

OCR

Oxford Cambridge and RSA

F

Date – Morning/Afternoon

GCSE (9-1) MATHEMATICS

J560/03 Paper 3 (Foundation Tier)

PRACTICE PAPER (SET 2) MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 100

DRAFT

This document consists of 13 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, 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 $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by e.g. FT $3 \times \textit{their} (a)$.

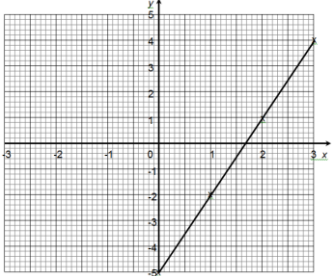
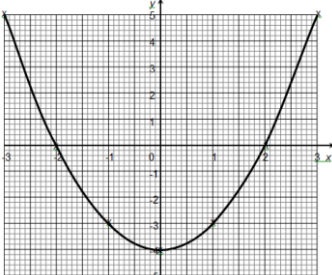
For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

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 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)	(i)	11	1 1 AO1.3a	
		(ii)	20	1 1 AO1.3a	
	(iii)	74	2 2 AO1.3a	B1 for 25 or 75	
	(b)		6h	1 1 AO1.2	
(c)	(i)	15	1 1 AO1.3a		
	(ii)	-19	1 1 AO1.3a		
2	(a)		8	1 1 AO1.3a	
	(b)		7 : 10	1 1 AO1.3a	
	(c)		1 : 15	2 2 AO1.3a	M1 for 8 : 120
3	(a)		143	1 1 AO1.3a	
	(b)		137	1 1 AO1.3a	
	(c)		102	2 2 AO1.3a	M1 for $360 - (110 + 84 + 64)$ oe

Question			Answer	Marks	Part marks and guidance	
4	(a)		54	2 2 AO1.3a	M1 for 9 [cm]	
	(b)		050	1 1 AO1.2	Tolerance $\pm 2^\circ$ Condone 50	
	(c)		600 000	2 2 AO1.3a	M1 for [6 x] 1000 x 100	
5	(a)	(i)	-2 4	1 1 AO1.3a		
		(ii)		2 2 AO2.3b	B1 for 2 points plotted correctly FT <i>their</i> table	
	(b)	(i)	5 -4 0 5	2 2 AO1.3a	B1 for two correct	
		(ii)		2 2 AO2.3b	B1 for 6 or 7 of <i>their</i> points correctly plotted	Tolerance ± 2 mm for points and curve
	(c)		0.4 and 2.6	2 2 AO2.1a	B1 for one correct FT from <i>their</i> graph ± 0.1	

Question		Answer	Marks	Part marks and guidance	
6	(a)	17.52	2 1 AO1.1 1 AO1.3a	M1 for $\frac{1}{2} \times 7.3 \times 4.8$	
	(b)	33.3[...]	3 1 AO1.1 2 AO1.3b	M1 for $4.8 \div 7.3$ M1 for $\tan^{-1} [\dots]$	
7		17 025	3 3 AO1.3b	M2 for $[15\ 000 +] 15\ 000 \times [0].045 \times 3$ oe or 2025 Or M1 for $15\ 000 \times [0].045$ oe or 675	
8	(a)	15	2 2 AO1.3a	B1 for 3364 or 3375	
	(b)	31 536 000	2 1 AO1.1 1 AO1.3a	M1 for $60^2 \times 24 \times \textit{their} 365$	Accept 31 622 400 and 31 557 600 for 2 marks
	(c)	$\frac{1}{16}$ or 0.0625	1 1 AO1.1		
9	(a)	1153.5 [kg] or 15.6[...] or 80 Any correct comment	B2 B1 2 AO2.4a 1 AO3.1c	M1 for 76.9×15 or $1200 \div 76.9$ or $1200 \div 15$	e.g. it is safe for 15 people
	(b)	Any suitable valid comment	1 1 AO3.5		e.g. any comment suggesting that the group may not be representative of the population such as it might be a rugby team

Question		Answer	Marks	Part marks and guidance	
10	(a)	1.4 to 1.45	2 1 AO2.1b 1 AO3.1c	M1 for attempt at gradient e.g. $36 \div 25$	It is direct proportionality so allow any point on the line used and $y \div x$ calculated
	(b)	Fully correct method leading to <i>their</i> correct answer	2 1 AO1.3a 1 AO2.3a	M1 for three numbers that make 76 e.g. 30, 30 and 16 or 36, 36 and 4	e.g. Readings at 30, 30, 16 and 21 + 21 + 11 = 53 or readings at 36, 36, 4 and 25 + 25 + 3 = 53
11	(a)	$2^4 \times 3^2 \times 5 \times 7$	1 1 AO1.2		
	(b)	[HCF =] $2 \times 2 \times 3 \times 3 \times 5 \times 7 = 1260$	2 1 AO2.1a 1 AO2.2	B1 for [HCF =] 2, 2, 3, 3, 5 and 7 identified as common to both	
	(c)	A = [HCF or 1260] $\times 2 \times 2$ B = [HCF or 1260] $\times 5$	2 1 AO2.2 1 AO3.1a	B1 for 1260 used or either A = [HCF or 1260] $\times 2 \times 2$ or B = [HCF or 1260] $\times 5$	
12	(a)	7.35 7.45	2 1 AO1.2 1 AO1.3a	B1 for either one correct or for both correct but reversed	
	(b)	Rounded to 2 sf/nearest 100 Any correct example which supports <i>their</i> statement	1 1 1 AO2.3a 1 AO2.4a		Condone to the nearest 5 or 10 e.g. if rounded to 2 sf/nearest 100 then 5887 is rounded to 5900

Question		Answer	Marks	Part marks and guidance																																										
13		402.89 or 402.90 or 403	<p>6 2 AO1.3b 2 AO3.1d 1 AO3.2 1 AO3.3</p>	<p>M2 for [AC or BD =] $\sqrt{35^2 + 15^2}$ soi by 38.078[...] or 38.079 Or M1 for $35^2 + 15^2$ AND M2 for $2 \times \textit{their}$ '38.078[...] + 1 \times 15 + 2 \times 35 (or 161.15...) oe Or M1 for at least adding <i>their</i> '38.078[...] + 15 + 35 AND M1 for <i>their</i> '161.15...' \times 2.5</p>	402.894(...) scores M5																																									
14		<p>Any method that will show all outcomes e.g. 5 \times 6 or table with 30 entries</p> <p>[total outcomes] = 30</p> <p>5 required outcomes e.g. a list of the 5 possibilities or a table with 5 lots of 7 shown</p> <p>$\frac{5}{30} = \frac{1}{6}$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1 1 AO2.2 1 AO3.1d 1 AO3.2 1 AO3.3</p>	<table border="1"> <tr> <td></td> <td>2</td> <td>4</td> <td>6</td> <td>6</td> <td>6</td> <td>8</td> </tr> <tr> <td>1</td> <td>3</td> <td>5</td> <td>7</td> <td>7</td> <td>7</td> <td>9</td> </tr> <tr> <td>3</td> <td>5</td> <td>7</td> <td>9</td> <td>9</td> <td>9</td> <td>11</td> </tr> <tr> <td>5</td> <td>7</td> <td>9</td> <td>11</td> <td>11</td> <td>11</td> <td>13</td> </tr> <tr> <td>7</td> <td>9</td> <td>1</td> <td>13</td> <td>13</td> <td>13</td> <td>15</td> </tr> <tr> <td>9</td> <td>11</td> <td>13</td> <td>15</td> <td>15</td> <td>15</td> <td>17</td> </tr> </table> <p>Allow any correct method e.g. P(total 7) = P(2 and 5) + P(4 and 3) + P(6 and 1) $= \frac{1}{6} \times \frac{1}{5} + \frac{1}{6} \times \frac{1}{5} + \frac{3}{6} \times \frac{1}{5}$ $= \frac{1}{30} + \frac{1}{30} + \frac{3}{30}$ $= \frac{5}{30}$</p>		2	4	6	6	6	8	1	3	5	7	7	7	9	3	5	7	9	9	9	11	5	7	9	11	11	11	13	7	9	1	13	13	13	15	9	11	13	15	15	15	17
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3	5	7	9	9	9	11																																								
5	7	9	11	11	11	13																																								
7	9	1	13	13	13	15																																								
9	11	13	15	15	15	17																																								

Question		Answer	Marks	Part marks and guidance
15	(a)	Any two from 1, 2, 3, 4, 6	1 1 AO2.1a	
	(b)	Any valid explanation	1 1 AO2.4a	e.g. \sqrt{S} is a factor
16		M[eatballs] and three comparable values e.g. proportion of fat B: $154 \div 440 = 0.35$ oe S: $120 \div 350 = 0.342[\dots]$ or 0.343 oe M: $116 \div 330 = 0.351[\dots]$ or 0.352 oe	4 1 AO2.4a 2 AO3.1c 1 AO3.3	Accept any correct method which produces three values which can be compared e.g. amount of food with 1 g of fat B: $440 \div 154 = 2.85[\dots]$ or 2.86 S: $350 \div 120 = 2.91[\dots]$ or 2.92 M: $330 \div 116 = 2.84[\dots]$ M3 for three correct values and the incorrect answer or three values with one arithmetic error and <i>their</i> correct answer Or M2 for three values with one arithmetic error Or M1 for correctly comparing two foods with <i>their</i> correct choice
17		The two prime numbers will be factors of the product [as well as 1 and the number itself] Any two prime numbers multiplied with a statement saying that these will be factors of the product e.g. $2 \times 3 = 6$ so 2 and 3 will be factors of 6 [as well as 1 and 6]	1 1 1 AO2.4a 1 AO2.5a	Accept any two prime numbers and the two numbers could be the same e.g. 5 and 5

Question		Answer	Marks	Part marks and guidance	
18	(a)	Insufficient trials	1 1 AO2.5a		Any acceptable reason
	(b)	11 8 1	3 1 AO1.3b 2 AO2.1b	B2 for two correct or for one correct with total balls = 20 Or M1 for $\frac{66}{120} \times 20$ or $\frac{47}{120} \times 20$ or $\frac{7}{120} \times 20$	
19	(a)	Final amount is less than initial investment	1 1 AO3.4b		Or equivalent correct reason
	(b)	Used an incorrect multiplier for the interest rate	1 1 AO3.4a		Or equivalent correct reason
	(c)	6498.40 or 6498.39	3 3 AO1.3a	M2 for 5800×1.023^5 Or M1 for 5800×1.023^n oe	Where $n \geq 1, n \neq 5$
20	(a)	175	1 1 AO1.3a		
	(b)	28 to 31 with correct working	4 2 AO3.1d 1 AO3.2 1 AO3.3	M2 for $0.7 \times$ <i>their</i> 175 oe and $0.85 \times$ <i>their</i> 175 oe Or M1 for $0.7 \times$ <i>their</i> 175 oe or $0.85 \times$ <i>their</i> 175 oe AND M1 for reading from graph using <i>their</i> cardio interval	Implied by 122.5 or 123 and 148.75 or 149 seen Using <i>their</i> max and min cardio rates
	(c)	Heart rate out of zone for about 4 minutes	1 1 AO2.4a		Or heart rate less than 87.5 during the 50 minutes

Question		Answer	Marks	Part marks and guidance	
21		69	4 1 AO1.3b 2 AO3.1d 1 AO3.3	M1 for $n - 6 + n + 3n = 109$ oe M1FT for $5n = 109 + 6$ A1 for $n = 23$	Allow equivalent part marks for use of different person as starting point Rearrangement of <i>their</i> equation to isolate n terms
22		604.8 kg	4 1 AO1.1 1 AO1.3b 1 AO3.1d 1 AO3.2	B3 for answer 10.08 [kg] OR M1 for $400 \times 400 \times 28$ soi M1 for <i>their</i> volume $\div 1000^3$ soi M1 for $2250 \times$ <i>their</i> volume [$\times 60$] soi	Volume calculation using consistent units Conversion of mm to m for all 3 dimensions done at any stage Calculation of mass of 1 or 60 slabs

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)(i)	1	0	0	1
1(a)(ii)	1	0	0	1
1(a)(iii)	2	0	0	2
1(b)	1	0	0	1
1(c)(i)	1	0	0	1
1(c)(ii)	1	0	0	1
2(a)	1	0	0	1
2(b)	1	0	0	1
2(c)	2	0	0	2
3(a)	1	0	0	1
3(b)	1	0	0	1
3(c)	2	0	0	2
4(a)	2	0	0	2
4(b)	1	0	0	1
4(c)	2	0	0	2
5(a)(i)	1	0	0	1
5(a)(ii)	0	2	0	2
5(b)(i)	2	0	0	2
5(b)(ii)	0	2	0	2
5(c)	0	2	0	2
6(a)	2	0	0	2
6(b)	3	0	0	3
7	3	0	0	3
8(a)	2	0	0	2
8(b)	2	0	0	2
8(c)	1	0	0	1
9(a)	0	2	1	3
9(b)	0	0	1	1
10(a)	0	1	1	2
10(b)	1	1	0	2
11(a)	1	0	0	1
11(b)	0	2	0	2
11(c)	0	1	1	2
12(a)	2	0	0	2
12(b)	0	2	0	2
13	2	0	4	6
14	0	1	3	4
15(a)	0	1	0	1
15(b)	0	1	0	1
16	0	1	3	4
17	0	2	0	2
18(a)	0	1	0	1
18(b)	1	2	0	3
19(a)	0	0	1	1
19(b)	0	0	1	1
19(c)	3	0	0	3
20(a)	1	0	0	1
20(b)	0	0	4	4
20(c)	0	1	0	1
21	1	0	3	4
22	2	0	2	4
Totals	50	25	25	100