12 \div 4$ oe	
	(c)	8 : 9	3 1AO1.3b 1AO2.1a 1AO3.1a	M2 for area of DBCE = $3^2 - 1^2$ oe Or M1 for 1^2 and 3^2 seen	
11		$\frac{1}{64}$	3 1AO1.2 2AO1.3b	M1 for answer $\frac{1}{k}$ M1 for $\sqrt{16}^3$ soi	
12	(a)	$x^2 + 9x + 14$	2 2AO1.3a	M1 for any three of x^2 , $3x$, $2x$, 14	
	(b)	$2x(x - 3y)$	2 2AO1.3a	M1 for $2(x^2 - 3xy)$ or $x(2x - 6y)$	
	(c)	3 and -8	3 3AO1.3b	M2 for $(x + 8)(x - 3)$ Or M1 for $(x + a)(x + b)$ where $ab = -24$ or $a + b = 5$ After 0 scored SC1 for $x^2 + 5x - 24 = 0$	Accept other correct methods e.g. formula, completing the square

Question		Answer	Marks	Part marks and guidance	
13	(a)	Correct sketch with max and min at (90, 1) and (270, -1) and roots at 0, 180 and 360	2 2AO2.3b	M1 for correct shape but inaccurate at roots and max/min	
	(b) (i)	(90, 1)	1 1AO2.3a		
	(ii)	(90, 4)	1FT 1AO2.1a		FT <i>their (b)(i)</i>
	(c) (i)	$2\sqrt{3}$	2 1AO1.1 1AO3.1a	M1 for $\sin 60 = \frac{\sqrt{3}}{2}$ soi	
	(ii)	120	1 1AO2.1a		
14	(a)	98	1 1AO2.1a		
	(b)	$2 \times \sqrt{7}^{(n-1)}$	3 2AO1.2 1AO2.1a	M2 for expression of correct form with two correct elements e.g. $2 \times \sqrt{7}^{(n+1)}$ Or M1 for expression of correct form with one correct element e.g. $4 \times (\sqrt{7})^n$	Condone omission of brackets
	(c)	49	2 2AO3.1b	M1 for $\sqrt{7}^4$	
15	(a)	$10 \times 5 \times 3$	1 1AO2.2		
	(b)	$(10 \times 5) + (10 \times 3) + (5 \times 3)$	3 1AO1.3b 2AO2.2	M2 for 2 correct products shown Or M1 for 1 correct product shown	

Question		Answer	Marks	Part marks and guidance	
16		$4\sqrt{5}$	<p>6 2AO1.3b 1AO3.1b 2AO3.2 1AO3.3</p>	<p>B5 for $\sqrt{80}$ oe</p> <p>OR</p> <p>M4 for $\sqrt{\frac{40}{0.5 \times 2 \times \sin 30}}$ oe</p> <p>Or M3 for $2x^2 = \frac{40}{0.5 \sin 30}$ oe</p> <p>Or M2 for $\frac{1}{2}x \times 2x \sin 30 = 40$ oe</p> <p>And B1 for $\sin 30 = 0.5$</p>	<p>Allow use of any variable</p> <p>B1 may be awarded with M4, M3 or M2</p>
17		<p>Use of 10 and 5 at any stage</p> <p>$\frac{4}{3} \times \pi \times 10^3 \times 5$</p> <p>20 000 [g] = 20 [kg]</p>	<p>B1</p> <p>M2</p> <p>A2 1AO1.3b 3AO2.2 1AO3.1a</p>	<p>Or M1 for $\frac{4}{3} \times \pi \times 9.8^3$ or $\frac{4}{3} \times \pi \times 10^3$</p> <p>Or SC1 for <i>their</i> 'volume' $\times 5$ [or 5.023]</p> <p>A1 for 4000 shown in working from $\frac{4}{3} \times \pi \times 10^3$</p>	<p>Allow $\frac{4}{3} \times \pi \times 9.8^3 \times 5.023$</p>
18	(a)	$x^2 + y^2 = 10^2$ or better	<p>4 1AO1.2 2AO3.1b 1AO3.2</p>	<p>M1 for answer of form $x^2 + y^2 = k$ ($k > 0$)</p> <p>AND</p> <p>B2 for [radius =] 10</p> <p>Or M1 for $\frac{20\pi}{2\pi}$ oe</p>	

Question		Answer	Marks	Part marks and guidance
	(b)	$p = 8$ and $q = 82$	<p>4 1AO1.3b 2AO3.1b 1AO3.2</p>	<p>B3 for $p = 8$</p> <p>Or M2 for gradient of tangent = $-\frac{5}{4}$ oe</p> <p>Or M1 for gradient [of radii to (5, 4)] = $\frac{4}{5}$</p> <p>oe</p>

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)	1	0	0	1
1(b)	2	0	0	2
2	1	0	2	3
3(a)	0	0	1	1
3(b)	2	0	0	2
4(a)	0	1	0	1
4(b)(i)	0	2	1	3
4(b)(ii)	0	0	1	1
4(c)	0	2	0	2
5	2	1	2	5
6	1	0	4	5
7(a)(i)	0	2	0	2
7(a)(ii)	0	2	0	2
7(b)	0	2	0	2
8(a)	1	0	0	1
8(b)(i)	0	0	2	2
8(b)(ii)	1	0	2	3
9(a)	3	0	0	3
9(b)	2	0	0	2
9(c)	3	0	0	3
10(a)	0	3	0	3
10(b)	1	1	0	2
10(c)	1	1	1	3
11	3	0	0	3
12(a)	2	0	0	2
12(b)	2	0	0	2
12(c)	3	0	0	3
13(a)	0	2	0	2
13(b)(i)	0	1	0	1
13(b)(ii)	0	1	0	1
13(c)(i)	1	0	1	2
13(c)(ii)	0	1	0	1
14(a)	0	1	0	1
14(b)	2	1	0	3
14(c)	0	0	2	2
15(a)	0	1	0	1
15(b)	1	2	0	3
16	2	0	4	6
17	1	3	1	5
18(a)	1	0	3	4
18(b)	1	0	3	4
Totals	40	30	30	100