OCR
Oxford Cambridge and RSA

Foundation

GCSE

Mathematics - Paper 3

J560/03: Paper 3 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for November 2024

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are available in RM Assessor.

3. Log-in to RM Assessor then mark and annotate the **required number** of practice responses ("scripts") and the **required number** of standardisation responses.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader via the RM Assessor messaging system.

5. Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners should give candidates the benefit of the doubt and mark the crossed out response where legible.

6. When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

7. On each blank page the annotation **BP** must be inserted to confirm that the page has been checked. For additional objects (if present), a tick must be inserted on each page to confirm that it has been checked.

8. There is a NR (No Response) option. Award NR (No Response)
   - if there is nothing written at all in the answer space
   - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
   - OR if there is a mark (e.g. a dash, a question mark) which is not an attempt at the question.

   The hash key (#) on your keyboard will enter NR.

   Note: Award 0 marks for an attempt that earns no credit (including copying out the question).

9. The RM Assessor **comments box** is used by the Principal Examiner or your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**

   If you have any questions or comments for your Team Leader, use the RM Assessor messaging system.

10. Assistant Examiners should send a brief report on the performance of candidates to their Team Leader (Supervisor) by the end of the marking period. Please follow the direction of your Team Leader about which questions you should report on and how to submit your report. Your report should contain notes on particular strengths displayed as well as common errors or weaknesses.

11. 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

Annotation	Meaning
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

12. **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.

13. 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.

14. 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.

15. 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.

16. 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).

17. 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'.

18. 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.

19. 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.

20. 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.

21. 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.

22. 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.

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

24. For methods not provided for in the mark scheme (including visual representations such as bar models, ratio tables, etc) give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

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

Question			Answer	Marks	Part marks and guidance	
1	(a)		–2, 1	1		
	(b)		12	1		
2	(a)		1 3 5 15	2	**B1** for 2 correct and no incorrect factors or 4 correct and 1 incorrect or 1×15 and 3×5	
	(b)		15	1		
3	(a)		8	1		$\frac{8}{60}$ scores 0
	(b)		25	1		$\frac{25}{60}$ scores 0
4			169	2	**B1** for answer figs 169 or **M1** for $(1.3 \times 10)^2$ oe or $\sqrt{169} = 13 \div 10 = 1.3$	May be flow diagram
5			682.2	3	**M1** for 18×10.4 oe soi by 187.2 **M1** for 360 + 90 + 45 + *their* 187.2 oe	e.g. 180×1.04 May be ratio method with $\times 18$ oe seen *Their* 187.2 from attempt at first M1 and $\neq 180$ Addition may be a series of sums or implied by a vertical list with number below Accept 495 + *their* 187.2

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part marks and guidance</th><th></th></tr>
<tr><td>6</td><td>(a)</td><td></td><td>5 [×] 70 or 5 [×] 0.7

and

3.5[0]</td><td>M1

A1</td><td></td><td>Not from 73 × 4.9 and rounded to 360 or truncated 350
Accept e.g. 70+70+70+70+70 for M1
Condone units included in product
Condone answer 350p with £ crossed through or £3.50p</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Recognition that the figures are not all to the same number of sig fig
e.g. They’re not all the same accuracy oe</td><td>1</td><td></td><td>See appendix

Allow complete and correct example(s)</td></tr>
<tr><td>7</td><td>(a)</td><td></td><td>$x = y - 3$ final answer</td><td>1</td><td></td><td>Accept $y - 3 = x$</td></tr>
<tr><td></td><td>(b)</td><td></td><td>$w = \frac{p}{3}$ or $w = p \div 3$ final answer</td><td>1</td><td></td><td>Accept $\frac{p}{3} = w$ or $p \div 3 = w$</td></tr>
<tr><td>8</td><td></td><td></td><td><table><tr><th>Statement</th><th>Value of x</th><th>True</th><th>False</th></tr><tr><td>$x > -1$</td><td>5</td><td>✓</td><td></td></tr><tr><td>$x \leq -1$</td><td>-1</td><td>✓</td><td></td></tr><tr><td>$\frac{x}{10} = 0.7$</td><td>70</td><td></td><td>✓</td></tr><tr><td>$x - 2 \neq 5$</td><td>3</td><td>✓</td><td></td></tr><tr><td>$-1 < x < 0.7$</td><td>0</td><td>✓</td><td></td></tr></table></td><td>3</td><td>B2 for three correct
or
B1 for two correct</td><td></td></tr>
<tr><td>9</td><td>(a)</td><td>(i)</td><td>6</td><td>1</td><td></td><td></td></tr>
<tr><td></td><td>(a)</td><td>(ii)</td><td>24</td><td>2</td><td>M1 for 36 ÷ 2 soi 18
or ÷ 2 and +6 written under appropriate parts of machine</td><td>May draw their own machine</td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th colspan="2">Part marks and guidance</th></tr>
<tr><td></td><td>(b)</td><td></td><td>x × 3 + 8 y</td><td>2</td><td>B1 for two of x × 3 + 8 y correctly placed</td><td></td></tr>
<tr><td>10</td><td></td><td></td><td>45</td><td>3</td><td>M1 for [1 share =] $\frac{100-1}{3+8}$ oe

and

M1 for their 9 × (5 or 8 and 3) oe

or

M1 for one from
<table><tr><th>[Jamal]</th><th>[Layla]</th></tr><tr><td>15</td><td>40</td></tr><tr><td>18</td><td>48</td></tr><tr><td>21</td><td>56</td></tr><tr><td>24</td><td>64</td></tr></table></td><td>M1 may be implied by 9

[Jamal] 27 and [Layla] 72 implies M1M1

Their 9 from $\frac{100-1}{3+8}$ or $\frac{100+1}{3+8}$ or $\frac{100}{3+8}$ may be decimal</td></tr>
</table>

Question			Answer	Marks	Part marks and guidance	
11	(a)		December and two correct values in comparable form	3	Allow B and M marks, even if not used in final reason or November chosen **B2** for 0.56 to 0.57 and 0.58[0] to 0.58[1] or 56% to 57% and 58[.0]% to 58[.1]% or $\frac{17\times31}{30\times31}$ and $\frac{18\times30}{30\times31}$ or better or **M1** for $\frac{17}{30}$ or 17÷30 soi by 0.56 to 0.57 or $\frac{18}{31}$ or 18÷31 soi by 0.58[0] to 0.58[1]	Values may be in working isw attempts to change form once correct value seen Condone $0.\dot{5}8$ for 0.58 Condone any missing % signs Accept 527 and 540 for $\frac{17\times31}{30\times31}$ and $\frac{18\times30}{30\times31}$ <u>Alternatively accept for all marks</u> $\frac{13}{30}$ and $\frac{13}{31}$ soi by 0.43[3] or $0.4\dot{3}$ and 0.41 to 0.42 etc or $\frac{30}{17}$ and $\frac{31}{18}$ soi by 1.76 or $1.\dot{7}6$ and 1.72 or $1.7\dot{2}$ etc May also be $\frac{30}{13}$ and $\frac{31}{13}$ oe and division e.g. 30 ÷ 13
	(b)		Relative frequency can be used as an estimate of probability Probability/proportion of rainy days is the same as last year	1		See appendix Do not accept amount / number of times / rain / weather for “number of rainy days”

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part marks and guidance</th><th></th></tr>
<tr><td>12</td><td>(a)</td><td></td><td>
<table>
<tr><th>Number</th><th colspan="2">...as a power of 2</th></tr>
<tr><td>4</td><td>2×2</td><td>2^2</td></tr>
<tr><td>16</td><td>$2\times2\times2\times2$</td><td>2^4</td></tr>
<tr><td>64</td><td>$2\times2\times2\times2\times2\times2$</td><td>$2^6$</td></tr>
</table>
</td><td>2</td><td>B1 for 2^4
B1 for 2^6

OR

B1 for $2\times2\times2\times2$ or $2\times2\times2\times2\times2\times2$</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>2^{40} cao</td><td>1</td><td></td><td></td></tr>
<tr><td>13</td><td>(a)</td><td></td><td>1.025×10^{-3}</td><td>1</td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>9.93×10^4</td><td>4</td><td>B3 for 99 300
or
B2 for figs 993
or
M2 for $\frac{1.655\times10^{12} \times 6\times10^{-5}}{1000}$ oe
or
M1 for $1.655 \times 10^{12} \times 6 \times 10^{-5}$ oe</td><td>May be in stages

May be seen as product of two st form numbers converted</td></tr>
<tr><td>14</td><td>(a)</td><td></td><td>300×8 [=2400]</td><td>1</td><td></td><td>Condone also doing the reverse $2400 \div 8$ or $2400 \div 300$ as a check</td></tr>
</table>

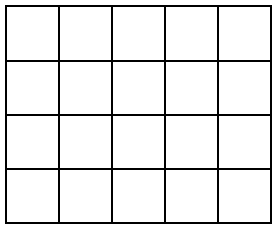
Question			Answer	Marks	Part marks and guidance	
	(b)		$\frac{1}{3}$	**3**	**B2** for $\frac{1200}{3600}$ oe or **M2** for $1 - \frac{2400}{3600}$ oe or **B1** for $\frac{2400}{3600}$ oe or $\frac{3600}{2400}$ oe or 1200	May be $\frac{3600}{1200}$ oe Answers of 33.3[3...]% or 0.333[3...] or 3 score B2 May be $1 - \frac{1}{1.5}$ or $1 - \frac{x}{1.5x}$ or $\frac{3600-2400}{3600}$ etc e.g. $\frac{2}{3}$ or $\frac{3}{2}$ 66% to 67% or 0.66 to 0.67 or $\frac{300}{450}$ or 1.5 A time may be chosen e.g. 1 hour 3600 in 60 min, 60 per min 2400 in 60 min, 40 per min B1 for $\frac{40}{60}$, M2 for $1 - \frac{40}{60}$ etc
15	**(a)**		$1.25 \times 3 + 2 \times 1.25$ oe	**1**		Addition implied by column with answer at bottom Accept 1.25×5 or 1.25 +1.25 +1.25 +1.25 +1.25 Condone $6 \times 1.25 - 1.25$ If working in pence must change 625 to 6.25

Question			Answer	Marks	Part marks and guidance	
	(b)		A 5[p] with 23.75 and 23.8[0] seen	**5**	**B2** for [total price A] 23.75 or **M2** for $6 \times 3 \times 1.25 + 1.25$ oe or **M1** for $25 \div 4$ or 6 [lots] or $\frac{1.25 \times 3}{4}$ soi 0.9375 AND **B2** for [total price B] 23.8[0] or **M2** for $8 \times 2 \times 1.4[0] + 1.4[0]$ oe or **M1** for $25 \div 3$ or 8 [lots] or $\frac{2.80}{3}$ soi 0.93 If **0, 1 or 2** scored, instead award **SC3** for Shop A and 5[p] or If **0 or 1** scored, instead award **SC2** for *their* cheapest shop and correct difference between *their* prices in pence	 3 × 1.25 = (3.75) then *their* 3.75 × 6 = (22.5) + 1.25 or $\frac{1.25 \times 3}{4} \times 24 + 1.25$ oe or 19×1.25 oe May be 4+4+4+4+4+4 or 1.4[0] × 2 = 2.8[0] then *their* 2.80 × 8 = (22.4) + 1.4[0] or $\frac{2.80}{3} \times 24 + 1.40$ or 17×1.4 oe May be 3+3+3+3+3+3+3+3 *Their* two total prices must be clearly identifiable Allow £ sign added to give e.g. £2.05[p]

Question			Answer	Marks	Part marks and guidance	
16	**(a)**		9 10 12 13 14	**2**	**B1** for 3 or 4 correct	
	(b)		$\frac{5}{12}$	**2**	$\frac{5}{12}$ or **FT** *their* table **B1FT** for *their* correct numerator **B1FT** for *their* correct denominator If **0** scored, **SC1** for answer only rounding to 0.42 or 42% without $\frac{5}{12}$ seen or answer $\frac{7}{16}$	*Their* table may be complete or incomplete eg $\frac{4}{7}$ after NR in **(a)** scores 2 Ignore attempts to change form once correct answer seen Do not accept ratio or words
17			6.25	**3**	**M2** for $\frac{\mathbf{340-320}}{\mathbf{320}}$ [× 100] oe or $\frac{\mathbf{340}}{\mathbf{320}}$ [× 100] oe or **M1** for 340 – 320 may be implied by 20	Implied by 0.0625, 1.0625 or 106.25

Question			Answer	Marks	Part marks and guidance	
18			12 000 with correct working	**6**		Correct working requires evidence of at least 3 M marks
					M3 for $\frac{x \times 1.5 \times 5}{100} - \frac{x \times 1.1 \times 6}{100} = 108$ oe or better or **M1** for $\frac{x \times 1.5 \times 5}{100}$ oe **M1** for $\frac{x \times 1.1 \times 6}{100}$ oe AND **M1FT** for correctly removing fractions **M1FT** for correct single *x* term isw If **0**, **1** or **2** scored, instead award **SC3** for answer 12 000 with no or insufficient working	Accept any letter for *x* e.g. M3 for *x* × [0].015 × 5 = *x* × [0].011 × 6 + 108 or [0].075*x* = [0].066*x* + 108 e.g. [0].015*x* × 5 or $\frac{7.5x}{100}$ or 0.075*x* e.g. [0].011*x* × 6 or $\frac{6.6x}{100}$ or 0.066*x* If both equations seen but only one used allow M1, M1 to stand FT *their* equation in one variable e.g. [0].009*x* [= 108] Note: [0].075*x*–[0].066*x*=108 scores M4 Any calculation of 1.5% or 1.1% of 108 scores 0 See appendix for alternative methods

Question			Answer	Marks	Part marks and guidance	
19	(a)		$\frac{2}{4}$ oe $\frac{1}{4}$ oe $\frac{3}{5}$ oe $\frac{2}{4}$ oe $\frac{1}{4}$ oe	3	**B2** for all red and yellow correct or **B1** for $\frac{3}{5}$ correctly placed **B1** for both red or both yellow correct	Accept equivalent fractions or decimals 0.6, 0.5 and 0.25 or 60%, 50% and 25% red $\frac{2}{4}$ oe yellow $\frac{1}{4}$ oe
	(b)		$\frac{1}{10}$ oe	2	**M1** for $\frac{2}{5} \times \frac{1}{4}$ oe	Accept 0.1 and 10% and equivalent fractions e.g. $\frac{2}{20}$ M1 do not accept 40% × 25%
20	(a)		54	2	**M1** for $\frac{9 \times 12}{2}$ oe	

Question			Answer	Marks	Part marks and guidance	
	(b)		828 with correct working	**5**	**B2** for [hypotenuse =] 15 or **M1** for $9^2 + 12^2$ AND **M2** for 2 from $2 \times$ *their* **part(a)**, 20 × 9, 20 × 12, 20 × *their* $\sqrt{9^2 + 12^2}$ or **M1** for 1 from $2 \times$ *their* **part(a)**, 20 × 9, 20 × 12, 20 × *their* $\sqrt{9^2 + 12^2}$ If **0** or **1**, scored instead award **SC2** for 828 with no or insufficient working	Correct working requires evidence of at least M1or B2 (Pythagoras) and M2 (area) Allow restart for area of triangle May be implied by 108, 180 , 240 , 300
	(c)		Reason that recognises the loss of part of the surface [of the triangular prisms] e.g. [The value of] two rectangular areas are lost /no longer on the surface oe	**1**		Accept e.g. faces/rectangles/slanting faces/sections for rectangular areas less/reduced for lost
21	**(a)**		Rectangle 4 by 5 correctly orientated 	**1**		Does not need shading nor internal lines

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part marks and guidance</th><th></th></tr>
<tr><td></td><td>(b)</td><td></td><td>
<table>
<tr><th>Pattern number</th><th>Calculation</th><th>Number of tiles</th></tr>
<tr><td>1</td><td>1 × 2</td><td>2</td></tr>
<tr><td>2</td><td>2 × 3</td><td>6</td></tr>
<tr><td>3</td><td>3 × 4</td><td>12</td></tr>
<tr><td>4</td><td>4 × 5</td><td>20</td></tr>
<tr><td>5</td><td>5 × 6</td><td>30</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>10</td><td>10 × 11</td><td>110</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>n</td><td>n × (n + 1)</td><td>n² + n</td></tr>
</table>
</td><td>4</td><td>B2 for first four cells correct
or
B1 for two of the first four cells correct

B1 for 10 × 11 and 110

B1 for n × (n + 1)</td><td>Allow 5 × 4

Allow 6 × 5

Condone n × n + n</td></tr>
<tr><td></td><td>(c)</td><td></td><td>4160</td><td>3</td><td>M2 for 4096 + $\sqrt{4096}$ oe
or $\sqrt{4096} \times (\sqrt{4096} + 1)$

or
M1 for $\sqrt{4096}$</td><td>Accept 64 × 65
May be
$\sqrt{4096}$ = y then y × (y + 1)
Accept
64 × 64 for 4096
and 64 for $\sqrt{4096}$ in M2 and M1</td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part marks and guidance</th><th></th></tr>
<tr><td>22</td><td></td><td></td><td>228</td><td>4</td><td>B3 for 133, 57 and 38
or
M3 for $\frac{76}{7-3}$ × their (7 + 3 + 2) oe
or
M2 for $\frac{76}{7-3}$ × n oe where n = 2, 3 or 7

or
M1 for $\frac{76}{7-3}$ implied by 19
or correct trial with blue >76 and difference between blue and green shown</td><td>Trials
<table><tr><th>B</th><th>G</th><th>R</th><th></th><th>Dif</th><th>Tot</th></tr><tr><td>77</td><td>33</td><td>22</td><td></td><td>44</td><td>132</td></tr><tr><td>84</td><td>36</td><td>24</td><td></td><td>48</td><td>144</td></tr><tr><td>91</td><td>39</td><td>26</td><td></td><td>52</td><td>156</td></tr><tr><td>98</td><td>42</td><td>28</td><td></td><td>56</td><td>168</td></tr><tr><td>105</td><td>45</td><td>30</td><td></td><td>60</td><td>180</td></tr><tr><td>112</td><td>48</td><td>32</td><td></td><td>64</td><td>192</td></tr><tr><td>119</td><td>51</td><td>34</td><td></td><td>68</td><td>204</td></tr><tr><td>126</td><td>54</td><td>36</td><td></td><td>72</td><td>216</td></tr><tr><td>133</td><td>57</td><td>38</td><td></td><td>76</td><td>228</td></tr></table></td></tr>
<tr><td>23</td><td>(a)</td><td></td><td>3.45</td><td>4</td><td>B1 for at least three of 1.5, 2.5, 3.5, 4.5

M1 FT for Σmf where m is a consistent value within each group
1.5 × 5 + 2.5 × 8 + 3.5 × 32 + 4.5 × 15 soi by 7.5 + 20 + 112 + 67.5 or 207

M1 FT dep on M1 for their 207 ÷ 60</td><td>May be implied by three correct products (7.5, 20, 112, 67.5) or [total =] 207

FT their “midpoints” seen
M1 may be implied by
Lower: 5+16+96+60 (177)
Upper: 10+24+128+75 (237)
Allow one error in calculation

FT from lower 2.95, upper 3.95</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Exact heights are not known oe</td><td>1</td><td></td><td>See appendix
Do not accept comments on the method used
Do not accept “estimate” unless clarified in comment</td></tr>
</table>

Question			Answer	Marks	Part marks and guidance	
24	(a)		$\begin{pmatrix}3\\-1\end{pmatrix}$ drawn with correct arrow	2	**B1** for $\begin{pmatrix}3\\-1\end{pmatrix}$ drawn with no or incorrect arrow or $\begin{pmatrix}3\\1\end{pmatrix}$ drawn with an arrow in either direction	Accept freehand Ignore BC on diagram Accept as part of triangle
	(b)		$\begin{pmatrix}5\\5\end{pmatrix}$	2	**B1** each value	Penalise by 1 mark first appearance of vinculum or poor form in vector but condone second use
	(c)		$\begin{pmatrix}-3\\1\end{pmatrix}$	1		
25			Accurate ruled perpendicular bisector of AB that reaches both horizontal boundaries, with correct supporting arcs	2	**B1** for accurate ruled perpendicular bisector of AB including with no or incorrect arcs	Condone perpendicular bisector going beyond rectangle

Question 6b

Response		Mark
13.7 rounded to the same number of significant figures would be 10	Mentions “same number of sig fig” and the correct number chosen with correct example	**1**
1.28 and 5.099 have not been rounded to the same number of sig fig as 13.7	Correct, but only because of the mention of 13.7 (because they have been rounded to the same number of sig fig as each other)	**1**
They should have rounded 13.7 to 10	Accept correct example as illustrating the error	**1**
They should have rounded 1.28 to 1.3 and 5.099 to 5.1	Accept the two correct examples as illustrating the error	**1**
They should have rounded 1.28 to 1.30 and 5.099 to 5.1	Condone the use of 1.30 for 1.3	**1**
He should have rounded 13.7 to the first significant figure	Condone “first” for “1”	**1**
They should have rounded 1.28 to 1.3	Recognises only one of the incorrectly rounded figures. If using 1.28 and 5.099 must describe both	**0**
The numerator is bigger than the denominator	Not a comment on the method	**0**
He did not round each number to its correct significant figure	A comment about the method BUT does not mention the same number of significant figures	**0**
They did not round each number to the correct amount of significant figures	A comment about the method BUT does not mention the same number of significant figures	**0**
1.28 rounded to the same number of significant figures would be 2	Does mention same number of sig fig but the wrong figure chosen and example is incorrect	**0**
They have rounded 13 wrong	Not explained what “wrong” means	**0**
He didn’t round 1.28 and 5.099 down properly	Does not explain the error. Might just be suggesting an arithmetic error	**0**

Question 11(b)

Response		Mark
There will be the same proportion of rainy days as the year before	Reason correct	**1**
It will be the same number of rainy days in December every year	BOD including “every” in the statement	**1**
There will be 18 rainy days in December next year	Reason correct	**1**
It will not rain on 13 days next year	Reason correct	**1**
It will rain 18/31 days in December	BOD 18/31 as 18 “out of” 31	**1**
December next year will have the same (amount of) rainfall as last December	Does not mention “number of days”	**0**
Each day will have the same chance of rain	Not a proportion and doesn’t reference last year	**0**
That the highest proportion will remain the same	No mention of proportion of **rainy days**	**0**
Rainy days occur at random/independently	Doesn’t justify the given probability	**0**
Rainy days are equally distributed	Doesn’t justify the given probability	**0**
That it rains the same amount of times each year in every December	Does not mention “number of days”	**0**
That rainfall will stay the same	Does not mention “number of days”	**0**
He has assumed that it will be the same every year	Does not mention “number of days”	**0**
It will rain on the same days next year	Does not say NUMBER of days	**0**

Question 18 Alternative methods

Mark using the one method that leads to the answer

<table>
<tr>
<td>Method of trials

M5 for correct calculation of total interest for both Darcie and Ivan for £12 000 and 108
or correct calculation of total interest for both Darcie and Ivan for an amount other than 12 000 with the interest scaled to 108

or

M2 for 1.5×5 and 1.1×6 or 7.5 and 6.6 or 0.075 and 0.066
or
M1 for 1.5×5 or 1.1×6 or 7.5 or 6.6 or 0.075 or 0.066</td>
<td><u>Example using scaling and non calculator methods</u>
Darcie Ivan
Guess 5000 1% = 50 1% = 50
0.5% = 25 0.1% = 5
1.5% = 75 1.1% = 55
Interest = $75 \times 5 = 375$ $= 55 \times 6 = 330$ Difference = 45

5000 diff = 45 90 + 9 + 9 = 108
10 000 diff = 90 10 000 + 1000 + 1000 = 12 000
1000 diff = 9

Allow 7.5 and/or 6.6 and 0.075 and/or 0.066 to stand, even if only one is used, unless method abandoned and new begun</td>
</tr>
<tr>
<td>Numerical method

M5 for $\frac{108}{1.5 \times 5 - 1.1 \times 6} \times 100$ oe
or
M4 for $\frac{108}{1.5 \times 5 - 1.1 \times 6}$ oe
or
M3 for $1.5 \times 5 - 1.1 \times 6$ or 7.5 – 6.6 or 0.075 – 0.066
or
M2 for 1.5×5 and 1.1×6 or 7.5 and 6.6 or 0.075 and 0.066
or
M1 for 1.5×5 or 1.1×6 or 7.5 or 6.6 or 0.075 or 0.066</td>
<td>Accept 7.5 for 1.5×5 and
6.6 for 1.1×6 and
0.9 for $1.5 \times 5 - 1.1 \times 6$

e.g. $\frac{108}{0.009}$

May be implied by 120 or e.g. $\frac{108}{7.5 - 6.6}$ or $\frac{108}{0.9}$

May be implied by 0.9 or 0.009

Allow 7.5 and/or 6.6 and 0.075 and/or 0.066 to stand, even if only one is used, unless method abandoned and new begun</td>
</tr>
</table>

Question 23b

Response		Mark
Because it does not give us an exact height of a pear tree	Correct as mentions “exact height”	**1**
We don’t know the exact measurements	Accept measurements for heights	**1**
The heights are not exactly accurate	BOD	**1**
The data are not accurate	No as could refer to frequencies	**0**
We don’t know the value of H	Exact value not mentioned	**0**
We can only estimate the height, we **won’t** know the exact height	The first part suggests a comment on part (a)	**0**
Because the metres are in ranges and not precise	Comment on method	**0**
Because it’s an estimate between two heights	This is a comment on method	**0**
We have to use the middle value of height each time	This is a comment on method	**0**
Because the heights are not given	They are but not exact heights	**0**
It is not accurate	No mention of exact heights not known	**0**
Due to it being an estimate so the exact can be far off	This is a comment on part (a) and the method	**0**
Because the heights are given as $1 < h \leq 2$	This is a comment on method	**0**
Because it is an estimate and isn’t an exact number	This is a comment on the answer in (a)	**0**
Because the frequency isn’t exact, it’s an estimate of the height	Incorrect term. “Because the **height** isn’t exact” would get the mark	**0**
There is not enough data to tell the exact value of mean height	This is some comment about small samples	**0**
Because the mid-point is used	Comment on method	**0**
Because it is grouped data	Comment on method	**0**

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