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 2017

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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

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 – $\sqrt{}$(*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)	44	1		±2°
		(ii)	Acute	1		Condone incorrect spelling
	(b)		Parallel	1		Condone incorrect spelling
2	(a)	(i)	>	1		
		(ii)	=	1		
	(b)		184 300	1		
	(c)		[0].625	1		
3	(a)		42	1		
	(b)		81	1		
	(c)		11, 23 and 41	2	**B1** for 2 or 3 correct with no more than 1 incorrect	
4			$\frac{28}{40}$ oe	3	**B2** for 0.7 or 70% OR **B1** for 8 or 4 or 30/100 oe and **M1** for 40 – *their* (8 + 4) soi by 28	Answer must be a fraction ignore cancelling of fraction after $\frac{28}{40}$ but not conversion to decimal or percentage Allow 8/40 or 4/40 or 12 nfww
5	(a)	(i)	(4, 3)	1		

Question			Answer	Marks	Part marks and guidance	
		(ii)	(−2, −1)	1		
	(b)		Point plotted at (3,− 2)	1		Condone use of a letter (R) if clearly in correct position
	(c)		line $y = 3$ drawn	1	minimum length 1 square	
6			9.2	3	**M1** for 0.17 × 54 oe **A1** for 9.18 If 0 scored **SC1** for *their* answer rounded to 1dp, if two dp or more seen.	Allow fully correct non calculator method for 1 mark allow 1 error in addition
7	(a)		$12t – 10u$ or $2(6t – 5u)$ cao	2	**B1** for $12t$ or $– 10u$ in final answer	12t + - 10u scores **B1**
	(b)		$5(v + 4w)$	1		Condone omission of final bracket
	(c)		−3 and −7	3	**M2** for (x + 3) and (x + 7) **M1** for (x + a) and (x + b) where ab = 21 or $a + b = 10$ **B1** ft their quadratic factors If 0 scored **SC1** for answer ±7 and ±3	ft their quadratic factors condone omission of final bracket
8	(a)		240	1		

Question			Answer	Marks	Part marks and guidance	
	(b)		10	**1**		
	(c)		No, with correct supporting values and justification	**4**	**B3** for 1.374 to 1.38 [kg] or 1374 to 1380[g] or 74 to 80[g] or 0.074 to 0.08 [kg] or 14[..people] OR **B1** for 1.3 × 1000 soi by 1300 or *their* 1375 ÷ 1000 and **M1** for 15 ÷ 6 soi by 2.5 or 550 ÷ 6 soi by 91.6[6] or 91.7 and **M1** for 550 × 2.5 =1375 or 1300 ÷ *their* 91.6[6] or *their* 91.6[6] × 15	Accept equivalent method
9	**(a)**		30	**1**		
	(b)	**(i)**	15 24 13 39	**1** **1** **1**		
		(ii)	fully labelled pie chart with at least 3 sectors correctly drawn	**2**	**B1** for 1 correct sector correctly labelled or pie chart with at least 3 sectors correctly drawn with incorrect or no labels	Wayne 144 Harry 15 Obi 72 Antony 39 Allow ±2°

Question			Answer	Marks	Part marks and guidance	
10			No he has scored 85[.2%] or no he needs at least 52.46 (52.5/53) to pass oe	2	**M1** for 52 ÷ 61 or 52 ÷ 0.61 soi by 0.85[2…] or 85[.2%] .. or 0.86 × 61 soi by 52.46 or 52.5 or 53	
11			Identifying there are not enough coaches or too many people with correct justification	2	**M1** for 320 ÷ 53 soi by 6.03[..] or 53 × 6 soi by 318 or 2 or 320 ÷ 6 soi by 53.3	No, he needs 7 coaches alone scores 0 See appendix
12			8	2	**M1** for 2 × 16 [÷4] or 16 ÷ 2 (speed)	32 alone scores 0
13	(a)		3 cao	1		
	(b)		1.5	3	**M1** for 6 × 25000 soi by 150 000 or **B1** for figs 15 or 1cm :0.25km and **M1** for *their* 150000 ÷ 100 000 or for *their* 0.25 x 6	
	(c)		$\frac{6}{13}$	1		
14	(a)		5.43×10^5	1		
	(b)		[0]. 063	1		
	(c)		No, it isn't in standard form, e.g it should be $2.4[4] \times 10^8$	1		See appendix

Question			Answer	Marks	Part marks and guidance	
15			19	5	**B4** for 12 nfww OR **M1** for x +7 or x - 7 **M1** for x +7 +x +7 +x + x + x + x = 86 **M1** for 6x + 14 = 86 ft **B1** for 12 ft OR **M1** for 86 - 7- 7 **A1** for 72 **M1**for *their* 72 ÷ 6 **A1** for 12 OR **M1** for a = c +7 oe **M1** for 2a + 4c = 86 oe **M1** for correct method to eliminate one variable allow one arithmetic error **A1** for 12	Allow use of other letters accept equivalent methods e.g **M1** for y+7 or y – 7 **M1** for y + y + y – 7+ y– 7+ y– 7 + y– 7 =86 **M1** for 6y – 28 =[86] **M1** for 6y = 114

Question			Answer	Marks	Part marks and guidance	
16			Complete correct arc centred at B identified with full construction shown including either perpendicular bisector of AB (including arcs and intersecting the arc centred at B) or arc(s) of 5cm radius centred at A and intersecting the arc from B at 2 points	5	**B4** 5cm arc centred at B with full construction shown including either perpendicular bisector of AB (including arcs and intersecting the arc centred at B) or arc(s) of 5cm (±0.2 cm) radius centred at A and intersecting the arc from B at 2 points OR **B2** for complete arc 5cm (±0.2 cm) centred at B or **B1** for arc**s** 5cm (±0.2 cm) radius centred at B or continuous arc 5cm (±0.2 cm) radius centred at B, but not covering the whole of the required region, minimum span 30˚ AND **B1** for arc[s] centred at A radius 5cm (±0.2 cm) or a perpendicular bisector of AB OR **B1** for minimum of 3 points in the correct position without arc from B	**B4** is fully correct without the correct locus identified Complete arc for the region required

Question			Answer	Marks	Part marks and guidance	
17			277 830	3	**M2** for 240000×1.05^3 or **M1** for 240000×1.05^2 soi by or 264600 If 0 scored **SC1** for 291721[.5] or 291722	
18	(a)		$2 \times 5 \times 7^2$ oe	2	**B1 for** only 2, 5 and 7 identified **or** **M1** for any correct factor pair of 490	Condone inclusion of 1 for **B1** Not 1 and 490
	(b)		12 20 [pm]	4	**SC3** for 1220 am OR **B2** for LCM as 200 and **M1** for 9:00 plus *their* LCM OR **M1** for 25 = 5x5 and 40 = 2 x 2 x 2 x 5 and **M1** for 9:00 plus *their* LCM OR **B1** for listing [0]925, [0]950, 1015 and **B1** for listing [0]940, 1020, 1100	

Question			Answer	Marks	Part marks and guidance	
19	(a)		0.7 0.8 , 0.2, 0.8, 0.2	1 1		
	(b)		0.76 with a complete correct method	2	**M1** for one correct product from *their* probabilities	e.g 1 – 0.24 = 0.76 or 0.06 + 0.56 + 0.14 = 0.76 Marks may be awarded for work on the diagram
20			34.5	3	**M2** for 38.64 ÷ 1.12 oe or **B1** for 1.12 or 112	

Question			Answer	Marks	Part marks and guidance	
21			214	5	**B4** for 214.2 or 214.24 to 214.26 OR **B1** for 60 marked or used as width of rectangle or distance from B to the corner AND **M2** for $\frac{1}{4}$ × π × 120 soi by 30π, 94.2 or 94.24 to 94.26 or **M1** for π × 120 soi by 376.8 to 377.1 or $\frac{1}{2}$ π × 120 soi by 188.4 to 188.6 AND **M1** for 2 × *their* 60 + *their* 30π AND **B1** for their final answer written to more than 3 figs correctly rounded to 3 s.f. to a max. of **4** marks	Accept 120 + 30 π for **B4** Allow e.g. r = 60 for **B1**

Question			Answer	Marks	Part marks and guidance	
22	(a)		135	2	**B1** for angle 45	e.g 45 marked at ACB or ABC or 180 – 45 or 90 + 45
	(b)		209 to 209.1	4	**M2** for $\tan^{-1}$ (45÷25) or $\tan^{-1}$ (25÷45) soi by 61, 60.94 to 60.95 or 29[.1] , 29.05... or **M1** for tan [=] 45÷25 or tan [=] 25÷45 AND **M1** for 270 – *their angle*ABD or 180 + *their angleADB*	Accept longer methods but they must get to the equivalent point to gain credit e.g. if they find the hypotenuse, they score **M0** until they start to use sin or cos. Can be implied by *their* answer
23	(a)		4 points accurately plotted	2	**B1** for 2 or 3 points accurately plotted	Condone missing or incorrect lines

Question			Answer	Marks	Part marks and guidance	
	(b)		Here are 4 different categories , • Compares the number of people in the whole of 2015 to the whole of 2016 (e.g. there were more people shopping in 2016) • Compares same seasons in 2015 with seasons in 2016 (e.g there were more in Jul–Sept 2016 than in 2015) • Compares seasons within the same year (e.g in 2016 there were more customers in the summer months) • Compares increases / decreases in the number of customers, referring to gradients (e.g the biggest change was between Jul–Sept and Oct-Dec) Do not allow comparisons that only refer to the shape of the graph (e.g, it goes up and down again or it peaks in Jul–Sept) 1 mark for each acceptable comment - for 2 marks they must come from different categories	**2**	**B1** for 1 correct comment	If they make 3 comments mark the best 2. It is possible to cover 2 categories in one comment for 2 marks

Question			Answer	Marks	Part marks and guidance	
24	(a)		24 31	5	**M1** for 3X + 2Y = 134 oe **M1** for 2X + 5Y = 203 oe **M1** for multiplying both equations by scalars to equate coefficients of one variable (allow one arithmetic error) **M1** for correct method to eliminate one variable (allow one arithmetic error) if **M4** not scored award **B3** for one correct answer	allow any correct method e.g. substitution **M1** for rearranging one equation to make X or Y the subject, $X = \frac{134-2Y}{3}$ **M1** for substitution of *their* expression in the other equation
	(b)		Any correct comment relating to distance	1		See appendix

APPENDIX

Exemplar responses for Q11

Response	Mark
No – 6 coaches only hold 318 people which is 2 short	2
Gary needs an extra coach for the other 2 people	2
320 ÷ 6 = 53.3333.. no you can't split a person up into 3 parts, you will need 7 coaches	2
320/53 = 6.03 No because it's a decimal you need to round up not down	2
53x6=318 Gary is not correct as 6 coaches will mean 2 people will not be aloud on the coaches	2
Gary is incorrect 6 coaches only hold 318 people so he needs 7	2
6 coaches hold 318 so there will be 2 people left	2 bod
320/53 = 6.03…. No he is wrong he will need more	2
Gary is correct 320/53 = 6.0	1
320/6=53.3 Not enough room one person will be left behind *(in fact two people are left behind!)*	1

Exemplar responses for Q14c

Response	Mark
He is not correct because the decimal point was moved to make a number bigger than 10	**1 bod**
No because the number has to be between 1 and 10	**1 bod**
No because the number has to be between 1 and 9, it should be 2.44×10^8	**1 bod**
No because the decimal has to be lower than 10	**1 bod**
No only 1 number should be before decimal point and he wrote 2	**1**
It should be 2.44×10^8	**1**
Standard form is 2.44×10^8	**1**
No because the number has to be between 1 and 9	**0**
Pierre is not correct as it is 2.44×10^7 and he got 24.4×10^7	**0**
No the power should be 8	**0**

Exemplar responses for Q24b

Response	Mark
He does no other driving other than routes X and Y in the week	**1**
There are no diversions or detours	**1**
He sets off from the same place each time	**1**
That he only drives these two routes	**1**
They are the same 2 routes and never change	**1**
He could of gone to other routes as well as X & Y routes. He didn't drive anywhere else.	**1**
That Dan isn't driving anywhere else during the week	**1**
The routes are correctly measured	**1**
He takes exactly the same route each time	**1**
He hasn't taken any breaks	**0**
There are no stops	**0**
There is no traffic jams	**0**
He does not cancel his drive	**0**
That no stops in petrol stations were made	**0**
Y has a longer route than X	**0**
Dan prefers to drive route Y as he has driven it more than route X	**0**
He didn't drive route X or Y there and back	**0**
That there is no traffic or road works	**0**

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