Oxford Cambridge and RSA

F

GCSE (9–1)

Mathematics

J560/02: Paper 2 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for November 2020

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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.

1. Annotations available in RM Assessor. These **must** be used whenever appropriate during your marking.

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
BP	Blank page
SEEN	Seen

For a response awarded zero (or full) marks a single appropriate annotation (cross, tick, M0 or ^) is sufficient, but not required.
For responses that are not awarded either 0 or full marks, you must make it clear how you have arrived at the mark you have awarded and all responses must have enough annotation for a reviewer to decide if the mark awarded is correct without having to mark it independently.

It is vital that you annotate standardisation scripts fully to show how the marks have been awarded.

Subject-Specific Marking Instructions

2. **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.

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

- **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 and applies as a default.
- **nfww** means **not from wrong working**.
- **oe** means **or equivalent**.
- **rot** means **rounded or truncated**.
- **soi** means **seen or implied**.
- **dep** means that the marks are **dependent** on the marks indicated. You must check that the candidate has met all the criteria specified for the mark to be awarded.
- **with correct working** means that full marks **must not** be awarded without some working. The required minimum amount of working will be defined in the guidance column and **SC** marks given for unsupported answers.

4. 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.

5. Unless the command word requires that working is shown and the working required is stated in the mark scheme, 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, i.e. incorrect working is seen and the correct answer clearly follows from it.

6. 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. 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.

   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* '52 + 72'). Answers to part questions which are being followed through are indicated by e.g. FT 3 × *their* (a).

7. In questions **with no final answer line**, make no deductions for wrong work after an acceptable answer (i.e. **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.

8. In questions **with a final answer line and incorrect answer given**:

   (i) If the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

   (ii) If the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

   (iii) If the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded if there is no other method leading to the incorrect answer. Use the **M0**, **M1**, **M2** annotations as appropriate and place the annotation **×** next to the wrong answer.

9. In questions **with a final answer line**:

   (i) If one answer is provided on the answer line, mark the method that leads to that answer. A correct step, value or statement that is not part of the method that leads to the given answer should be awarded **M0** and/or **B0**.

   (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

   (iii) If more than one answer is provided on the answer line and there is more than one method provided, award marks for the poorer response unless the candidate has clearly indicated which method is to be marked.

10. In questions with **no final answer line**:

    (i) If a single response is provided, mark as usual.

(ii) If more than one response is provided, award marks for the poorer response unless the candidate has clearly indicated which response is to be marked.

11. 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. If a candidate corrects the misread in a later part, do not continue to follow through, but award **A** and **B** marks for the correct answer only.

12. 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.

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

14. 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.

15. If in any case the mark scheme operates with considerable unfairness consult your Team Leader.

Question			Answer	Marks	Part marks and guidance	
1	(a)	(i)	5	1		
1	(a)	(ii)	10	1		
1	(b)		Two of 11, 13, 17, 19	2	**B1** for one correct and one other or more than two of 11, 13, 17, 19	
2	(a)	(i)	3.5	1		Accept 3.50 or 3½
2	(a)	(ii)	1520	1		
2	(b)		8.7	2	**B1** for 3 [cm] or 57 [mm] Or **M1** for answer of 87 [mm]	
3	(a)	(i)	6	1		
3	(a)	(ii)	8	1		
3	(b)	(i)	[0].4 final answer **oe**	1		
3	(b)	(ii)	3.4 final answer **oe**	1		
4	(a)		$\frac{4}{25}$	2	Mark final answer **M1** for $\frac{16}{100}$ or equivalent fraction	
4	(b)		0.35	2	**M1** for correct first step to convert to decimal e.g. $\frac{35}{100}$ seen or attempt to divide 7 by 20	
5	(a)	(i)	Equilateral	1		
5	(a)	(ii)	Rhombus	1		

Question			Answer	Marks	Part marks and guidance	
5	(b)	(i)	Draws both lines of symmetry correctly	1		Mark intention
5	(b)	(ii)	She is incorrect **oe** and gives rhombus or parallelogram as the other quadrilateral	2	**M1** for correct description of RS of any other quadrilateral e.g square has order 4	For M1 ISW other comments that do not refer to symmetry See AG
5	(c)		Arrows facing the same way added to AB and DC	1		Condone more than one arrow facing the same way on AB and DC
6			7 50 [am] **oe**	4	**B2** for 2 [hours] or **M1** for 100 ÷ 50 **M1** for 10 10 [am] – *their* 2 h – 20 mins	B2 may be implied by 120 mins
7	(a)		No and statement referencing 10 and 12 **oe**	1		Referencing 10 and 12 could be implied by eg United only scored 2 more **oe** United's bar would be a height of 20 **oe** Do not accept 'scale should go up in 2s' See AG
7	(b)		Start the vertical scale from 0 **oe**	1		Accept other values <8, or suggestion of inserting zig-zag on 'goals' axis line See AG
7	(c)		All teams played the same number of games **oe**	1		United may have played less games
8	(a)		3^4	1		

Question			Answer	Marks	Part marks and guidance	
8	(b)		64 [×] $\frac{1}{4}$ 16 is a square number **oe**	**2** **1dep**	**B1** for each correct value Dep on 2 previous marks earned	Allow B1 for $2^6 \div 4$ or 4 seen as a denominator or 0.25 for $\frac{1}{4}$ Accept $16 = 4 \times 4$ or $16 = 4^2$
9	(a)		4 : 5	**1**		
9	(b)		1 : 3	**3**	**B1** for 0.6 [kg] or 1800 [g] seen **M1** for correct partial simplification of the given ratio or *their* first ratio	
10	(a)		$5b^4$	**1**		Condone $5 \times b^4$
10	(b)		x^{12}	**1**		
11	(a)		30	**2**	**M1** for $\frac{6}{100} \times 500$ **oe**	Answer 530 implies M1
11	(b)		650	**2**	**M1** for 500 + 5 × *their* (a)	
12			70	**3**	**M2** for 56 ÷ 0.8 **oe** or **B1** for 0.8[0] **oe** seen or for 56 associated with 80% **isw**	For B1 0.8 **oe** seen allow fraction but not just for 80%

Question			Answer	Marks	Part marks and guidance	
13			0.28 and 0.14	5	**B4** for 0.14 identified as white or for 0.28 and 0.14 reversed or **M1** for 1 – (0.34 + 0.24) **A1** for 0.42 **M1** for *their* 0.42 ÷ (1 + 2) **A1** for 0.14	Allow equivalent fractions or percentages Condone lack of % sign for M marks A1 Implies previous M1 or may be implied by *their* y + *their* w = 0.42
14	(a)	(i)	$x = 3$ sketched correctly with 3 indicated on x-axis as x – intercept	2	**M1** for a vertical line or a dotted vertical line passing through 3	Condone good freehand
14	(a)	(ii)	$y = x^2 + 1$ sketched correctly with 1 indicated as y-intercept	2	**M1** for correct shape or y-intercept at 1 but not y = 1	Condone good freehand
14	(b)		It should not touch the axes **oe** It should also have a curve in the 3rd quadrant **oe**	1 1		Accept responses on the graph
15	(a)		$2a + 3b$ final answer	2	**B1** for $2a$ or $3b$ in answer If 0 scored, **SC1** for correct answer seen then spoilt	 Eg $2a + 3b = 5ab$
15	(b)(i)		$4x + 12$ final answer	1		
15	(b)(ii)		$x^2 + 3x – 10$	2	Mark final answer **B1** for 3 of x^2, $5x$, $–2x$, $– 10$	[+]$3x$ counts as two terms For B1 could be in a grid

Question			Answer	Marks	Part marks and guidance	
16			$4x - 10 = 11 - 2x$ $4x + 2x = 11 + 10$ $x = 3.5$ [Dimension of square =] 4 One perimeter/area calculation correctly evaluated Perimeter and area both shown to be 16	**M1** **M1** **A1** **B1** **B1** **A1**	or better Correct or **FT** 4 × *their x* – 10 or 11 – 2 × *their x* **FT** 4 × *their* length of square or (*their* length)^2	Alt method M1 for $(4x - 10)(11 - 2x) = 2(4x - 10) + 2(11 - 2x)$ or better M1 for $2x^2 - 15x + 28 = 0$ Dep on use of algebra Identifying 4 as the side of the square may be implied by later calculations B1FT Dep on previous B. Allow embedded solution Dep on all previous marks earned and that only x = 3.5 leads to perimeter = area
17	(a)		Correctly completes table 7 6 7	1		
17	(b)	(i)	$\frac{13}{25}$ **oe**	2	**B1FT** for *their* correct numerator **B1** for fraction with denominator 25	In (b)(i) and (ii), not ratio or words, isw eg $\frac{13}{25}$, likely but not $\frac{13}{25}$, unlikely isw cancelling/conversion to other forms FT numerator 12 + any evens in *their* (a)
17	(b)	(ii)	$\frac{14}{25}$ **oe**	2	**FT** their correct numerator / 25 **B1FT** for *their* correct numerator but denominator incorrect	FT numerator 13 + any multiples of 3 or 4 in *their* (a)

Question			Answer	Marks	Part marks and guidance	
18			5.6[0] with correct working	6		"Correct working" requires full evidence of M1A1 AND M1 or convincing pictorial/alternate convincing approach For method accept equivalent decimals or percentages (to 2 sf)
					M2 for $\left(\frac{1}{3}+\frac{2}{5}\right)\times 10$ **oe**	M2 could be split into $\frac{1}{3}\times 10 + \frac{2}{5}\times 10$
					or **M1** for $\frac{1}{3}\times 10$ or $\frac{2}{5}\times 10$	The method may be shown pictorially
					A1 for $\frac{110}{15}$ **oe**	For A1 eg 7⅓, accept 4 + 3⅓ oe, 733[..]% A1 implies M2
					or	
					M1 for $\frac{1}{3}+\frac{2}{5}$ **oe**	The method may be shown pictorially
					A1 for $\frac{11}{15}$ **oe**	Implies M1
					AND	
					M1 dep for *their* improper fraction/decimal/mixed number rounded up to next integer	Dep on their improper fraction ≠ integer Must show a more accurate value first, could be in two parts eg 4 + 3⅓ then 8
					M1 for *their* integer multiplied by 70 or 0.7	This may be earned by those with wrong working then doing eg 8 x 0.7. Must see a calculation implying an integer × 70 or 0.7, could be in several parts
					If 0 scored, **SC1** for answer 5.60 or 5.6	

Question			Answer	Marks	Part marks and guidance	
19			6 with correct working	5		"Correct working" requires evidence of at least B2 AND B1 or alternate convincing approach
					B2 for 40 (LCM) identified or **M1** for multiples of 8 and 20 up to at least 40	Eg attempts to count in 40 May be seen as clock times eg 0808, 0816, 0824,… 8.20, 8.40, 9.00,… Condone 1 error in either list FT other values Accept also if starting from 0801
					AND	
					B2 for indicates 40, 80, 120, 160, 200, 240	Implies previous B2 Accept as times [0800], 8.40, 9.20, 10.00, 10.40, 11.20, 12.00 Condone [0801], 8.41, 9.21, 10.01, 10.41, 11.21, 12.01
					or **B1** for [time =] 269 **oe** or 270 **oe** **M1** for *their* time ÷ 40 **oe**	eg Accept 4 hours 30 mins For M1 accept 4 correct multiples of 40 listed Condone 1 error FT other values Accept as times as above
					If 0 scored, **SC1** for answer 6	

Question			Answer	Marks	Part marks and guidance	
20			C (24, 9) D (10, 2)	**5**	**B4** for three correct ordinates or **B3** for two correct ordinates or **B2** for one correct ordinate from 24, 10, 2 or for longer length of triangle = 7 **soi** or **B1** for 9 as *y*-coordinate for C or for shorter length of triangle = 3 **soi** OR **M1** for long = 17 – 4 – 2 × *their* short **oe** **A1FT** for C (4 + 2 × *their* short + 2 × *their* long, 9)) **A1FT** for D (4 + 2 × *their* short, 9 – *their* long)	For part marks, check ordinates first (may be on diagram if answer line blank) .If B2 or fewer check alt method and mark to candidates' advantage B4, B3, B2, B1 May be on diagram For M1 and A1FT, *their* short and *their* long needs to be clear in working or on diagram
21			[*x* =] –1 [*y* =] 4	**4**	**M1** for attempt to equate coefficients **M1** for correct method to eliminate 1 variable **A1** for 1 correct solution If A0, **SC1** for a pair of values that satisfy one of the original equations	ISW correct answers seen in working then reversed Condone 1 arithmetic error – a sign error is not an arithmetic error Condone 1 further arithmetic error <u>Alt method</u> M1 for rearrangement of one equation to make either *x* or *y* the subject M1 for correct substitution of *their* rearrangement into the other equation

Question			Answer	Marks	Part marks and guidance	
22			For Monday, does not rain should be 1 – 0.55 **oe** For Tuesday, 0.25 is incorrectly placed on the does not rain branch **oe** A pair of branches is missing for Tuesday after does not rain on Monday **oe**	3	**B1** for each	After each correct statement isw eg 0.55 + 0.35 does not equal 1 Monday not rain should be 0.45 eg For Tuesday the probabilities are placed the wrong way around 0.25 should be on the rain branch eg There should be two more branches for Tuesday See AG
23			$\sqrt{\frac{24}{\pi}}$	4	**M2** for [r^2 =] $\frac{360\times 8}{120\times \pi}$ or better or **M1** for $\frac{120}{360}\times \pi r^2$ [= 8] **oe** or better **A1** for [r^2 =] $\frac{24}{\pi}$	For method condone use of 3.1, 3.14, etc used for π M1 implied by $\pi r^2 = 24$ Implied by 7.6…

Exemplar responses

Exemplar responses for Q5bii

Response	Mark
A rhombus has symmetry of order 2. (No decision).	**1**
No, other polygons have rotation symmetry of 2 eg rhombus, kite.	**1**
Diagram of square drawn and 4 written by the side (BOD 1 as they haven't contradicted that the 4 isn't order of rotation)	**1**
No because if you take a square or a rhombus you can also have rotation symmetry of 2 (not a completely correct statement for both marks but M1 scored for 'rhombus….symmetry of 2')	**1**
No because other quadrilaterals have rotational symmetry 2	**0**
No because a square has rotational symmetry 2	**0**
Amaya is not correct because a rectangle is not the only quadrilateral that has rotational symmetry 2. A square also has it.	**0**
She isn't correct because there are a few shapes with it	**0**
Yes because a square is a quadrilateral but has 4 lines of symmetry	**0**
Squares do not have a rotational symmetry of order 2.	**0**
Rhombus drawn in the space provided with the correct lines of symmetry	**0**
No because some irregular quadrilaterals have 4 – depends on the shape if it is irregular shape	**0**
This because most other quadrilaterals don't have the same sides as the others, leaving no symmetry (correct description of a scalene quadrilateral but they need to specify the shape by name)	**0**

Exemplar responses for Q7a

Response	Mark
No, City scored 10 goals and United scored 12 so therefore they only scored 2 more.	**1**
No, they only scored two more than them	**1**
No, they only scored 2 more goals than City not twice as many, that would be 20.	**1**
No, they only scored two more not two times more.	**1**
No, United scored 12 goals and half of 12 is 6.	**1**
No, twice the number city scored is 20 and united only scored 12	**1**
No because he hasn't double city to give 20 and united is less than that	**1**
No, United have only scored two more goals than City. This is because the number have massive gaps between them.	**1 BOD**
NO – twice as many means times 2. (This is not enough, if they also stated "not +2" then they would get the mark)	**0**
Yes, City is 10 goals of scores and united 12 goals of scores	**0**

Exemplar responses for Q7b

Response	Mark
She should start the graph from zero so that she can show the point clearly	**1**
Start number of goals from 1 (Accept other values <8)	**1**
Put a zero in the corner instead of an 8	**1**
She could start from 1 and go up in 2's to stop at 13	**1**
The numbers because she started it at 8 not 0. (BOD 'The numbers to imply vertical scale)	**1**
Start from 0 not 9	**0**
She should go up in two's instead	**0**
Make the spaces of 'number of goals scored' smaller so it isn't misleading to read.	**0**
Go up a different sequence for the number of goals scored	**0**

Exemplar responses for Q22
Mark clear intention and condone slips in language provided intention is clear. e.g. accept tree for branches

Response	Mark
0.35 needs to be 0.45	**1**
She didn't subtract the 0.55 probability that it rain from 1 to get the probability that it doesn't rain (0.45 seen on the diagram and 0.35 crossed out)	**1**
The (0.35) they did not show it, how did they get that number, because it's wrong (error identified)	**1**
Don't add to 100 on Monday (condone lack of % sign)	**1 BOD**
They do not add up to 1 (but if 0.55 and 0.35 shown then this would score)	**0**
A probability tree always adds up to 1 (but if ref to 0.55 and 0.35 then this would score)	**0**
0.55 + 0.35 = 90, meaning she's not taking it from 1 (statement incorrect)	**0**
For Tuesday it should be 0.25 for rain and 0.75 for not rain (if stated as separate reasons this is just 1 mark)	**1**
She says probability that it rains on Tuesday is 0.75 but it is 0.25	**1**
She has said that the probability it doesn't rain on Tuesday is 0.25. (points out the error)	**1**
On Tuesday the chance of rain is 0.25 (just restating the stem needs further explanation)	**0**
For Tuesday the probability it will rain is plotted wrong (not specific enough)	**0**
In the second tree diagram, she has the wrong number for rain (not specific enough)	**0**
She wrote the probability "0.25" that it rains on Tuesday in the wrong section on the diagram (not specific enough)	**0**
There would be another tree diagram (with two more branches correctly drawn on the diagram)	**1**
She only drew 2 trees, she should have shown the probability of it raining and not raining on each end of the tree	**1**
She has put Tuesday branch following on from Monday it rains and has not done the Monday it does not rain tree	**1**
There is no tree for Tuesday it does not rain (BOD with position indicated)	**1**
She needs a second tree diagram for it does not rain (or for Tuesday)	**1**
There is no second branch for Tuesday, (or there is not a Tuesday for it does not rain)	**1**
She's not continued the does not rain section (BOD gives some indication of position)	**1**
There should be another branch (Needs to indicate where)	**0**
She doesn't have all the branches that are needed	**0**
She hasn't completed the whole tree diagram with all the outcomes	**0**

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