OCR
Oxford Cambridge and RSA

GCSE

Mathematics (9-1)

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

General Certificate of Secondary Education

Mark Scheme for June 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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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

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 × (*their* '37' + 16), or FT 300 – √(*their* '5^2 + 7^2'). Answers to part questions which are being followed through are indicated by eg 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.

-    **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 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).
-    **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   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'.

7   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).

8   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.

9   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.

10   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.

11   Ranges of answers given in the mark scheme are always inclusive.

12   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.

13   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)	5	1		
		(ii)	8	1		
	(b)	(i)	6	1		
		(ii)	10	2	**B1** for only 2 and 12 identified	
2	(a)		32	1		
	(b)		Times by 2 oe	1		see exemplars
3	(a)		24	1		
	(b)		20	1		
	(c)		390	3	**M2** for [0].6 × 650 oe Or **M1** for [0].4 × 650 oe implied by 260	.
4			144 final answer	2	**M1** for 27 – 15 implied by 12	
5	(a)		2 : 9	2	**B1** for 6 : 27 oe	Any correct simplified ratio of 12 : 54 Including 1 : 4.5 for **B1**
	(b)		2.5 cao	2	**B1** for 400 : 1000 oe	Allow 1 : 2.5 for **B1** Condone inclusion of units for **B1** only
	(c)		161	3	**M2** for $\dfrac{115}{5} \times (2 + 5)$ oe **M1** for $\dfrac{115}{5}$ soi by 23 or 46	

	Question		Answer	Marks	Part marks and guidance	
6			11	2	**M1** for 3 + 2 × 4	
7	(a)	(i)	14	1		
		(ii)	18	1		
		(iii)	6.5 final answer	2	**M1** for $8x = 46 + 6$ or better or $x = \dfrac{b}{a}$ from *their ax= b a ≠1*	Accept $6\frac{1}{2}$ or $\frac{13}{2}$ must be an equation Accept a fully correct flow chart for **M1**
	(b)		⁻6 and ⁻5 final answer	3	**B2** for $(x + 6)(x + 5)$ Or **M1** for $(x \pm a)(x \pm b)$ where $(a + b)$ =11 or (ab) = 30 or pairs of factors giving two correct terms may be implied in a table And **B1** for correct solutions **FT** *their* quadratic factors	
8	(a)		Triangle at (3, ⁻1) (5, ⁻1) (4, ⁻3)	2	**B1** for triangle with correct orientation and size but incorrect location	Tolerance 2mm in both parts For both parts mark to their labels unlabelled triangles score 0
	(b)		Triangle at (1, 1) (3, 1) (2, 3)	2	**B1** for reflection in $x = k$ or in $y = ⁻1$	Overlay with red lines for B1 or base on the red line $y = 1$ **SC2** for 2 unlabelled triangles in correct positions
9			Enlargement [SF] 2 [Centre] (0, 0)	1 1 1	 Accept origin or O	Allow enlarge(d) /enlarging More than 1 transformation scores 0

Question			Answer	Marks	Part marks and guidance	
10			786.65	4	**M1** for 28361 – 27612 soi by 749 **M1** for *their* 749 × [0].85 implied by 636.65 or *their* 749 × 85 implied by 63665 **M1** for *their* 636.65 + 150 or *their* 63665 + 15000	Accept alternative methods
11	(a)		27.8[0]	4	**M1** for $14 \times \dfrac{3}{5}$ oe implied by 8.4 or 8400 **B1** for 9 [kg] oe And **M1** for 4 × 6.15 + 3.2[0] or for any other correct combination which isn't the cheapest	condone 9 used as tubs A method to find a combination of 9kg implies **B1**
	(b)		1881	3	**M2** for 1650 × 1.14 oe Or **M1** for 1650 × [0].14 soi by 231	
12			37.7 cao	3	**M1** for 12 × π oe **A1** 37.68 to 37.70[4] If A0 scored **B1** for rounding their answer to 1 dp	Their unrounded answer must be seen

Question			Answer	Marks	Part marks and guidance	
13	**(a)**		Showing that 9 is a common factor of 18 and 63	**1**		9 appearing in both lists of factors. 9 × 2 = 18 9 × 7 = 63 or both 18 and 63 can be divided by 9 Venn diagram with 3 and 3 in the centre 18 = 2 × 3 × 3 and 63 = 3 × 3 × 7 oe Accept factor trees with 2,3 and 3 and 3,3,7 at the ends
			Showing there is no greater common factor	**1**		9 must be clearly identified as the highest factor it may be ringed or underlined. Do not accept 3^2 for 9. If listing factors we need to see a complete list for both 18 and 63 in order to award 2 marks
	(b)		126	**2**	**M1** for listing at least 4 multiples of 18 or 2 x 3 x 3 x 7 or any common multiple of 18 and 63	could be from Venn diagram approach

Question			Answer	Marks	Part marks and guidance	
14			26, 20, 25	**5**	**M2** for any complete correct equation or	$x + x + 6 + x + 6 - 1 = 71$ oe or $x + x - 6 + x - 1 = 71$ oe or $x + x + 1 + x - 5 = 71$ oe Allow other letters for x
					M1 for any two expressions e.g. x, $x + 6$, $x - 1$ oe or equations using more than one variable e.g. $A = B + 6$; $C = A - 1$, $A + B + C = 71$	must be different $A = B + 6$ is the same as $B = A - 6$ Accept equivalent methods
					A1 for $x = 20$, or $x = 26$ or $x = 25$ **B1** for Aditi 26 or Becky 20 or Calli 25 IF less than 3 marks scored **SC3** for 3 correct values attributed to the wrong person as final answer	
15	**(a)**		accept any correct explanation e.g. sample size is small, no mention of subjects being randomly selected	**1**		If more than one choose the best one see list of exemplars
	(b)		two points accurately plotted	**2**	**B1** for each	tolerance $\pm \frac{1}{2}$ small square and use overlay as a guide
	(c)		positive	**1**		ignore any extras e.g. strong

Question			Answer	Marks	Part marks and guidance	
	(d)		a line or a mark between (35,9) and (35,15)	**1**		use overlay as a guide, a clear indication of method to find their answer
			9 to 15	**1**		
	(e)		9 soi	**B1**		9 can be implied by 75
			For putting *their 9* out of 12 into a percentage oe e.g. 9 in 12 or $\dfrac{9}{12}$ [=] 75[%]	**M1**	Accept any correct reasoning e.g. **M1** for 0.80 × 12 or 9.6	Accept fractions or decimals providing the two figures can be compared
			A correct conclusion from *their 9* e.g. "No/She is wrong"	**A1FT**	**A1FT** for a correct conclusion from *their 9* e.g. "No/She is wrong" If no points plotted in (b) award **M1** for 8 [out of 10] = 80[%] and **A1** for "Yes"	**FT** *their percentage or figure*
16			0.58 oe	**4**	**M3** for 0.3 × 0.4 + 0.3 × 0.6 + 0.7 × 0.4 or 1 − (0.7 × 0.6) Or **M2** for two correct products or 0.42 Or **M1** for one correct product Or **B1** for 0.7 and 0.6 seen (may be on a tree diagram oe)	implied by 0.12 + 0.18 + 0.28 allow equivalent fractions 0.42 cannot be one of the 2 products as it's a different method

Question	Answer	Marks	Part marks and guidance	
17	222	5	**M4** for 750 × [0].8 × [0].88 oe or 528 Or **M2** for 750 × [0].8 soi by 600 Or **M1** for 750 × [0].2 implied by 150 and **M1** for *their* 600 ×[0.] 88 or *their* 600 × [0].12 implied by 72	Accept equivalent methods e.g finding 20% and subtracting.
18	15	4	**B1** for at least 3 mid-points seen (from 5, 12.5, 17.5, 22.5, 27.5) or implied by products 80, 125, 350, 180, 165 **M1** for Σmf where m is a value within each group; allow one error in calculation **M1dep** for *their* '900' ÷ 60	

Question			Answer	Marks	Part marks and guidance	
19	**(a)**		610.7 to 632.2	**5**	**B2** for 1425 to 1475 or **B1** for 11.4 to 11.8 or **M1** for *their length* × 125 AND **B1** for $2\frac{1}{3}$, 2[h] 20 or 2.33… or 140 and **M1** for distance ÷ time and **A1FT** ft for a correct answer for *their length*	See additional guidance This calculation must be seen and distance must be *their* measurement or *their* measurement × 125. You must be convinced that it is a time as a divisor.
	(b)		accept any correct reason e.g. it may not have flown in a straight line or it may have been diverted	**1**		If more than one choose the best one. Comment about distance only, see list of exemplars.
20	**(a)**		Accurate angle bisector with 2 pairs of correct arcs	**2**	**B1** for correct bisector with no arcs or incorrect arcs	The bisector does not have to go through A but if extended it must go through A and it must lie within green lines in overlay. For **2** marks condone intersecting arcs of equal radius, one centre B and the other centre C for the construction with bisector drawn.
			Arc centre C radius 7cm	**2**	**B1** for arc centre C with incorrect radius	For arc, measure radius using ruler.
			Correct region indicated	**1Dep**	Dependent on at least **B1** for bisector and **B2** for arc	tolerance ± 2 mm and ± 2° for both constructions
	(b)		accept any correct assumption e.g. Road[s] is not/are not straight, road AB is busier than road AC, land is not suitable for construction	**1**		If more than one choose the best one see list of exemplars

Question	Answer	Marks	Part marks and guidance	
21	15 9	6	**B5** for [x=] 4.5 or $4\frac{1}{2}$ and [y =] -0.5 or $-\frac{1}{2}$ even given as answers OR **B2** for $5x - y - 8 = 3x + 5y + 4$ or $3x + y - 4 = 2x - 6y - 3$ and **M1dep** for rearranging either equation correctly so that the x's, y's and numbers are combined in <u>one</u> of the equations and **M1dep** for multiplying one equation to equate coefficients of one variable and **M1dep** for the correct method to eliminate a variable If **0** scored **SC1** for equating two adjacent sides e.g. $5x - y - 8 = 2x - 6y - 3$	accept 15 or 9 either way round for **6** marks The next **M1**s are dep on **B2** gained. For **M1** need an equation with one x term, one y term and one number term and allow one numerical error e.g. 2x – 6y = 12 oe or x + 7y = 1 oe . allow one numerical error e.g. 2x – 6y = 12 and 2x + 14y = 2 allow one numerical error e.g. 20y = -10

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