OCR
Oxford Cambridge and RSA

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GCSE (9–1)

Mathematics

J560/01: Paper 1 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for November 2021

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

Annotations available in RM Assessor. These must be used whenever appropriate during your marking.

Annotation	Meaning
	Correct
	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
^	Omission sign
BP	Blank page
SEEN	Seen

For a response awarded zero (or full) marks a single appropriate annotation (cross, tick, M0 or ^) is sufficient, but not required.
For responses that are not awarded either 0 or full marks, you must make it clear how you have arrived at the mark you have awarded and all responses must have enough annotation for a reviewer to decide if the mark awarded is correct without having to mark it independently.

It is vital that you annotate standardisation scripts fully to show how the marks have been awarded.

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. 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**.
   - **soi** means **seen or implied**.
   - **dep** means that the marks are **dependent** on the marks indicated. You must check that the candidate has met all the criteria specified for the mark to be awarded.
   - **with correct working** means that full marks **must not** be awarded without some working. The required minimum amount of working will be defined in the guidance column and **SC** marks given for unsupported answers.

3. 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.

4. Unless the command word requires that working is shown and the working required is stated in the mark scheme, 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.

5. 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. 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.

   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* '52 + 72'). Answers to part questions which are being followed through are indicated by e.g. FT 3 × *their* (a).

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 and incorrect answer given**:

   (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 if there is no other method leading to the incorrect answer. 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. A correct step, value or statement that is not part of the method that leads to the given answer should be awarded **M0** and/or **B0**.

   (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 marks for the poorer response 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 marks for the poorer response 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. If a candidate corrects the misread in a later part, do not continue to follow through, but award **A** and **B** marks for the correct answer only.

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. If in any case the mark scheme operates with considerable unfairness consult your Team Leader.

Question			Answer	Marks	Part marks and guidance	
1	(a)		9.3	1		Allow 9.1 to 9.5
	(b)	(i)	57	1		Allow 55 to 59
	(b)	(ii)	acute	1		
2	(a)		Any odd number	1		If more than one, all must be correct
	(b)		Any square number	1		If more than one, all must be correct Do not accept k^2
	(c)		31 or 37	1		If more than one, both must be correct
	(d)		Any multiple of 8	1		If more than one, all must be correct
3	(a)		2 correct lines	2	**B1** each correct line	Treat extra lines as choice Mark intention Accept dashed lines
	(b)		2 cao	1		
4	(a)		8	2	**B1** for only 1 and 9 identified	
	(b)		5	2	**M1** for $(6 + 9 + 2 + 3 + 9 + 1) \div 6$	Condone missing brackets for **M1**
5	(a)		560 cao	1		
	(b)		439 000 cao	1		

Question			Answer	Marks	Part marks and guidance	
6			0.502, 0.51, 0.529, 0.54	2	**B1** for 3 in the correct order	Condone trailing zeros
7	(a)		44	1		
	(b)		3.5 final answer	2	**M1** for $6y = 28 - 7$ or better	Accept 3½, $\frac{7}{2}$ or $\frac{21}{6}$ for 2 marks
8	(a)		(3, -4)	1		
	(b)		H plotted at (-2, 4)	1		Must be labelled if more than 1 point plotted
9			17	2	**B1** for 289 or 17^2 or **M1** for $\sqrt{295 - 6}$	Accept -17
10	(a)		$6c^2d^2$ cao, final answer	2	**B1** for $6c^2$ or d^2 in final answer or correct answer seen and spoilt.	B1 for e.g. $6c^2 \times d^2$
	(b)		$7x(5 + x)$ final answer	2	**B1** for $7(5x + x^2)$ or $x(35 + 7x)$ as final answer or correct answer seen and spoilt	Accept $7x(5 + 1x)$ Condone final bracket missing
11			32.1 to 32.14 nfww	4	**M1** for 3×6 may be implied by 18 AND **M2** for $\frac{3^2\pi}{2}$ soi by 14.1 to 14.15 or **M1** for $3^2\pi$ soi by 28.2 to 28.3	18 must not come from wrong working Not part of longer multiplication e.g. $3 \times 6 \times 3$
12	(a)		Straight line oe Passes through origin oe	1 1		
	(b)		26	1		

Question			Answer	Marks	Part marks and guidance	
	(c)		$195 < $221 or £150 < £170 With correct working	4	Allow exchange rates of 1.25 to 1.35 leading to $212.5[0] to $229.5[0] or £144 to £156 **M2** for 195 ÷ 1.3 or 170 × 1.3 **A1** for [£]150 or [$]221 or **M1** for a correct exchange rate e.g 26 ÷ 20 OR **M2** for building up to $ equivalent of £170 or £ equivalent of $195 e.g. 17 × 13 or 8.5 × 26 or 15 × 10 **A1** for [£]150 or [$]221 or **M1** for building up to £170 or $195 e.g. 17 × 10 or 8.5 × 20 or 15× 13 or 170 ÷ 10 = 17 OR **M2** for 195 ÷ 13 and 170 ÷ 10 **A1** for 15 and 17 or **M1** for 195 ÷ 13 = 15 or 170 ÷ 10 = 17 If **0** scored **SC1** for $195 < ($212.5[0] to $229.5[0]) or (£144 to £156)< £170 with no or insufficient working, but not wrong working	Comparison in symbols or words required Allow FT *their* value from (b) Allow correctly rounded values used for **M** marks e.g for £7.69 or £8 for $10 used

Question			Answer	Marks	Part marks and guidance	
	(d)		26 or **FT** their (c)	**1 dep**	**Dep** on **A1** or **SC1** awarded in part (c)	Accept 25.99
13			0.12 0.48	**4**	**B3** for 0.12 OR **M2** for 1 – (0.1 + 0.1 + 0.2) soi by 0.6 in working or two values in the table which sum to 0.6 or **M1** for 0.1 + 0.1 + 0.2 soi by 0.4 in working **M1** for *their* 0.6 ÷ 5	Accept percentages or fractions
14	**(a)**	**(i)**	36	**1**		Condone further terms if correct
	(a)	**(ii)**	added 7	**1**		Needs quantity and direction eg Add 7, plus 7, +7 Not *n*[th] +7
	(b)		$\frac{32-2}{4}$ is not an integer	**2**	**M1** for $\frac{32-2}{4}$ or 30 and 34	Accept any full alternative methods or arguments e.g. 32 is a multiple of 4 and 4*n*+2 is not a multiple of 4.
15			E C B F	**4**	**B1** for each	Accept correct equations

Question			Answer	Marks	Part marks and guidance	
16			$\frac{11}{30}$ cao	4	**B3** for answer of $\frac{440}{1200}$ or better nfww **or** **M1** for 1200 ÷ 4 soi by 300 **M2** for $\frac{1200 - (their\ 300 + 460)}{1200}$ or **M1** for 1200 – (*their* 300 + 460) soi by 440 or $\frac{their\ 300 + 460}{1200}$ soi by $\frac{760}{1200}$	
17			24	2	**M1** for $\frac{32\times15}{20}$ oe or $\frac{32}{20} = \frac{x}{15}$ oe or $\frac{15}{20} = \frac{x}{32}$ oe or scale factor of 1.6, 0.625, 0.75, 1.$\dot{3}$ or 1.33[3]	

Question			Answer	Marks	Part marks and guidance	
18			$\frac{4}{16}$ oe nfww	4	**M2** for 16 correct outcomes shown or for [4 × 4 =] 16 [outcomes] or **M1** for table, list etc, with at least 10 correct outcomes to a maximum of 16 (ignoring repeats) AND **M2FT** for correctly indicating all the primes in *their* outcomes (at least 6) **and** gives the correct response for *their* outcomes or **M1FT** for writing *their* correct response from *their* outcomes **or** for indicating all the primes in *their* outcomes with maximum one error to a maximum of **3** marks if **0** scored then **SC3** for a correct response from adding 16 outcomes i.e. $\frac{9}{16}$ or **SC2** for a correct response from adding (at least 6 outcomes), primes must be indicated or **SC1** for correct response from adding (at least 6 outcomes), primes are not indicated Note : an alternative method is **M3** for [P(1 with 2,3 OR 2,3 with 1)=] $\frac{1}{4} \times \frac{2}{4} + \frac{2}{4} \times \frac{1}{4}$ or **M2** for the above method with one error or **M1** for a correct tree diagram drawn	<u>M marks are for products</u> The outcomes may be a list or table showing 16 outcomes which may have numbers or ticks and crosses to show primes etc, if just numbers with nothing above 8 assume addition By e.g. shading, underlining or ringing **M1** implied by a correct numerator and a correct denominator for *their* list Note that $\frac{2}{4} \times \frac{2}{4}$ is an incorrect method

Question			Answer	Marks	Part marks and guidance	
19	(a)		18 07 [pm] or 6 07 pm	4	**B3** for 18 07 am or 6 07 [am] OR **B2** for listing the next three correct times of both fountains, i.e. 15 43, 16 07, 16 31 and 16 01, 16 43, 17 25 OR **B1** for listing the next three correct times of one fountain, i.e. 15 43, 16 07, 16 31 or 16 01, 16 43, 17 25. <u>Alternative method</u> **B3** for 2[h] 48[m] OR **B2** for [LCM=] 168 OR **B1** for listing the next three multiples of 24 and 42, i.e. 48, 72, 96 and 84, 126, 168 OR **M1** for [24 =] 2 × 2 × 2 × 3 or [42 =] 2 × 3 × 7 allow in a factor tree or table or [LCM=] 168k ($k \neq 1$) and **M1** for correctly converting *their* time(mins) to hours and mins	Condone use of 12 hour clock e.g. [0]3 43 and 3 43 am for **B1** and **B2** *their* time must be over 60

Question			Answer	Marks	Part marks and guidance	
	(b)		[size] 15 [number] 11	**4**	**B3** for 15 and 11 OR **B2** for [HCF or group size =] 15 or **M2** for [60] = 2× 2 × 3 × 5 and [105] = 3 × 5 × 7 or for listing complete factors of both numbers allow in a factor tree or table OR **M1** for one of 2 × 2 × 3 × 5 or 3 × 5 × 7 allow in a factor tree or table or for common factors 3 or 5 AND **B1** for [size] 3 [number] 55 or [size] 5 [number] 33	accept any correct method [60] 1,2,3,4,5,6,10,12,15,20,30,60 [105] 1,3,5,7,15,21,35,105
20	**(a)**	**(i)**	0.2 and 0.8 in all the correct places	**2**	**B1** for first branch correct or second branches correct	Accept equivalent fractions and percentages (need % sign)
	(a)	**(ii)**	0.64 or $\frac{16}{25}$ oe or 64%	**2**	**FT** *their* tree for **1** or **2** marks (*their* values < 1) **M1** for 0.8 × 0.8 oe	Allow long method : e.g. 1 – (0.04 + 0.16 + 0.16)
	(a)	**(iii)**	Suggestion of dependence between the trains or unexpected events or data may not be applicable	**1**		Accept any correct reason, e.g. if first train is late second train may be held up e.g. unexpected delays can occur e.g. changed schedule that day (implies data not applicable)

Question			Answer	Marks	Part marks and guidance	
	(b)		0.73[4] or $\frac{734}{1000}$ oe or 73.4%	3	**M2** for 1 – 0.35 × 0.76 or 0.35 × 0.24 + 0.65 × 0.24 + 0.65 × 0.76 oe or **M1** for two correct products or 0.35 × 0.76	e.g. common equivalent $\frac{367}{500}$ products implied by 0.266, 0.084, 0.156, 0.494
21			1240	**3**	**M2** for 1426 ÷ 1.15 oe or **B1** for 1.15 or 115	Accept $\frac{115}{100}$ but not 115%
22			[*d* =] 2.25 [*c* =] 1.7[0] with correct working	**5**	**B4** for 1 correct answer with correct working OR **M1** for $5d + 3c = 16.35$ oe **M1** for $2d + 6c = 14.7[0]$ oe **M1** for method to find a common coefficient, allow 1 arithmetic error **M1** for correct method to eliminate 1 variable, allow one arithmetic error OR **If 0 or M1** scored instead award **SC2** for both answers correct with no or insufficient working or **SC1** for two answers which satisfy one of the original equations	Accept other variables for *d* and *c* "Correct working" requires evidence of at least M1M1M1 Correct answers from trial and improvement score 5 If substitution method used **M1** for correct rearrangement of equation **M1** for correctly substituting into other equation A sign error is not an arithmetic error

Question			Answer	Marks	Part marks and guidance	
23			16 nfww	3	**M2** for [h =] $\frac{8}{cos60}$ or **M1** for cos60 = $\frac{8}{h}$	Accept alternative methods e.g **M2** for [h =] $\frac{8}{sin\,30}$ or **M1** for sin 30 = $\frac{8}{h}$
24			319.44 cao	4	**B3** for 9319.44 soi or for 319[.4…] as final answer OR **M3** for (9000 × 1.007^5) – 9000 OR **M2** for 9000 × 1.007^5 oe implied by 9319[.44…] or 9000 × r^5 – 9000 oe OR **M1** for 9000 × 1.007^n oe implied by 9126[.44…] ($n \neq 5$ and $n \geq 2$) or 9000 × r^n oe ($n \geq 2$)	Answers of 315 and 9315 are from simple interest and score 0 For **M2** and **M1** where r = 1.7, 1.07 or 1.0007

25			3 [hours] 51 [minutes] with correct working	**6**	**B5** for 3.85[...] or 3 [hours] 51.1[1…] [minutes] or $3\frac{23}{27}$ oe or 231 [minutes] with correct working OR **M1** for 52 × 4 soi by 208 **M2** for $\frac{15\times60\times60}{1000}$ or better or **M1** for 15 × 60 × 60 oe or $\frac{15}{1000}$ oe **M1** for *their* 208 ÷ *their* $\frac{15\times60\times60}{1000}$ <u>Alternative method</u> **B5** for 3.85[...] or 3 [hours] 51.1[1…] [minutes] or $3\frac{23}{27}$ or 231 [minutes] with correct working or **M1** for 52 × 4 soi by 208 **M2** for $\frac{their\ 208\times1000}{15}$ or **M1** for *their* 208 × 1000 or **M1** for *their* $\frac{208}{15}$ **M1** for $\frac{their\ 13866\ \text{to}\ 13867}{60\times60}$ If **0** or **M1** scored, instead award **SC2** for 3 [hours] 51 [minutes] with no working or insufficient working or **SC1** for 3.85[...] with no working or insufficient working	"Correct working" requires evidence of at least M2 or M1M1 Accept other alternative methods. "Correct working" requires evidence of at least M2 or M1M1

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