ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark scheme
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GCSE

Mathematics A

Paper 2: Intermediate

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Registered address AQA, Devas Street, Manchester M15 6EX. *Dr Michael Cresswell Director General.*

Notes for Examiners

In general if a response is fully correct then it is sufficient to tick the final answer and put the mark for that part in the margin. Parts not attempted or totally incorrect must have 0 for that part in the margin. Negative marks must not be used.

Errors **must** be underlined or ringed.

Responses that are partly correct will generally be awarded marks for method or partial working. In that case the following should appear in the margin to indicate what the mark(s) has been awarded for. These are detailed in the mark scheme.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M dep or **DM**	A method mark dependent on a previous method mark being awarded.
B dep or **DB**	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.

Within the script the following notations can be used to explain the decision further. These should appear next to the place in the script where the error or omission is made.

ft or ✓	Follow through marks. Wrong working should not be penalised more than once so that positive achievement later in the question can be recognised.
✗	An answer that does not follow through from previous working.
MR or **MC**	Misread or miscopy. Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.
fw	Further work. Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.
choice	When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.
wnr	Work not replaced. Erased or crossed out work that is still legible can be marked.
wr	Work replaced. Erased or crossed out work that has been replaced is not awarded marks.

^	Work incomplete or method missing.
allow	In general decisions should support the candidate. If an examiner feels that work is worthy of a mark then it can be allowed.
BOD	Benefit of the doubt should only be given in cases where evidence is not secure. For example overwriting numbers. It should not be used to avoid making a decision. Examiners are expected to make decisions based on the scheme.
seen or ✓	Every page containing working should be annotated to show it has been considered.
from page 23 ↘	Marks transferred from another part of the paper. Candidates often make a mistake in their original work and do the question on the back page or another page with some space. The part marks should be credited there **within the script** and the marks transferred to the margin by the printed question.
wrong method	Candidates sometimes obtain the correct answer via a completely wrong method. If an examiner is sure that this is the case then the Method mark should not be awarded and subsequently the accuracy mark cannot be awarded. This notation should also be used when candidates 'fiddle' algebra to demonstrate a given result.
pa	Premature approximation. Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise in the standardising meeting.

Unusual responses

Very occasionally situations may occur which are not covered by the above notations. In these rare cases examiners should write brief comments in the script to explain their decision, such as ignore, irrelevant etc.

Blank answer spaces and blank pages

Blank answer spaces should be crossed through to show that they have been seen. Blank pages at the end of a paper should also be crossed through to indicate that they have been seen. Any working on these pages must be marked.

Diagrams

Diagrams that have working on them should be treated like normal responses and marked with same notations as above. If the diagram is written on but the correct response is within the answer space the work within the answer space should be marked and the diagram ticked to indicate that the examiner has seen it. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a candidate has used an incorrect method to obtain an answer, as a general principle the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised as directed at the standardising meeting.

Questions which ask candidates to show working

Instructions on marking will be given at the standardising meeting but usually marks are not awarded to candidates who show no working.

Questions which do not ask candidates to show working

As a general principle, a correct response is awarded full marks.

Probabililty

Answers should be written as fractions, decimals or percentages. If a candidate uses an incorrect notation such as "1 out of 4" for ¼ consistently through the paper, then penalise the first occurrence but allow any following answers. Ratio is not acceptable as incorrect notation.

Recording marks

Part marks for a question should be shown in the margin at the side of the work. The totals should be shown in the oval either at the end of each question or after each double page. These marks should be transferred to the appropriate box on the front of the paper. The grand total for the paper should also be shown in the appropriate box on the front of the paper. This total should agree with the total of the part marks within the paper.

Checkers at the board will first check that the part marks agree with the ringed totals, either at the end of each question or after each double page. They will then check that these marks have been transferred correctly and finally that the total on the front cover is correct. Papers that contain clerical errors may be returned to examiners.

1(a)	3 5 6 5 7 8 6 8 9	B2	-1eeoo
(b)	4/9, 0.444, 44.4%	B2	B1 numerator, ft from their table B1 for 9 7/15 SC1
(c)	2/5	B1	Accept 0.4, 40%

2	55/100 × 3 1.65 (litres) 3/4 × 2.5 1.875 (litres) + (B or 2.5 litre)	M1 A1 M1 A1	 oe only penalise once for repeated error oe

3(a)	1.4 × 95 (=133 pence) 193 – (their 133) (= 60 pence) (their 60) ÷ 0.8 75 (pence)	M1 DM1 M1 A1	 £0.75
(b)	4.50 / 22.50 × 100 20 (%)	M1 A1	

4(a)	(180 – 34) ÷ 2 73	M1 A1	
(b)	180 – (38 + 34 + their *x*) 35	M1 A1	Their 73 – 38
(c)	No, because 38 ≠ 35	B1	oe angles are not the same ft their answer to *y* but not 38

5(a)	¾ × ½ + 2 2 3/8	M1 A1	Accept 0.75 × 0.5 + 2 2.375 or 19/8
(b)	(¾ + ½) ÷ 2 5/8	M1 A1	(0.75 + 0.5) ÷ 2 0.625

6	255/15 or 285/15 their 17 × their 19 their 323/24 (= 13.45..) 14 (boxes)	M1 DM1 DM1 A1	M0 for 255 × 285/15

7(a)	Ruled line within given limits	B1	Between (0.5, 40 to 45) and (2.5, 7) and (2.75, 9)
(b)	Negative correlation	B1	Allow equivalent wording eg. longer time implies slower speed etc.

8(a)	3.1428.., 3.16227.., 3.16049.., 3.125 3 1/8, 22/7, 256/81, √ 10	M1 A1	Allow M mark for any two correct decimals to at least three sf R G E H and H, E to 4 sf, none wrong
(b)	22/7	B1	Accept 3.14..... or G

9(a)	$3x + y$	B2	B1 for $3x$ or B1 for $(1)y$ B0 total for $3xy$
(b)	$4(c + 3)$	B1	$2(2c + 6)$
(c)	$x(x + 5)$	B2	B1 for × or × + 0, B1 for $(x + 5)$

10(a)	i) A ii) E iii) B	B1 B1 B1	
(b)	Reflection in × = –2	B1 B1	

11(a)	$6r = 8 – 2$ 1	M1 A1	
(b)	$2s$ or 1 seen $2s = 1$ ½ or 0.5	M1 A1 A1	$7s–5s$ or 3–2 or $5s–7s$ or $–2s$ or 2–3 or –1 $–1 = –2s$
(c)	$12 – y = 3 \times 5$ $12 – 15 = y$ –3	M1 DM1 A1	$4 – y/3 = 5$ $- y/3 = 1$, allow $y = 15 – 12$

12	Sight of 360 360 ÷ 20 (= 18) 7 × 18 = 126	B1 M1 A1	 totalling ratios and dividing into 'their' 360

13(a)	$\pi \times 8^2$ 201.06..., 200.96, 201.14 cm^2	M1 A1 B1	 Allow 201, 200 Independent mark for units
(b)	$2\pi x4.5$, $2\pi x9$, $\pi x4.5$, $\pi x9$ 14.1... 23.1…	M1 A1 A1ft	Attempt to find circumference of circle or semi-circle Allow (their 14.1...) + 9

14(a)	0.28	B1	Accept equivalent fractions or 28%
(b)	320 ÷ 0.2 1600	M1 A1	M1 for equating 320 with 0.2

15	27.5 × 12 – 250 (=80) (their 80)/250 × 100 32	M1 DM1 A1	330/250 or 330/2.5 Attempt to find % using their value Or 330/250 × 100 – 100 SC2 for 28 or 21 or 44 on MR
15 alt	1.10 × 1.20 M1 (their 1.32) – 1 DM1 32 A1		Accept 110% × 120% 132 – 100

16(a)	D Slow steady, faster steady	B1 DB1	 Steady rate and an indication why quicker at top
(b)	Any container with uniform vertical cross - section	B1	Allow 2D eg. rectangle and/or substantially uniform × section

17(a)	$10a - 5c + 12a + 8c$ $22a + 3c$	M1 A1	Allow one error
(b)	$3x < 1 - 7$ $x < -2$, $-2 > x$, $x \leq -2$, $-2 \geq x$	M1 A1	$6 < 3x$, $3x < 6$, $3x < 8$ allow one error Allow ≤ but not = unless recovered in the answer

18	$6^2 + 2.5^2$ (= 42.25) √42.25 6.5 $AB = 4$	M1 DM1 A1 A1ft	Squaring & adding M1 tan Square root DM1 $OA = 6/\cos 22.619$ or $2.5/\sin 22.619$ ft their 6.5 – 2.5 SC1 2.95 from incorrect Pythagoras

19(a)	Sight of sin 48 or cos 42 $x = \sin 48 \times 5.1$ or $5.1 \times \cos 42$ $x = 3.79\ldots$ $x = 3.8$ or 3.79	M1 DM1 A1 B1	 $\sqrt{(5.1^2 - (5.1\cos 48)^2)}$ gets M2 Independent rounding mark for a value or calculation that is four sf or greater
(b)	6.8 × (their x) 25.77	M1 A1ft	$5.1 \times 6.8 \times \sin 48$ ft their value for x

20	$1 + 2 + 3 = 6 = 2 \times 3$ $2 + 3 + 4 = 9 = 3 \times 3$ $3 + 4 + 5 = 12 = 4 \times 3$ Goes up in 3s so must always be a multiple of 3	B1 B1 DB1	B1 for any numerical example B1 for indication that any total is a multiple of 3 DB1 for statement that in 3 times table
20 alt	Convincing algebraic proof eg. $n + n + 1 + n + 2$ B1 $= 3n + 3$ B1 $= 3(n + 1)$ B1		B1 for identifying consecutive numbers in algebraic form B1 for sum B1 for 3 × (....)

21	$u - 5 = t / 3$ or $5 - u = t/3$ $t = 3(u - 5)$	M1 A1	$3u = t + 3 \times 5$ $t = 3u - 15$ $u - 5 \times 3$ is A0 $3u - 5$ is A0

22(a)	7×10^9	B1	
(b)	0.0045	B1	
(c)	sight of 8 8×10^{-3}	M1 A1	

23(a)	i) 100 ii) 106 – 93 13	B1 M1 A1	100.5 93 – 106 or readings from graph 12.5 to 13
(b)	i) George, smaller IQR ii) Brian, lower median	B1 B1	oe smaller range, smaller spread oe B0 for lower scores B0 for Brian is 70 George is 85

24(a)	3.6 ÷ 2/3 5.4	M1 A1	3.6 × 3 ÷ 2 Allow 3.6 ÷ 0.66 or better
(b)	45	B1	