OCR
Oxford Cambridge and RSA

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GCSE (9–1)

Mathematics

J560/01: Paper 1 (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.

MARKING INSTRUCTIONS

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

4. **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.

5. 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.

6. 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.

7. 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.

8. 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).

9. 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'.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

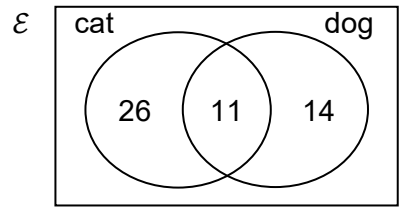
15. Ranges of answers given in the mark scheme are always inclusive.

16. 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.

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

Question			Answer	Marks	Part marks and guidance	
1	(a)		Bar at height of 10	1		Condone freehand must have sides and a top nearer to 10 than 9.5 or 10.5 Width ±2mm by eye
	(b)	(i)	Soaps	1		
		(ii)	7	1		
		(iii)	3	1		
2	(a)		Fully correct	2	**B1** for correct orientation in incorrect position	Condone good freehand By eye
	(b)		Fully correct	2	**B1** for correct orientation in an incorrect position or correct 90˚ anti-clockwise rotation about P	Condone good freehand By eye
3			70	2	**M1** for 7 × 5 × 2 oe	
4	(a)		[0].02	1		
	(b)		55	1		
5	(a)		>	1		
	(b)		<	1		

Question			Answer	Marks	Part marks and guidance	
6	(a)		Arrow at half way	1		In all parts allow indication other than arrow. To be within 2mm by eye of the line
	(b)		Arrow at first mark	1		
	(c)		Arrow at 0	1		
7	(a)		32 : 40	2	**M1** for 72 ÷ (4 + 5) soi by 8	**M1** implied by values 32 and 40
	(b)		15 final answer	2	**M1** for 35 ÷ 7 soi by 5	**M1** may be implied by 15
8			39	2	**M1** for 460 ÷ 12 soi by 38.3[3..] oe or 38 × 12 = 456 **and** 39 × 12 = 468 in working.	Allow **M1** for repeated addition or subtraction if method shown. If only numbers listed addition must reach 468. subtraction must reach 4 Answer of 38 no working scores 0

Question			Answer	Marks	Part marks and guidance	
9	(a)			1		Must be numerical values In this part, condone their (b) (i) misplaced
	(b)	(i)	8 cao	1		
		(ii)	*Their* (i) written outside circles but inside rectangle	1FT		Strict **FT**
	(c)		$\frac{25}{59}$ oe probability	2	**FT** *their* (11 + 14) must be < 59 for 2 or 1 mark **M1** for *their* 11 + *their* 14	isw an incorrect simplification of their correct probability not as a denominator
10			10 000	2	**M1** for 20 × 5	**M1** may be implied by 100
11			4	3	**M2** for 8 × 50 000 ÷ 100 ÷ 1000 oe or **M1** for one correct step from 8 × 50 000 ÷ 100 000 e.g. 8 × 50 000 or *their* (50 000 ÷ 100…) × 8	e.g. 0.5 × 8 Division by 100 000 may be in stages **M1** may be implied by 400 000, 0.5 or 0.000 08 Need to see the calculation for e.g. *their* (50 000 ÷ 100…)

Question			Answer	Marks	Part marks and guidance	
12	(a)		18	2	**M1** for 15 + 0.5 × 6 or better	Do not accept use of 0.5^2
	(b)		$a = \frac{v-u}{t}$ oe final answer	2	**M1** for correct first step or $\frac{v-u}{t}$	Accept $\frac{v-u}{t}$ = a
13	(a)		Equation	1		
	(b)		Expression	1		
	(c)		Identity	1		
14			326.37	6	**B4** for 296.7[0] **M1** for 296.7[0] × 1.1 oe OR **M1** for 8.6[0] × 30 oe soi 258 and **M2** for 8.6 × 1.5 × 3 oe or **M1** for 8.6 × 1.5 oe or 8.6 × 3 oe or 1.5 × 3 oe and **M1** for *their* basic pay + *their* overtime and **M1** for *their* final value × 1.1 oe	Alternative method **M1** for 33 × 8.6 soi by 283.8[0] and **M2** for 8.6 × 0.5 × 3 oe or **M1** for 8.6 × 0.5 oe or 8.6 × 3 oe or 0.5 × 3 oe and **M1** for *their* basic pay + *their* overtime and **M1** for *their* final value × 1.1 oe Mark 1 method only

Question			Answer	Marks	Part marks and guidance	
15	**(a)**		20	**2**	**M1** for $\frac{x}{2} = 15 - 5$ or better or $x + 10 = 30$	For **M1** must be an equation in x
	(b)		$5a(a - 2)$ final answer	**2**	**M1** for $5(a^2 - 2a)$ or $a(5a - 10)$ as answer	Condone missing final bracket
	(c)		$(x + 7)(x + 8)$ $^-7$ and $^-8$ final answer	**M2** **B1FT**	**M1** for $(x + a)$ and $(x + b)$ where $ab = 56$ or $a + b = 15$ for correct solutions from *their* quadratic factors If **0** scored **SC1** for answers ±7 and ± 8	
16			4.25 4.35	**2**	**B1** for each or for correct answers reversed	

17	**(a)**		93 200	**1**		
	(b)		3.04×10^6	**4**	**B3** for 3 040 000 or $3.041[0..] \times 10^6$ or 30.4×10^5 oe rounded to 3sf OR **B2** for 3 041 000 or $30.41[0..] \times 10^5$ oe index form OR **M1** for $(3.98 \times 10^6) - (9.39 \times 10^5)$ or 3 980 000 – 939 000 and **M1** for *their final value* correctly rounded to 3sf	**M1** may be implied by figs 3041…. The unrounded value must be seen
	(c)		Wrong/Incorrect it is 3 000 or 2 984 to 2 985 times bigger or No, difference is [order of] 3×10^3 which is 3 000 or Incorrect 11 760 is 3 times bigger than 3 920 or 3 900 000 is 3 times smaller than 11 700 000 or Incorrect and evaluates USA's production ÷ 3 or Japan's production × 3 with comment comparing the values	**2**	**M1** for difference is [order of] 10^3 or $\frac{1.17 \times 10^7}{3.92 \times 10^3}$ or $(1.17 \times 10^7) \div 3 = 3.9 \times 10^6$ or 11 700 000 ÷ 3 = 3 900 000 or $(3.92 \times 10^3) \times 3 = 1.176 \times 10^4$ or 1.18×10^4 or 3 920 × 3 = 11 760	Wrong/Incorrect and a comment for 2 marks to answer the question Condone No Values must be in the same form for comparison.

18			No, with full correct working and a statement referring to correct comparable values	**4**	**M3** for $\sqrt{14.1^2+14.8^2}$ = 20.4 to 20.5 or 14.1² + 14.8² = 417.8 to 417.9 **and** 19.5² = 380.2 to 380.3 OR **M2** for $\sqrt{14.1^2+14.8^2}$ or 14.1² + 14.8² **and** 19.5² OR **M1** for $14.1^2 + 14.8^2$ If **0** scored, **SC2** for 20.4 to 20.5 or 12.6 to 12.7 or 13.4 to 13.5 with no or insufficient working or **SC1** for 417.8- 417.9 or 161.2 -161.21 or 181.4 to 181.44 with no or insufficient working	Do not accept a scale drawing method Need No and a comment for 4 marks Need to see evidence Accept equivalent alternative methods e.g. using subtraction: **M3** for $\sqrt{19.5^2-14.8^2}$ = 12.6 to 12.7 OR **M2** for $\sqrt{19.5^2-14.8^2}$ OR **M1** for $19.5^2 - 14.8^2$

19			68	**4**	**B3** for 36 and 32 nfww OR **B1** for [silver =] 0.18 or 18% and **M2** for *their* 0.18 × 200 + 0.16 × 200 oe implied by *their* 0.34 × 200 or **M1** for *their* 0.18 × 200 implied by 36 or 0.16 × 200 implied by 32 or *their* 0.18 + 0.16 implied by 0.34	May be in table
20			63	**4**	**M1** for 80 + 65 + 95 or 240 seen as total **M1** for *their* 240 × [0].6 or 144 **M1** for *their* 144 – 43 – 38 If **0** scored **SC1** for 0.6 × 95 or 57	condone $\frac{63}{95}$ for 4 marks and mark the method leading to *their* answer

21			2 [h] 15 [m]	**4**	**M3** for a fully correct method e.g. $2.5 \times \frac{405}{270} \times \frac{3}{5}$ OR **M2** for three correct steps from $2.5 \times \frac{405}{270} \times \frac{3}{5}$ e.g. $2.5 \times \frac{405}{270} \times 3$ OR **M1** for one correct step e.g. $\frac{270}{2.5}$, $\frac{270}{150}$, $\frac{270}{3}$, 2.5×3, 150×3, $\frac{3}{5}$, $\frac{405}{270}$ or $\frac{405}{5}$ if **M0** or **M1** scored allow **SC1** for *their* final time as a decimal hour or *their* final time in minutes correctly converted to hours and minutes e.g. 2.3333[h] = 2[h] 20[min]	**M3** implied by 2.25, 2 [h] 25 [min] or 135 nfww note : (405 – 270 or 270 ÷ 2)= 135 = 2[h] 15[min] scores **M0** **M2** could be implied by 180, 11.25, 675 or 3 nfww **M1** could be implied by 108, 1.8, 90, 7.5, 450, 0.6, 1.5 or 81 allow alternative methods

22	**(a)**		3	**1**		Accept (0, 3)
	(b)		Any correct reason e.g. (-2, 7) and (4, -5) [gradient=] $\frac{-5-7}{4--2}=\frac{-12}{6}$ [= -2]	**1**		Points used must be on the line
	(c)		$y = -2x + 3$ oe	**1**	**FT** $y = -2x +$ *their a*	
	(d)		No because $y = -97$ when $x = 50$ oe or No because $x = 53$ when $y = -103$ oe or No because $-103 \neq -97$ oe or No because $50 \neq 53$ oe	**2**	**M1** for [y =] -2 × 50 + 3 soi by [y =] -97 or -103 = -2x + 3 soi by [x =] 53	**FT** Award **M1** for substitution seen into y = -2x + their c
23	**(a)**		Accurate ruled angle B bisector with two pairs of correct arcs	**2**	**B1** for accurate ruled angle B bisector	Tolerance ± 2° e.g. one angle 49° to 53° and the line can be any length, must touch B and condone dotted line
	(b)		Accurate ruled perpendicular bisector of BC with two pairs of correct arcs	**2**	**B1** for accurate ruled perpendicular bisector of BC	Tolerance ± 2° e.g. angle 88° to 92° and ± 2mm e.g. 27mm to 31 mm and line can be any length, must touch BC and condone dotted line
	(c)		Correct region shaded	**1 dep**	**dep** on at least **B1** and **B1** and both bisectors intersecting	

24			46.77 to 46.84 or 47 nfww or (using 9) 47.45 to 47.5 or 48 nfww	**6**	**B2** for 9, 9.9, 9.975, 9.98 or 10 or **M1** for [faulty =] $\frac{6}{80}[\times 133]$ oe AND **M1** for [costs =] 133 × (32 + 7) + *their* 10 × 25 oe or *their* 5187 + *their* 10 × 25 **M1** for [income =] 133 × 60 **M1** for [percentage profit =] $\frac{their\ 7980 - their\ 5437}{their\ 5437}$ [× 100] oe or $\left(\frac{their\ 7980}{their\ 5437} - 1\right)$[× 100]	equivalents include 7.5% **M1** implied by 5412, 5434.5, 5436.375, 5436.5 or 5437 **M1** implied by 7980 numerator could be e.g. 2543 accept any correct method

25			142.2[0] with correct working	**6**	**M1** for 36^2 or 1296 **M1** for $k \times \pi \times 18^2$ oe where k = ½, 1, 1½ or 3 AND **M1** for *their* area × 30 **M1** for *their* mass ÷ 1000 and ÷ 10 or counting up in 10 000s to their mass AND **M1** for *their* 9 × 15.8 If **0, 1 or 2** scored instead award **SC3** for answer of 142.2[0] with insufficient working If **0 or 1** scored instead award **SC2** for 2822 to 2823.02 If **0** scored award **SC1 for** 1526 to 1527.02, 1017 to 1018.008, 508 to 509.004, 3051 to 3054.024, 162π, 324π, 486π rot to at least nearest integer	Correct working requires **M1** AND **M1** AND **M1** **M2** implied by 2822 to 2823.02 or **M1** implied by 1526 to 1527.02, 1017 to 1018.008, 508 to 509.004, 3051 to 3054.024, 162π, 324π, 486π rot to at least nearest integer *their* area cannot be 36 and **M1** implied by 84660 to 84 690.6 or 84.66 to 84.7 *their* mass is attempt at (rectangle and circle(s)) × 30, **M1** implied by 8.46 to 8.47 *their* 9 **dep.** on fourth **M1** scored **with a rounding up to next integer**

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