

GCSE

Applications of Mathematics (Pilot)

Unit **A381/01**: 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.

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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

Subject-Specific Marking Instructions

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

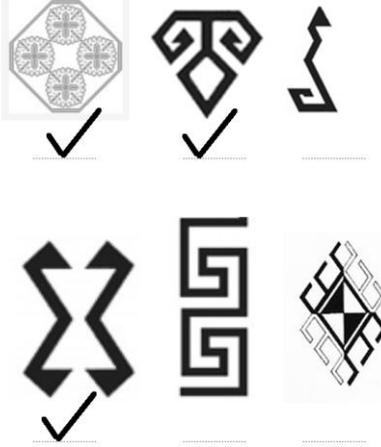
For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

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.
 - a. **cao** means **correct answer only**.
 - b. **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.
 - c. **isw** means **ignore subsequent working** (after correct answer obtained).
 - d. **nfw** means **not from wrong working**.
 - e. **oe** means **or equivalent**.
 - f. **rot** means **rounded or truncated**.
 - g. **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.
 - h. **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	Guidance
1	(a)	(i)	2037600	3	B1: 56600 or 283×200 seen M1: “number” x 36 i.e. “×36” or 36 × “.....number ..”
		(ii)	339 or 339.6 or 340 [days]	2FT	M1: “÷ 6000” soi at some point For FT decimal or rot
	(b)	(i)	18 or 19	1	
		(ii)	47.2(91 ...)	2	B1: 361 seen 361=19 ² Effectively condoning lack of full calculator display.
		(iii)	47	1FT	
	(c)		 <p>All correct</p>	2	B1: at least two correct and at the most one wrong tick Allow any unambiguous indication
(d)	(i)	(2, 8) (6, 2)	1	Need both correct (in any order)	
	(ii)	Centre square NAMBI	1	Mark for clear intent – condone other extraneous decorations.	
(e)		(7, 7)	1		
(f)		45 (years old)	3	B1: 1349.5 seen or B2: 1971 or 1971.1 seen	Condone 2017 slip over present year giving answer of 46
				If zero gained	Result of MR to “undo” the

Question			Answer	Marks	Guidance
					SC1: 1437.(223 ...) seen number machine.
2	(a)	(i)	1.38 to 1.40	1	
		(ii)	2.3	1	Condone 2 (i.e. 1 sf)
	(b)	(i)	1235.9 [kph]	3	M2: $72.2 \times \sqrt{(293)}$ or 1235 or 1236 or 1235.86.. or 17.1(17 ...) M1: 293
		(ii)	(1.1) [kph]	3	M2: $1193 + 2.2 \times 20 (=1237) -$ <i>their</i> (b)(i) M1: 1237
	(c)		(10 to 14)°	2	M1: incorrect angle answered but clear attempt to draw two relevant lines e.g. 
	(d)		(2 to 3) Metres/m	1 1	Dependent of a number within range 1 to 4 (6 foot to 9) foot Foot/feet/ft o.e.
	(e)	(i)	(16 to 17) [km]	1	
		(ii)	20 - - 55 or -55 - 20 75 or -75	1 1	
	(f)		2003	1	
	(g)		£10 ⁸	1	
	(h)	(i)	60	1	Condone addition of %
		(ii)	75	1	Condone addition of % and for this part only $\frac{75}{100}$
	(i)		Total number of passengers was [2 500 000] for [5 000 000] seats, which is a load factor of [50], so no profit.	4	4: the three [key numbers] and a stated conclusion or 1: each correct [key number] Condone addition of % to load factor. Cannot gain conclusion mark unless three [key numbers] shown

Question		Answer	Marks	Guidance	
(j)	(i)	(Concorde) $14\,000 \times 2.5$ o.e. or $35\,000 / 35$ or "should be 2.5" o.e. (Boeing 707) "Correct for the Boeing707" o.e. or $8\,000 \times 2.6$ o.e. or $20\,800 / 20.8$	2	1: Correct point for each aircraft Condone absence of labelling – isw after a correct calculation shown (e.g. incorrect conversion to tonnes)	
	(ii)	(Evie's working is correct) evidence of two recalculations.	2	1: each calculation o.e. 1.5×8000 o.e. (e.g. $\frac{1400}{800} = 1.75$) $2 \times 3 = 6 < 6.5$ o.e. (e.g. half of 6.5 is 3.25) Just statement about correctness gains no credit.	
	(iii)	Fairest comparison is per passenger for the same journey length o.e. Boeing 707: 715.3 (kg) Concorde: 1050 (kg) So Concorde the worst polluter	1 1 1 1FT	CAO CAO	The fairer comparison is the pollution per passenger for the same journey but see LIST after SSU.
(k)		True (o.e.), it takes 3.19 hours to fly which is less than 3.25 hours o.e.	4	B1: speed is $5 \times 1062 (=5310)$ B1: time taken is $16983 \div \text{their "5310"}$ B1: Comparison of <i>their</i> time with 3.25 hours (must be comparison in the same number/time format)	isw if failed attempt to change <i>their</i> "3.19" hours into hours/minutes format. <i>Mark less conventional approaches in the spirit of the left- hand columns.</i>
(l)		$a = 3$ $b = 50 [^\circ]$ $c = 1.3$	1 1 1		

Question		Answer	Marks	Guidance	
	(m)	$r=55$ $s=75$ $t=160$ (their " r " + 105)	1 1 1FT		
	(n)	(A =) $fg + 0.5eg$ o.e.	2	1: fg 1: $0.5eg$	Condone non-standard algebra such as $g \times f$ or $0.5 \times g \times e$
			60		

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