Foundation

GCSE

Mathematics - Paper 2

J560/02: Paper 2 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for June 2024

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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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MARKING INSTRUCTIONS

PREPARATION FOR MARKING
RM ASSESSOR

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.

7. Award No Response (NR) if:
   - there is nothing written in the answer space

   Award Zero '0' if:
   - anything is written in the answer space and is not worthy of credit (this includes text and symbols).

   Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. 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.

9. 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.

10. 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

11. **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.

12. 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.

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.

14. 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.

15. 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).

16. 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'.

17. 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.

18. 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.

19. 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.

20. 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.

21. 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.

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

23. 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.

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

Question			Answer	Marks	Part marks and guidance	
1	(a)		11[.0]	1		
1	(b)		[£]4.23	1		Condone [£]4.23p
2	(a)		-11	1		
2	(b)		-7	1		
2	(c)		16	1		
3	(a)		Correct reflection	2	**B1** for a correct reflection in any vertical line	Use overlay as a guide, mark intention, allow freehand. Reflection must be on the grid given
3	(b)		Correct rotation	2	**B1** for correct rotation 180^0 or 90^0 or clockwise about P or 90^0 anticlockwise by another point	Use overlay as a guide, mark intention, allow freehand. Mark to Candidates advantage Rotation must be on the grid given Red Overlays have to be correct for **B1** Green Overlay shows correct answer for 2 marks, but can be moved around the grid to check for **B1.**
4			6	1		
5	(a)		$\frac{1}{8}$	1		Maybe seen on the diagram Accept equivalent fractions
5	(b)		Arrow at $\frac{7}{8}$	1		Accept any clear intention of identification of $\frac{7}{8}$

Question			Answer	Marks	Part marks and guidance	
6			180	2	**M1** for 15 × 12 **oe** If 0 scored**, SC1** for 180000[ml]	Repeated addition, we must see their method, allow one arithmetic error. e.g. 15, 30, 45, 60, 75, 90 then 90×2 [=180]
7	(a)		$\frac{3}{5}$	2	**B1** for $\frac{60}{100}$ **oe**	
7	(b)		$3\frac{2}{5}$	1		
8			= < <	3	**B1** for each	
9	(a)		$\frac{3}{16}$	2	**M1** for $\frac{4}{16}$ or $\frac{7k}{16k} - \frac{4k}{16k}$ or $\frac{3k}{16k}$	e.g $\frac{28}{64} - \frac{16}{64}$
9	(b)		$\frac{3}{4}$	3	**B2** for $\frac{45}{60}$ oe fraction or $\frac{1}{4} \times \frac{3}{1}$ or **M1** for $\frac{5}{12} \times \frac{9}{5}$ or $\frac{1}{\frac{12}{9}}$ or $\frac{1}{\frac{4}{3}}$ If 0 scored, award **SC1** for converting the fractions to a common denominator	isw attempts to convert after correct answer seen e.g. 0.75 $\frac{15k}{36k} \div \frac{20k}{36k}$ e.g. $\frac{15}{36} \div \frac{20}{36}$ or $\frac{15}{36}$ and $\frac{20}{36}$
10	(a)		2*y* + 11*x*	2	**B1** for 2*y* or 11*x* in final answer	Accept 11*x* + 2*y* for 2 marks Do not accept -2*y* or -11*x*
10	(b)		30*ab* or 30*ba*	1		Not e.g. 30×*ab, a*30*b, b*30*a*, *ab*30

Question			Answer	Marks	Part marks and guidance	
11			Cuboid Cone [Triangular] Prism	**3**	**B1** for each	Mark intention, allow name to be in any 'box' associated with that line For cuboid accept 'Rectangular Prism' For Cone accept 'Circular based pyramid'
12	**(a)**		7	**1**		
12	**(b)**		8	**1**		
13	**(a)**		15	**1**		
13	**(b)**		3 27	**2**	**B1** for each in correct place	
14			10 **nfww**	**3**	**M2** for $6^2 + 2 \times 4 \times 8$ **oe** or **M1** for [u^2 =] 6^2 or [2as =] $2 \times 4 \times 8$	Accept answer -10 or ± 10 **M2** implied by [v^2 =] 100 or $\sqrt{100}$ **M1** implied by [u^2 =] 36 or [2as =] 64
15	**(a)**		5	**2**	**M1** for 6×7.5 **oe**	**M1** implied by 45 Repeated addition, we must see their method, allow one arithmetic error. e.g. 7.5, 15 then 15×3 [=45]

Question			Answer	Marks	Part marks and guidance	
	(b)		12	**3**	**B2** for 12.5 or **M2** for *their* (*a*) × 1000 ÷ 400 or *their* (*a*) ÷ [0].4 or **M1** for *their* (*a*) × 1000 or 400 ÷ 1000 or *their* (*a*) ÷ figs 4	*their* (*a*) must be > 0.4 **M2** implied by repeated addition or subtraction to one less than *their* (*a*) or *their* (*a*) × 1000 see appendix If *their (a)* < 1.2 then all multiples must be seen
	(c)		200	**2**	**B2FT** for *their* (*a*) × 1000 – *their* (*b*) × 400 evaluated correctly or **M1** *their* (*a*) × 1000 – *their* (*b*) × 400	*their* (*a*) must be > 0.4 *their* (*a*) × 1000 ≥ *their* (*b*) × 400 *their* (*b*) must be an integer. Implied by repeated subtraction or addition. Working may be seen in part (*b*) for **M1**

<table>
<tr><td>16</td><td>(a)</td><td></td><td>Three of 20[.00], 30[.00], 40 and 4 seen

40 × 20

4 × 30

920 or 800 and 120</td><td>B1

M1

M1

A2</td><td>

for their 40 x their 20

for their 4 x their 30

A2 dep on B1M1M1
or
A1 dep on B1M1 for 800 or 120</td><td>B1 seen as rounding

their 40 can be $40\frac{1}{3}$, $40.\dot{3}$, 40.33[3…] or 41
their 20 can be 20.15 or 21
their 4 can be $4\frac{1}{4}$, 4.25 or 5
their 30 can be 30.23 or 31</td></tr>
<tr><td>16</td><td>(b)</td><td></td><td>The calculation is an underestimate</td><td>1</td><td></td><td>All values were rounded down oe

Mark best response as long as not contradictory or incorrect

<u>See Appendix 1</u></td></tr>
<tr><td>17</td><td></td><td></td><td>40</td><td>2</td><td>M1 for 120 ÷ 3</td><td>Accept 1200 ÷ 30, $\frac{600}{15}$, $\frac{120}{100} \div \frac{3}{100}$
Do not allow M1 if extra step after 120 ÷ 3 e.g. 120 ÷ 3 then divide by 100</td></tr>
<tr><td>18</td><td>(a)</td><td></td><td>
<table>
<tr><td></td><td></td><td colspan="4">First card</td></tr>
<tr><td></td><td>Difference</td><td>0</td><td>2</td><td>5</td><td>9</td></tr>
<tr><td rowspan="4">Second card</td><td>0</td><td></td><td>2</td><td>5</td><td>9</td></tr>
<tr><td>2</td><td>2</td><td></td><td>3</td><td>7</td></tr>
<tr><td>5</td><td>5</td><td>3</td><td></td><td>4</td></tr>
<tr><td>9</td><td>9</td><td>7</td><td>4</td><td></td></tr>
</table>
</td><td>2</td><td>B1 for 3 or 4 correct entries</td><td>For 2 marks, ignore entries in shaded squares if they are 0’s
For B1 ignore shaded squares</td></tr>
</table>

18	**(b)**		$\frac{6}{12}$ oe **nfww**	**2**	If shaded squares are blank or all have zeros **FT** *their* 12 entries for 2 marks **M1** for all *their* even numbers and all factors of 10 identified only <u>IF Shaded SQUARES are counted</u>: **FT** *their* 16 entries **B2FT** *their* table Or **M1** for all *their* even numbers and all factors of 10 identified only If 0 scored **SC1** for answer $\frac{6}{16}$	**isw** conversion/cancelling after *their* correct probability Do not accept ratio or words If table correct and shaded squares have zeros allow answer $\frac{10}{16}$ **oe** for 2 marks **M1** may be seen on table by e.g. ringing values or listing We only accept the 16 squares in the Grid, not the card values Count zero as an even number If table correct apart from all zeros in shaded squares allow all even numbers and factors of 10 [0's in shaded squares] identified For **SC1** allow answer $\frac{3}{8}$ if $\frac{6}{16}$ seen first
19			Correct ruled line with two pairs of correct arcs	**2**	**B1** for correct ruled line with no or wrong arcs, or correct intersecting arcs but no line or correct dashed/dotted line with correct arcs	Use protractor to measure, allow 88^0-92^0 Use Ruler to measure, allow 35-39mm from A or B Arcs may be two continuous arcs centred at A and B with two intersections
20	**(a)**		$\begin{pmatrix} 2 \\ -3 \end{pmatrix}$	**2**	**B1** for answer $\begin{pmatrix} 2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -3 \end{pmatrix}$	For **B1** allow $\left(\frac{2}{-3}\right)$ B0 for incorrect numbers with vinculum/fraction line.

20	**(b)**		**-a**	**1**		
21	**(a)**		12 26 with correct working	**6**	**B5** for 3 hours 36 mins with correct working or 12 26am with correct working OR <u>Method to find time in 1st stage</u> **M2** for $\frac{1}{10} \times 200 \div 40$ [× 60] **oe** or **M1** for $\frac{1}{10}$ × 200 **oe** AND <u>Method to find time in 2nd stage</u> **M2** for $0.4 \times 200 \div 50$ **oe** or **M1** for 0.4 × 200 **oe** AND **M1dep on M2M2** for *their* 30[mins] + *their* 96[mins] + 1hr30[mins] If 0 or 1 or 2 scored, instead award **SC3** for answer 12 26 or 12 26pm If 0 or 1 scored, instead award **SC2** for 3h 36 [mins] or 12 26 am	<u>Correct working requires evidence of at least **M2M2**</u> Accept 12 26pm for 6 marks **M2** implied by 0.5[h], $\frac{1}{2}$ [h] or 30 [mins] nfww **M1** implied by 20 [miles] nfww **M2** implied by $\frac{8}{5}$ [h], $1\frac{3}{5}$ [h], 1.6 [h] isw, 96[mins] or 1[h] 36[min] nfww **M1** implied by 80 [miles] nfww **M1** implied by addition onto 0850

21	**(b)**		Correct response e.g. Ryan drives at the speed limit and does not drive slower or is delayed	**1**		Accept any valid reason why Ryan may not be able to travel at Maximum Speed at all times e.g. Ryan does not get stuck in traffic There are no roadworks etc He does not stop on the journey Car does not breakdown Do not accept incorrect statements e.g he travels at a constant speed Mark best response as long as not contradictory or incorrect <u>See Appendix 2</u>
22	**(a)**		Positive	**1**		Ignore embellishments
22	**(b)**		Indicates the point (39, 10)	**1**		Ignore circles around the points ≤ 30 for both Science and Maths as this working is for part (e)
22	**(c)**		Ruled line of best fit **and** answer **FT** ± 0.5 *their* straight ruled line at 28 Science marks	**2**	**B1** for ruled line of best fit or answer **FT** ± 0.5 *their* straight ruled line with positive gradient	Use overlay for LOBF, ruled line needs to reach both gates set at: (8,11) and (8,22) (49,35) and (49,46) Gates include circles on overlay Ignore LOBF beyond gates

22	**(d)**		Correct explanation e.g. It is beyond the range of the data provided on the scatter diagram. The pupil may not follow the trend/pattern of the data	**1**		Accept The line of best fit should not extend beyond the data provided Outside range of data provided oe Small sample Data only goes up to 49 No one scores 60 Do not Accept You cannot extend past the LOBF otherwise it is inaccurate Ignore incorrect statements See Appendix 3
22	**(e)**		35[%]	**3**	**M2** for $\frac{7}{20} \times 100$ **oe** **or** **B1** for 7 [pupils] If 0 scored, **SC1** for $\frac{their7}{20}$ correctly converted to a percentage.	**B1** implied by $\frac{7}{20}$ **oe** or $\frac{7}{k}$ ($k > 7$)
23			8	**4**	**M2** for $a + a + a + 5 + a + 5 = 42$ **oe** or **M1** for 3×14 **oe** or $a + a + a + 5 + a + 5$ **oe** AND **M1** for $a = \frac{42-10}{4}$ **oe** or **FT** *their* equation of the form $ka + c = d$ **oe** to $a = \frac{d-c}{k}$ **oe**	Allow **M2** if correct expression seen first and then incorrectly simplified before equation = 42 **M1** implied by 42 or $4a + 10$ **oe** **FT** only from written equation Where k, c and d are positive integers and $k > 1$ Allow **M1** for one trial into $2(a + 5) + 2a$ evaluated correctly

24			1200 × 1.05 **oe** or 1200 × 0.05 **oe** 1260 or 60 or 1.1025 1260 × 1.05 **oe** or 1260 × 0.05 **oe** or 60 × 1.05 **oe** or 60 × 0.05 **oe** 60 and 63 or 1323	**M1** **B1** **M1FT** **A1**	 **M1FT** for *their* 1260 × 1.05 **oe** or *their* 1260 × 0.05 **oe** or *their* 60 × 1.05 **oe** or *their* 60 × 0.05 **oe** **A1** dep **M1B1M1**	e.g. 10% = 120, 5% = 60 We do not allow mis-reads in this question **M1M1** implied by 1200 × 1.05^2 **oe** **M1FT** implied by 1323 or 63 or 3 For method we do not accept e.g. 105% × 1200 or 5% of 1200
25			Correct reason given e.g. Her sample may not be representative **oe** Her sample is too small **oe**	**1**		She should do the test more than 10 times She should do the test e.g. 100/1000 times. Mark best response as long as not contradictory or incorrect <u>See Appendix 4</u>

26			$\frac{23}{50}$ **oe** with correct working	**5**	**M1** for 50 – 10 – 1 **M1** for *their* 39 ÷ (2 + 1) **A1** for 13 or 26 AND **B1** for answer $\frac{23}{k}$ or answer $\frac{p}{50}$ If 0 or 1 scored, instead award **SC2** for answer of $\frac{23}{50}$ **oe**	<u>Correct working requires evidence of at least **M1M1A1**</u> isw conversion/cancelling after correct answer seen Do not accept ratio or words All method marks may be seen on Diagram **M1** implied by 39 **M1** implied by 13 Repeated addition/subtraction see appendix 26:13 or 13:26 implies **M1M1A1** Where k>23 and an integer Where p<50 and a positive integer Algebraic method see Appendix 5

27	**(a)**		$(x - 2)(x + 7)$	**B1**		**B1** implied by $(x - 2)$ and $(x + 7)$ in a multiplication grid Condone missing final bracket e.g. $(x - 2)(x + 7$
			$x^2 - 2x + 7x - 14$ or better	**M2**	**M1** for 3 out of 4 terms correct	$+5x$ is two terms
			$x^2 + 5x - 14 = 70$ or $x^2 - 2x + 7x - 14 = 70$	**A1**	**A1** dep on **B1M2** With no errors leading to the answer	A1 alternatives: $x^2 + 5x - 14 - 70 = 0$ or $x^2 - 2x + 7x - 14 - 70 = 0$
27	**(b)**	**(i)**	$(x + 12)(x - 7)$ [= 0]	**M2**	**M1** for $(x + a)(x + b)$ where $ab = -84$ or $a+b = 5$ or $x(x + 12) - 7(x + 12)$ or $x(x - 7) + 12(x - 7)$	Condone $(x + 12)(x - 7) = y$ for 2 marks For **M2** and **M1** condone the omission of the final bracket.
			-12 and 7	**B1FT**	correct or **FT** *their* linear factors	(x - 12)(x + 7) then -12 and 7 scores **M1B0** If both correct after $x(x + 12) - 7(x + 12)$ or $x(x - 7) + 12(x - 7)$ allow **M2B1 BOD**
27	**(b)**	**(ii)**	14	**1**	**FT dep** on 2 integer answers given in part (b)(i) *their* largest positive answer + 7	

APPENDIX

Percentage Methods:

Labels Only

This is when labels such as 10% = are used

If ONLY labels are used, the final answer scores full marks if it correct.
If there is an error in the values and therefore the final answer is incorrect this cannot score method marks

e.g. Find 2% of 700 .
10% = 70
5% = 35
1% = 3.5 ✖
2% = 7 ✖

Error in the method without operations seen scores M0, if we saw the appropriate operations at each stage e.g. ÷ 10, we could award method mark(s).

Repeated Addition/Subtraction Methods

This is when division is attempted by listing multiples of a number or by repeated subtraction.

e.g. 3000 ÷ 400

Repeat Addition: 400, 800, 1200, 1600, 2000, 2400, 2800, [3200]

When marking this we need to **see at least 3 correct multiples**, one of these MUST be the number before reaching the value, in this case 2800.

We allow ONLY one arithmetic error in this method (**unless the mark scheme states otherwise**)
Example 1:
400, 800, 1100 (error), 1500, 1900, 2300, 2700, [3100] – one arithmetic error, but correct **FT** from the error so **M1** awarded.

Example 2:
400, 800, 1100 (error), 1500, 1800 (error), 2200, 2600, [3000] – two arithmetic errors, so **M0** awarded.

e.g. 400 ÷ 60

Repeat Subtraction: 400, 340, 280, 220, 160, 100, 40, [-20]

When marking this we need to **see at least 3 correct subtractions**, one of these MUST be the number before reaching 0.

We allow ONLY one arithmetic error in this method (**unless the mark scheme states otherwise**)
Example 1:
400, 340, 280, 200 (error), 140, 80, 20, [-40] – one arithmetic error, but correct **FT** from the error so **M1** awarded.

Example 2:
400, 320(error), 260, 210 (error), 150, 90, 30, [-30] – two arithmetic errors, so **M0** awarded.

APPENDIX 1
Question 16(b)
We want the candidate to say WHY they are certain of the figure being at least £900.
If TOTAL is used then this MUST be £920. IF rounded figures are used then **all** four must be rounded down correctly (20,30,40,4)

	Response	**Mark**
1	It is an Underestimate	**1**
2	All Values were rounded down	**1**
3	This is correct because at minimum she will make 920 (‘*at minimum’ implies rounding and is correct*)	**1**
4	The values are rounded down meaning she earnt more than this	**1**
5	(40 x 20) + (4 x 30) already equal over £900	**1**
6	The underestimation is over £900	**1**
7	If you round the earnings you get over £900 (*this is true for rounding both up and down*)	**1BOD**
8	Because in my working not adding the minutes, it’s still over £900 as it’s £928.80 (*incorrect*)	**0**
9	Because I estimated it meaning she’d probably got more (*probably does not mean certain*)	**0**
10	As it has gone over £900 (*not describing rounding or underestimate*)	**0**
11	This is correct because she will make 920 (*the candidate is not telling us WHY they are certain*)	**0**
12	Because £20.15x40=£806 and £30.23 x4=120.92 + them = 926.92 not including the minimum (*All rounded values not used*)	**0**
13	If you added everything without a fraction it adds up to almost £900 (*incorrect*)	**0**
14	Because it works out that all of her work will add to over 900 (*no reference to underestimate*)	**0**
15	Because it’s over 900 (*not enough, need to say WHY it is certainly over £900*)	**0**
16	The estimation is over £900 (*not enough, need to say WHY estimation is certainly over £900*)	**0**
17	Because I rounded down (*not enough- needs to be e.g. rounded all numbers down*)	**0**

APPENDIX 2
Question 21(b)

	Response	**Mark**
1	That Ryan does not stop along the way	**1**
2	He stayed the exact speed limit and was not below the limit	**1**
3	That he didn't speed and met the speed limit (*travels at speed limit*)	**1**
4	He travels at the speed limit	**1**
5	Does not have to stop [for fuel, lunch etc]	**1**
6	Ryan stays at 40 mph and 50mph when on these roads (**BOD** *referencing the roads with the speed limits*)	**1BOD**
7	There was no traffic so Ryan kept on moving (**BOD** *implies that he isn't stopped/slowed down by traffic*)	**1BOD**
8	That Ryan stayed at a constant speed in each section of the journey	**0**
9	That he didn't stop for a brake and drove the same speed (*drove same speed is incorrect*)	**0**
10	He makes stops on his journey (*He must be travelling at max speed at all times*)	**0**
11	Could not be true due to traffic	**0**
12	There will not be much traffic	**0**
13	They are at 50mph and 40mph the whole time (*for the third part he doesn't travel at 50mph or 40mph so this is incorrect*)	**0**
14	He travelled at a constant speed (*this is not true*)	**0**
15	The speed limit does not change (*this is not true*)	**0**
16	He drove and constant speed and did not stop for lunch (*part of statement is incorrect-constant speed*)	**0**
17	There is no traffic (*not quite enough – need to say e.g. traffic is not holding them up*)	**0**

APPENDIX 3
Question 22(d)

	Response	Mark
1	It is extrapolated and not in the data provided	**1**
2	The diagram has no data above 49 (*underlined part gets the mark*) (*accept range 49 to 59 for this type of statement*)	**1**
3	The graph does not go up to 60 as there is no data above 49 (*underlined part gets the mark*)	**1**
4	We do not know that the pattern will continue above 49 (*implies trend may not continue*)	**1**
5	The graph does not cover that data range (*allow for the underlined part*)	**1**
6	There are no pupils on the graph with scores above 49 (*accept pupils **oe** for data*) (*accept range 49 to 59 for this type of statement*)	**1**
7	There are no plots/points/results on the graph above 49 (*accept plots/points/results for data*) (*accept range 49 to 59*)	**1**
8	Most pupils scored between 20 and 50 in Science – we cannot predict accurately for 60 marks	**1**
9	They may be much better at one subject than the other and do not follow the correlation (*allow for the underlined part with 'may'*)	**1**
10	There is no data above 50 [for Science] (*accept range 49 to 59 for this type of statement*)	**1**
11	It may be an outlier (*Implies it may not follow the pattern*)	**1**
12	It is too far away from the last piece of data	**1**
13	There is insufficient data (*implies small sample*)	**1**
14	The graph reaches up to 49 (*not referring to data*)	**0**
15	The scatter graph does not go beyond 50 (*not referring to data*)	**0**
16	Extrapolated (*needs explanation*)	**0**
17	The graph only goes up to 49 (*not referring to data*)	**0**
18	The graph does not show information for a score of 60	**0**
19	There is no data	**0**
20	They might be better at Maths than Science	**0**
21	It is an outlier (*It is not an outlier – we do not know – needs to be phrased like example 11*)	**0**
22	Because there is no results	**0**

APPENDIX 4
Question 25

	Response	**Mark**
1	The machine took a random sample so it will not always be 6 bolts out of 10 to the correct length (*implies not representative*)	**1**
2	Janes claim may be unreliable as she only did 1 sample and it might not be 60% all the time (*'only' implies too small a sample*)	**1**
3	Because she's only checked 10 out of thousands so she needs to check a higher amount to measure probability	**1**
4	Because not every 10 bolts will have 6 correct ones	**1**
5	6/10 of the bolts may not always be 6/10 it could be 4/10 she needs to do the test again	**1**
6	Only collects 10 bolts (*implies small sample*)	**1**
7	It's a random selection	**0**
8	Because the more samples you have the more unreliable it is	**0**
9	Because she hasn't sampled all 2000 bolts meaning she cannot claim 1200 are of the correct length	**0**
10	They may not be reliable because her evidence on these lengths are facts its not 60%	**0**
11	Because they have to be correct to 1 decimal place	**0**
12	The machine took a random sample so it will not always be 6 bolts to the correct length (*not enough*)	**0**
13	Only an estimate	**0**
14	Because there could be more or less bolts which are longer or shorter	**0**
15	Might not be accurate, and she is going off the 10 bolts (*Not as good as Exemplar 6, 'only' needs a reference here*)	**0**

APPENDIX 5
Question 26

Algebraic method

Allow any 2 different letters to represent ‘only car’ and ‘only bike’.

M1 $b + c = 39$ or $2c = b$
M1 $3c = 39$ or $3b = 78$
A1 $b = 26$ or $c = 13$

AND
B1 for answer $\frac{23}{k}$ or answer $\frac{p}{50}$

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