GCSE

Mathematics

Unit **J560/01**: Foundation Tier Paper 1

General Certificate of Secondary Education

Mark Scheme for November 2018

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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.

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1.   Annotations used in the detailed Mark Scheme.

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

These should be used whenever appropriate during your marking.

The **M**, **A, B** etc. annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks.
It is vital that you annotate these scripts to show how the marks have been awarded.
It is not mandatory to use annotations for any other marking, though you may wish to use them in some circumstances.

Subject-Specific Marking Instructions

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

3.   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 <u>not from wrong working</u> **full marks** should be awarded.

       Do <u>not</u> award the marks if the answer was obtained from an incorrect method, i.e. incorrect working is seen <u>and</u> the correct answer clearly follows from it.

4.   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.

5.   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.

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

       -     **cao** means **correct answer only**.
       -     **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).
       -     **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**.

7.   Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

8.   As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).

9.   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.

10.   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.

11.   If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer' or 'cao'. Place the annotation ✓ next to the correct answer.

      If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

      If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

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)		Correct bar drawn	1		condone freehand
	(b)	(i)	Germany	1		
		(ii)	25	1		
		(iii)	6	1		
2	(a)		Cylinder	1		
	(b)		90º symbol marked at BCD cao	1		Accept 90º <u>with</u> arc
3			364.8[0]	2	**M1** for 320 × 1.14	
4	(a)	(i)	Any even number	1		Accept more than one, if all even
		(ii)	1 or 5 or 25	1		Accept more than one, if all correct Condone 1 × 25 or 5 × 5
		(iii)	11 or 13 or 17 or 19	1		Accept more than one, if all correct
		(iv)	Any cube number	1		Accept more than one, if all correct Do not accept e.g. 2 ×2 × 2 or 2^3
	(b)		7	2	**M1** for 5, 7 and 7, 13	Could be a correct Venn diagram
5	(a)		1 : 19	1		
	(b)		12	2	**M1** for 8 ÷ 2 soi by 4 or 8 × 1.5 oe	
6	(a)		10 final answer	1		
	(b)		4 final answer	1		
7	(a)		81.5 or 8.15 × 10^1 cao	1		
	(b)		0.005 69 or 5.69 × 10^{-3} cao	1		
8			$[y =] \dfrac{x}{3} + 9$ or $[y =] x \div 3 + 9$ final answer	2	**M1** for $[y =] \dfrac{x}{3} + k$ or $[y =] jx + 9$	$j \neq 0$

Question			Answer	Marks	Part marks and guidance	
9			15 with correct supporting working	5	**M1** for 140 ÷ 7 soi by 20 **M1** for 4 × *their* 20 and 3 × *their* 20 soi by 80 and 60 **M1** for *their* 80 ÷ 5 or their 60 ÷ 4 **A1** for 16 and 15 or **M1** for 140 ÷ 9 soi by 15.5 **M1** for 15 × 5 and 15 × 4 soi by 75 and 60 **M1** for 140 ÷ 7 soi by 20 **M1** for 4 × *their* 20 and 3 × *their* 20 soi by 80 and 60 **SC1** for 15 without working	Accept correct alternative methods their 20 must come from a division of 140 15 from incorrect working scores 0
10			Vertices at (4, 8) (8, 2) (4, 2)	3	**B2** for 2 vertices correct **M1** correct enlargement incorrect position	Condone freehand if vertices ±2mm by eye
11	(a)		(2, 4)	1		
	(b)		Q plotted at (⁻1, 2)	1		
12			23	2	**M1** for 8 + 3 × 5 or better	
13			31.4[2] or 31.41…	2	**M1** for π × 10 oe	Method can be spoiled
14	(a)	(i)	7 cao	1		Do not allow a7 or a^7
		(ii)	12 cao	1		Do not allow b12 or b^{12}
	(b)		$9x(2x + 1)$ final answer	2	**B1** for $9(2x^2 + x)$ or $x(18x + 9)$ or $3x(6x+3)$ or $3(6x^2+3x)$	condone final bracket missing

Question			Answer	Marks	Part marks and guidance	
15	(a)		Medium with correct comparisons **and** valid reason	4	**M3** fully correct method and values to compare all 3 packs Or **M2** fully correct method to compare all 3 packs Or **M1** for fully correct method to compare any 2 packs After **M0 or M1 SC2** for 3 correct comparable values	Condone 150 or [£]3.55 for medium Accept fully correct alternative methods Accept consistent working in pence or pounds SC2 **replaces** M1
	(b)		Correct statement	1		Do not accept contradictory statements See exemplars
16			$7x + 2$ final answer	4	**B2** for $28x + 8$ or **B1** for $28x + k$ or $jx + 8$ or **M1** for $5x + 3 + 7x + 4 + 9x - 10 + 5x + 8 + 2x + 3$ AND **M1** for *their* $(28x + 8) \div 4$ soi	$j \neq 0$ B1 not from only one side e.g. $5x + 8$ must be an algebraic expression in the form $ax + b$

Question			Answer	Marks	Part marks and guidance	
17			246	**6**	**B1** for $6\frac{1}{2}$, 6.5 or 6 h 30 m AND **M2** for *their* $6\frac{1}{2}$ × 2 × 12 soi by 156 or **M1** for *their* $6\frac{1}{2}$ × 12 soi by 78 or *their* $6\frac{1}{2}$ × 2 AND **M2** for 12 × $1\frac{1}{2}$ × 5 soi by 90 or **M1** for 12 × $1\frac{1}{2}$ soi by 18 or $1\frac{1}{2}$ × 5 soi by $7\frac{1}{2}$ or 12 × 5 soi by 60	13, 78 or 156 imply B1

Question			Answer	Marks	Part marks and guidance	
18			10:50 [am]	4	**SC3** for 10:50 pm OR **B2** for LCM as 140 or 2 hours 20 [min] and **M1** for [0] 8:30 plus *their* LCM OR **M1** for 20 = 2 x 2 x 5 and 35 = 5 x 7 and **M1** for [0]8:30 plus *their* LCM OR **B1** for listing [0]8:50, [0]9:10, [0]9:30 and **B1** for listing [0]9:05, [0]9:40, 10:15	*Their* LCM must be correctly converted to hours and minutes No incorrect times in between [0]8:30 and [0]9:30 or [0]8:30 and 10:15

Question			Answer	Marks	Part marks and guidance	
19			Arc centre D radius 6 cm meeting AD and DC or DC and bisector of ABC	2	**B1** for any arc centre D	Accept dashed or dotted for all marks Arc must be complete within ABCD not freehand Allow beyond AD and DC for 1 or 2 marks Tolerance 5.8 to 6.2 cm
			Ruled bisector of angle ABC to reach DC with construction arcs or Bisector with construction arcs from ABC to *their* arc centre D	2	**B1** for correct ruled bisector at least 2cm long by eye with no construction arcs	Tolerance $\pm$ 2°
			Correct region shaded	1	**Dep** on **B2** and at least **B1**	
20			28.8	3	**M2** for $\sqrt{30^2 - 8.4^2}$ or **M1** for $x^2 + 8.4^2 = 30^2$ oe	Allow answer of 29 after M2 scored

Question			Answer	Marks	Part marks and guidance	
21			8 cao	4	**M3** for $\dfrac{their\,60\times2.25-125}{125}$ soi [0].08 or **M2** for *their* 60×2.25 – 125 soi 10 or **M1** for 60×2.25 soi 135	allow work in £ or p, alt method : **M3** for $\dfrac{their\,60\times2.25}{125}-1$ soi [0].08 or **M2** for *their* 135 ÷ 125 soi by 1.08 or 108% or **M1** for 60×2.25 soi 135 OR **M3** for $\dfrac{2.25-their\,125\div60}{their\,125\div60}$ soi[0].08 or **M2** for 2.25 – *their* 125 ÷ 60 soi 0.16[6…] or 0.17 or **M1** for 125 ÷ 60 soi 2.08[3…]

Mark Scheme

Question			Answer	Marks	Part marks and guidance	
22	(a)		a correct distance conversion e.g. 400 ÷ 1000 or [0].4 or 5 × 1000 or 5000	M1	accept any correct method	
			a scale factor e.g. 5[000] ÷ 400 soi by figs 125 or 840 ÷ 66 soi by 12.727…or 12.73 or figs 127	M1		
			correct time conversion e.g. 14 × 60 or 840 or 66 ÷ 60 or 1[m] 6[s] or 1.1 or 825 ÷ 60	M1		
			correct figures e.g. 13.75 or 13.7 or 13.8 [14] 5.09… or 5.1 [5] 5090[. …] or 5100 5000 825 840 12.5 12.7… 5.95 or 5.9 or 6 6.06… or 6.1	A1	Dep on M3	
	(b)		an acceptable response e.g. [he will not maintain this rate because] he will get tired	1		Accept any correct reason must not be contradicted.

13

Question			Answer	Marks	Part marks and guidance	
23			15.38 cao	6	**M2** for 6400×1.025^8 oe soi by 7797.78 or **M1** for 1.025^k (k>1) soi 6724 AND **M2** for $6400 + 6400 \times [0].027 \times 8$ oe soi 7782.4 or **M1** for $6400 \times [0].027$ oe soi 172.8 or 1382.4 AND **M1** for subtracting *their* two totals or *their* two interests e.g. *their* 7797.7785… − *their* 7782.4 or *their* 1397.78 – *their* 1382.4	
24	(a)		0.6 0.7, 0.3, 0.7, 0.3 (White), not white, white, not white	1 1 1		Alternative answer 0.7, 0.3, 0.3, 0.7 (White), not white, not white, white
	(b)		[0].12	2	Correct or ft *their* 0.3 **M1** for 0.4 × 0.3 ft *their* 0.3	isw incorrect conversions after 0.12
25			28 or [£][0] .28	5	**B1** for $7r + 15c = 7[00]$ or $[r =] c + [0.]12$ **M1** for $7(c + [0.]12) + 15c = 7[00]$ or better oe or $r – c = [0.]12$ **M1** for $7c + 84 + 15c = 7[00]$ or better oe or $7r – 7c = [0.]84$ **M1** for $15c + 7c = 7[00] – [0.]84$ or better	Allow any pair of letters, Trial-and-improvement will score 0 or 5 only allow work in pence or pounds i.e. removing brackets i.e. rearranging their equation
26			$33 – 5n$ oe	2	**M1** for $– 5n + k$ oe or for $mn + 33$ oe ($m \neq 0$)	condone use of other variable condone $n = 33 – 5n$ for 1 mark

Question			Answer	Marks	Part marks and guidance	
27	(a)			3	**B2** for three correct entries ignore labels or **B1** for one element in the correct place	
	(b)		$\dfrac{36}{72}$ oe	2	**FT** *their* labelled Venn diagram (2 sets) for **2** marks e.g. $\dfrac{their\,36}{72}$ **B1** for $\dfrac{k}{72}$ where k < 72	isw cancelling and conversion, accept 50% for **2** marks

APPENDIX

<u>Exemplar responses for Q15b</u>

Response	Mark
May be a person who lives alone and only wants a small pack	**1**
May be having a party so want a lot	**1**
They don't have enough money	**1**
They may not have done the calculation [correctly]	**1**

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