



GCSE MATHEMATICS 8300/2F

Foundation Tier

Paper 2 Calculator

Shadow paper based on November 2023 paper

Mark scheme

November 2023

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
[a, b)	Accept values $a \leq \text{value} < b$
3.14 ...	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Examiners should consistently apply the following principles.

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

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

Questions which ask students to show working

Instructions on marking will be given but usually marks are not awarded to students who show no working.

Questions which do not ask students to show working

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

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Q	Answer	Mark	Comments
1	6	B1	

Q	Answer	Mark	Comments
2	-7	B1	

Q	Answer	Mark	Comments
3(a)	30(%)	M1	

Q	Answer	Mark	Comments
3(b)	10(%)	M1	

Q	Answer	Mark	Comments
4(a)	40	B1	
	Additional Guidance		
	Embedded answer with no or incorrect answer eg $\frac{40}{5} = 8$		B0

Q	Answer	Mark	Comments
4(b)	$3x = 13 + 2$ or $3x = 15$ or $\frac{13+2}{3}$ or $\frac{15}{3}$	M1	oe
	5	A1	
	Additional Guidance		
	Embedded answer with no or incorrect answer eg $3 \times 5 - 2 = 13$ without 5 selected or with incorrect answer		M1A0
	Trial and improvement with answer 5		M1A1
	Trial and improvement with no answer or answer other than 5		M0A0

Q	Answer	Mark	Comments
5	1.25	B1	
	Additional Guidance		
	1.25%		B0

Q	Answer	Mark	Comments
6	274.37	B1	
	309.37	B1ft	ft their 274.37 + 35.00
	2558.22	B1ft	ft their 309.37 + 2248.85
	Additional Guidance		
	274.37		B1
	239.37		B0
	2488.22		B1ft
	1574.37		B0
	1609.37		B1ft
	3858.22		B1ft

Q	Answer	Mark	Comments									
7	<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">4</td> <td style="padding: 5px;">7</td> <td style="padding: 5px;">10</td> </tr> <tr> <td style="padding: 5px;">5</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">28</td> </tr> <tr> <td style="padding: 5px;">14</td> <td style="padding: 5px;">20</td> <td style="padding: 5px;">1</td> </tr> </table>	4	7	10	5	2	28	14	20	1	B3	B2 3 or 4 correct B1 1 or 2 correct
	4	7	10									
	5	2	28									
	14	20	1									
Additional Guidance												
Mark the grid												
Ignore repeats for B1 or B2												

Q	Answer	Mark	Comments
8(a)	3	B1	

Q	Answer	Mark	Comments							
8(b)	Alternative method 1									
	Correct reading(s) taken from one or more number(s) of pounds and correct calculation to scale up	M1								
	3200	A1								
	Alternative method 2									
	$200 \times \frac{48}{\text{their } 3}$	M1	oe							
	3200	A1ft	correct or ft their 3							
	Additional Guidance									
	A correct ft answer implies both marks eg1 answer 2.9 in (a) and answer 3310(.34) in (b) eg2 answer 4.8 in (a) and answer 2000 in (b)		M1A1ft M1A1ft							
	Further work eg $80 \times 40 + 64 \times 20$		M0A0							
	For information:									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>5 lbs</td> <td>80×40</td> </tr> <tr> <td>4 lbs</td> <td>64×50</td> </tr> <tr> <td>2 lbs</td> <td>32×100</td> </tr> <tr> <td>1 lb</td> <td>16×200</td> </tr> </tbody> </table>	5 lbs	80×40	4 lbs	64×50	2 lbs	32×100	1 lb	16×200	M1
5 lbs	80×40									
4 lbs	64×50									
2 lbs	32×100									
1 lb	16×200									

Q	Answer	Mark	Comments
9(a)	410 or 1680	M1	
	2090	A1	
	Additional Guidance		
	Answer only		M1A1
	Ignore calculation of 2097 but 2090 only coming from incorrect rounding of 2097 is M0		

Q	Answer	Mark	Comments
9(b)	Valid explanation referring to both of the original numbers being rounding down	B1	eg he rounded each number down or each rounded number is smaller than the actual number or 410 is smaller than 413 and 1680 is smaller than 1684
	Additional Guidance		
	Ignore irrelevant, non-contradictory statements		
	Ignore 2097 alongside a correct explanation		
	Incorrect rounding or values seen in this part even alongside a correct explanation		B0
	The numbers are rounded down (to the nearest 10)		B1
	413 became 410 and 1684 became 1680		B1
	One number decreased 3 and the other 4 (so it will be 7 smaller)		B1
	413 became 410 and 1684 became 1700		B0
	The numbers are rounded to the nearest 10		B0
	It's rounding so the answer is smaller		B0
	2090 is smaller than 2097		B0

Q	Answer	Mark	Comments	
10(a)	$(17\,500 + 26\,000 + 27\,500 + 27\,500 + 27\,500 + 141\,000) \div 6$ or $267\,000 \div 6$	M1	oe allow missing brackets	
	44 500	A1	SC1 149 500 or [39 916, 39 917]	
	Additional Guidance			
	Correct answer followed by rounding eg 44 500 followed by 40 000	M1A1		
	Special cases are for missing brackets or omitting one 27 500			
	Addition signs between the numbers with an attempt at a total implies addition			
	A vertical column of the 6 numbers with an attempt at a total implies addition			
	Allow misreads but must be dividing by 6			
	Accept incorrect money notation for the mean eg1 44 500.0 eg2 39 916.6	M1A1 SC1		

Q	Answer	Mark	Comments
10(b)	No Ticked and Valid explanation	B1	accept any indication that one of the values is non-typical, or that the mean would be non-typical
	Additional Guidance		
	Ignore any attempt to state the best average		
	Ignore irrelevant, non-contradictory statements		
	Accept any indication that 141 000 is significantly different		
	One is an outlier / anomaly / is an odd one out / doesn't fit	B1	
	The large value boosted the average	B1	
	The average is too large	B1	
	(Five are below / most are below and) only one is above the mean	B1	
	Five are below / most are below (and only one is above) the mean	B1	
	141 000 / one number is much bigger	B1	
	141 000 / one number is bigger	B0	
	The range is too large	B0	
	The numbers are all different	B0	
	Some numbers are much bigger	B0	
Some of the numbers are the same	B0		
It is an estimate / it's not exact / it's not accurate	B0		

Q	Answer	Mark	Comments	
11	65×2.2 or 143	M1	oe	
	$143 \div 14$ or 10.2(...) or 143 and $(10 \times 14 =) 140$	M1dep	oe	
	10 stone 3 pounds	A1	SC2 10 stone 2 pounds	
	Additional Guidance			
	Answer of 10 stone 2 pounds (from incorrect conversion of 10.2...)			SC2
	Answer 10.2... stone 143 pounds			M2A0

Q	Answer	Mark	Comments
12(a)	70×5 or 350 or 70×6 or $350 + 70$	M1	oe implied by $70 : 350$
	420	A1	

Q	Answer	Mark	Comments	
12(b)	$\frac{1}{10}$	B1	oe fraction	
	Additional Guidance			
	Decimal, percentage or ratio answer			B0
	Do not allow 1 in 10 or 1 out of 10 unless the correct fraction seen			

Q	Answer	Mark	Comments
13(a)	$4y = y + 12$	B2	correct single equation with $4y$ and $y + 12$ eg $12 + y = y \times 4$ B1 $4y$ or $y + 12$ or rearranged equation eg $4y - 12 = y$ or $3y = 12$ but not $y = 4$ only
	Additional Guidance		
	B1 may be awarded for a correct term even if this is seen amongst multiple attempts or embedded in an incorrect equation or incorrect term eg $4y + 12$ or $4y + 12y$ or $4(y + 12)$		
	Allow any variable for B1 but must be consistent for B2		
	Allow unprocessed terms for B1 or B2 eg $4 \times y$ or $y4$		
	$4y = y + 12$ seen, but then correctly simplified or solved		B2
	$4y = y + 12$ seen, but then incorrectly simplified or solved		B1
	$4y = 16$ or $y + 12 = 16$ or both (unless combined to a single equation)		B1
No work worth B2 or B1 and answer $y = 4$		B0	

Q	Answer	Mark	Comments
13(b)	Alternative method 1: substitutes $y = 4$ into both expressions		
	$(4y =) 20$ and $(y + 12) = 17$	B1ft	oe eg $5 \times 4 = 20$ and $5 + 12 = 17$ correct or ft their equation if their equation has a term in y on each side
	Alternative method 2: solves equation		
	$y = 4$	B1ft	oe eg $4 \times 4 = 16$ and $4 + 12 = 16$ correct or ft their equation if their equation has a term in y on each side
	Additional Guidance		
	Allow any variable		
	Only allow $(y =) 4$ seen in (a) if referenced in (b) and not contradicted		B1
	For alt 1, accept substituting into one side and then equating and solving the other eg $5 \times 4 = 20$ and $20 - 12 = 8$		B1

Q	Answer	Mark	Comments
14	$6.5(0) \times 2$ or $13(.00)$	M1	implied by $6.5(0) \times 112$ or 728
	$56 \div 16$ or $\frac{7}{2}$ or 3.5 or 4	M1	minibuses needed implied by 4×115 or 460 or 4×179 or 716
	$115 \times \text{their } 4 + 179 \times \text{their } 4$ or $460 + 716$ or 294×4 or 1176	M1dep	oe dep on 2nd mark allow their 4 to be a decimal eg 3.5 1029 scores 2nd & 3rd marks 1904 or 1757 scores M3
	their $1176 \div 56 + \text{their } 13$ or $(\text{their } 1176 + 56 \times \text{their } 13) \div 56$ or $1904 \div 56$	M1dep	oe eg $(115 \times \text{their } 4 + 179 \times \text{their } 4 + 56 \times \text{their } 13) \div 56$ dep on M3
	$34(.00)$	A1	SC4 27.50 SC3 27.5
	Additional Guidance		
	Up to M4 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	Using 3.5 throughout gives an answer of 31.37(5) or 31.38		M4A0
	Only 1 game of bowling gives an answer of 27.50		SC4
	460 + 716 may be seen embedded with an incorrect number of games of bowling eg $(460 + 716 + 13) \div 56$		M1M1M1M0

Q	Answer	Mark	Comments
15	$\frac{1}{6}$ or 0.16(6...) or 0.167 or 0.17 or 16(.6...) % or 16.7% or 17%	B1	oe fraction
	Additional Guidance		
	Ignore conversion attempt to fraction, decimal or percentage (but not ratio) after correct probability seen		
	Do not allow eg 1 in 6 or 1 out of 6 unless the correct probability seen		
	Do not allow ratio		
Ignore words if correct probability seen			

Q	Answer	Mark	Comments
16	1 : 25 or $1^2 : 5^2$	B1	oe ratio
	Additional Guidance		
	$1r : 25w$		B0

Q	Answer	Mark	Comments
17(a)	A 2×2 square drawn	B1	accept overlap with given square mark intention
	Additional Guidance		
	Ignore shading and internal lines		
	If more than one shape drawn apply the rules of choice		

Q	Answer	Mark	Comments
17(b)	Square with dimensions other than 2×2	B1	accept overlap with given square mark intention
	Additional Guidance		
	Ignore shading and internal lines		
	If more than one shape drawn apply the rules of choice		

Q	Answer	Mark	Comments									
18(a)	$66 \times \frac{3}{11}$ or 18 (Fruit) or $66 \times \frac{8}{11}$ or 48 (Caramel) or $66 \times \frac{1}{3}$ or 22 (Dark) or $66 \times \frac{2}{3}$ or 44 (Milk)	M1	oe implied by the numbers in the relevant row or column making the correct total accept 18 seen in Milk Fruit accept 22 seen in Dark Caramel									
	<table border="1" data-bbox="272 701 730 909"> <thead> <tr> <th></th> <th>Caramel</th> <th>Fruit</th> </tr> </thead> <tbody> <tr> <th>Milk</th> <td>34</td> <td>10</td> </tr> <tr> <th>Dark</th> <td>14</td> <td>8</td> </tr> </tbody> </table>		Caramel	Fruit	Milk	34	10	Dark	14	8	A3	A2 two of Milk Fruit = 10 Dark Caramel = 14 and Milk Caramel = 34 A1 Milk Fruit = 10 or Dark Caramel = 14
		Caramel	Fruit									
	Milk	34	10									
	Dark	14	8									
Additional Guidance												
<table border="1" data-bbox="272 1066 730 1274"> <thead> <tr> <th></th> <th>Caramel</th> <th>Fruit</th> </tr> </thead> <tbody> <tr> <th>Milk</th> <td>10</td> <td>10</td> </tr> <tr> <th>Dark</th> <td>14</td> <td>8</td> </tr> </tbody> </table>		Caramel	Fruit	Milk	10	10	Dark	14	8		M1A2	
	Caramel	Fruit										
Milk	10	10										
Dark	14	8										
<table border="1" data-bbox="272 1379 730 1588"> <thead> <tr> <th></th> <th>Caramel</th> <th>Fruit</th> </tr> </thead> <tbody> <tr> <th>Milk</th> <td>20</td> <td>10</td> </tr> <tr> <th>Dark</th> <td>20</td> <td>8</td> </tr> </tbody> </table>		Caramel	Fruit	Milk	20	10	Dark	20	8		M1A1	
	Caramel	Fruit										
Milk	20	10										
Dark	20	8										
For M1 the values must be seen outside the table or implied by the table but also accept 18 seen in Milk Fruit or 22 in Dark Caramel	<table border="1" data-bbox="272 1760 730 1968"> <thead> <tr> <th></th> <th>Caramel</th> <th>Fruit</th> </tr> </thead> <tbody> <tr> <th>Milk</th> <td>10</td> <td>18</td> </tr> <tr> <th>Dark</th> <td>5</td> <td>8</td> </tr> </tbody> </table>		Caramel	Fruit	Milk	10	18	Dark	5	8		M1
	Caramel	Fruit										
Milk	10	18										
Dark	5	8										

Q	Answer	Mark	Comments
18(b)	$\frac{8}{66}$ or $\frac{4}{33}$ or $0.\dot{1}\dot{2}$ or 12.1%	B1	oe fraction, decimal or percentage accept rounding to 2 sf or better
	Additional Guidance		
	Ignore incorrect simplification or conversion attempt to fraction, decimal or percentage (but not ratio) after correct answer seen		
	Do not allow eg 8 in 66 or 8 out of 66 unless the correct probability seen		
	Do not allow ratio		
	Ignore words if correct probability seen		

Q	Answer	Mark	Comments
18(c)	$\frac{\text{their } 48}{66}$ or $\frac{8}{11}$ or $0.\dot{7}\dot{2}$ or 72.7%	B1ft	oe fraction, decimal or percentage correct or ft their Caramel total from table accept rounding to 2 sf or better
	Additional Guidance		
	Ignore incorrect simplification or conversion attempt to fraction, decimal or percentage (but not ratio) after correct answer seen		
	Do not allow eg 48 in 66 or 48 out of 66 unless the correct probability seen		
	Do not allow ratio		
	Ignore words if correct probability seen		

Q	Answer	Mark	Comments	
19	Rotation	B1		
	90° or quarter turn anticlockwise or 270° or three-quarter turn clockwise	B1		
	Origin or (0, 0) or <i>O</i>	B1		
	Additional Guidance			
	Accept eg rotate for rotation and condone rotational symmetry			
	Do not accept turn for first B1			
	Accept 90 for 90°			
	Accept 0, 0 for origin			
	Do not accept centre of grid for origin			
	Reflection on (0, 0)			B0B0B1
Choice of transformations eg rotation (and) $\begin{pmatrix} -2 \\ -4 \end{pmatrix}$ or rotation (and) flip			1st B0	
Combined transformation			max B0B1B1	

Q	Answer	Mark	Comment	
20	13.3 ² or 176.89 and 15.6 ² or 243.36	M1	implied by 420.25 or 66.47 or $\sqrt{66.47}$ or 8.15... or 8.2	
	$\sqrt{13.3^2 + 15.6^2}$ or $\sqrt{176.89 + 243.36}$ or $\sqrt{420.25}$	M1dep		
	20.5	A1	oe	
	Additional Guidance			
	Correct answer with no working			M1M1A1
	20.5 with error seen is A0 eg $\sqrt{13.3^2 + 15.6^2} = \sqrt{420.3}$ Answer 20.5			M1M1A0
	Answer from trigonometry or drawing			M0M0A0

Q	Answer	Mark	Comments
21	24 + 52 or 76	M1	may be marked on diagram
	076	A1	
	Additional Guidance		
	24 + 52 followed by further work leading to the answer eg $24 + 52 = 76$, $90 - 76 = 14$		

Q	Answer	Mark	Comments
22	12	B1	

Q	Answer	Mark	Comment
23	Alternative method 1: price of buying 8 from each shop		
	3.19×8 or 25.52	M1	oe shop A
	$3.82 \times 4 + 3.82 \div 2 \times 4$ or 22.92	M1	oe shop B
	$14.6(0) \div 5$ or 2.92 or $14.6(0) \times 2 \div 5$ or 5.84	M1	oe shop C
	$14.6(0) \times 2$ – their 2.92×2 or $14.6(0) \times 2$ – their 5.84 or 23.36	M1dep	oe dep on previous mark $14.6 \times \frac{4}{5} \times 2$ oe scores 3rd and 4th marks
	B and 22.92 with 25.52 and 23.36 seen	A1	
	Alternative method 2: compares price of individual batteries first		
	$3.82 \times 1.5 \div 2$ or 2.86(5) or 2.87	M1	oe shop B
	$(14.6(0) \div 4) \div 5$ or 0.73	M1	oe shop C
	$14.6(0) \div 4$ – their 0.73 or 2.92	M1dep	oe dep on previous mark $14.6(0) \times \frac{4}{5} \div 4$ oe scores 2nd and 3rd marks
	their 2.86(5) or 2.87×8 or 22.92	M1dep	oe
	B and 22.92 with 2.86(5) or 2.87 and 2.92 seen	A1	

Mark scheme continues on the next page

Q	Answer	Mark	Comment
23 cont	Alternative method 3: compares the price of 4 batteries first		
	3.19 × 4 or 12.76 and 3.82 × 1.5 × 2 or 11.46	M1	oe shops A and B
	14.6(0) ÷ 5 or 2.92	M1	oe shop C
	14.6(0) – their 2.92 or 11.68	M1dep	dep on previous mark 14.6(0) × $\frac{4}{5}$ oe scores 2nd and 3rd marks
	their 11.46 × 2 or 22.92 with M3 awarded	M1dep	oe
	B and 22.92 with 12.76 and 11.46 and 11.68 seen	A1	
	Alternative method 4: compares the price of 2 batteries first		
	3.19 × 2 or 6.38 and 3.82 × 1.5 or 5.73	M1	oe shops A and B
	(14.6(0) ÷ 2) ÷ 5 or 1.46	M1	oe shop C
	14.6(0) ÷ 2 – their 1.46 or 5.84	M1dep	dep on previous mark 14.6(0) × $\frac{4}{5}$ ÷ 2 oe scores 2nd and 3rd marks
	their 5.73 × 4 or 22.92	M1dep	oe
	B and 22.92 with 6.38 and 5.73 and 5.84 seen	A1	

Additional Guidance is on the next page

Additional Guidance																				
23 cont	Up to M4 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts																			
	Use the scheme which gives the highest mark																			
	NB The 4th mark in Alts 2, 3 and 4 does not imply any earlier marks Either the method or values must have been seen and awarded for the first 3 marks in order to give this mark However 22.92 always implies M1 by Alt 1																			
	If students use different numbers of batteries for different shops do not combine marks from different schemes But note that there are possible valid methods that compare eg 2 batteries from A and B and then 4 batteries from B and C																			
	All schemes can be oe in pence and allow work in a mix of pounds or pence for up to M4																			
	Allow $\times 0.2$ or $\times 20\%$ if seen for method for one-fifth for shop C																			
	Allow $\times 0.8$ or $\times 80\%$ if seen for method for four-fifths for shop C																			
	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Shop</th> <th>Cost for 1</th> <th>Cost for 2</th> <th>Cost for 4</th> <th>Cost for 8</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>3.19</td> <td>6.38</td> <td>12.76</td> <td>25.52</td> </tr> <tr> <td>B</td> <td>2.86(5) or 2.87</td> <td>5.73</td> <td>11.46</td> <td>22.92</td> </tr> <tr> <td>C</td> <td>2.92</td> <td>5.84</td> <td>11.68</td> <td>23.36</td> </tr> </tbody> </table>	Shop	Cost for 1	Cost for 2	Cost for 4	Cost for 8	A	3.19	6.38	12.76	25.52	B	2.86(5) or 2.87	5.73	11.46	22.92	C	2.92	5.84	11.68
Shop	Cost for 1	Cost for 2	Cost for 4	Cost for 8																
A	3.19	6.38	12.76	25.52																
B	2.86(5) or 2.87	5.73	11.46	22.92																
C	2.92	5.84	11.68	23.36																

Q	Answer	Mark	Comments	
24	10×16 or 160 or $0.5 \times 10 \times (22 - 16)$ or $0.5 \times 10 \times 6$ or 30 or 10×22 or 220	M1	oe may be seen in an incorrect attempt to calculate population eg $\frac{7940}{220}$	
	$10 \times 16 + 0.5 \times 10 \times (22 - 16)$ or $10 \times 16 + 0.5 \times 10 \times 6$ or $160 + 30$ or $10 \times 22 - 0.5 \times 10 \times (22 - 16)$ or $10 \times 22 - 0.5 \times 10 \times 6$ or $220 - 30$ or 190	M1dep	oe may be seen in an incorrect attempt to calculate population eg $\frac{7940}{220}$	
	their 190×7940	M1	oe their 190 must be from a calculation involving two of 22, 16 and 10	
	1508 600	A1		
	Additional Guidance			
	The first M1 may be awarded for a correct partial area even if this is seen amongst multiple attempts			

Q	Answer	Mark	Comment
25(a)	4	B1	

Q	Answer	Mark	Comment
25(b)	No and correct reason	B1	eg no and this gives percentage (not angle) no and it should be $\times 360$ (not 100) no and it should be 144°
	Additional Guidance		
	Yes indicated		B0
	If neither box is ticked then No may be implied by the reason eg She hasn't used 360° for the circle		B1
	Ignore irrelevant, non-contradictory statements		
	Do not ignore incorrect calculations or evaluations of the angle, or incorrect statements		
	No and this is 40%		B1
	No and she still needs to work out 40% of 360		B1
	No and a circle is 360°		B1
	No and angles in a pie chart are 360		B1
	No and she needs to divide 360 by 2.5		B1
	No, shouldn't have \times by 100		B0
	No, she should have divided 360 / divided by 360		B0
	No and a circle has 360 not 180		B0
No and it's not big enough		B0	

Q	Answer	Mark	Comment
26	Correct method or evaluation of the area of any face or correct method or evaluation of the volume of any relevant cuboid of length 5 cm	M1	eg 3×2 or 6 or 3×3 or 9 or 3×4 or 12 or 5×3 or 15 or $5 \times 2 + 3 \times 2$ or $10 + 6$ or 16 or $2 \times 3 \times 5$ or 30 or $3 \times 2 \times 3$ or 18 or $2 \times 2 \times 3$ or 12 or $5 \times 3 \times 4$ or 60
	Correct method for volume of prism	M1dep	eg $2 \times 3 \times 5 + 3 \times 2 \times 3$ or $30 + 18$ or 16×3
	48	A1	
	Additional Guidance		
	The first M1 may be awarded even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comment
27	4×34 or 136 or 101	M1	may be seen embedded in an expression, equation or calculation eg $4 \times 34 + 50.5x = 237$
	$\frac{237 - 4 \times 34}{50.5}$ or $(237 - 136) \div 50.5$ or $101 \div 50.5$ or 2 (hours)	M1dep	oe eg $50.5 \times 2 = 101$ implied by total of 6 (hours)
	$237 \div (4 + \text{their } 2)$ or $237 \div 6$	M1dep	
	39.5	A1	accept 40 with M3 awarded
	Additional Guidance		
	Up to M2 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comment
28	$8a + 51$	B1	oe eg $2(4a + 23) + 5$
	$15a + 85$	B1ft	correct or ft B0 only their $8a + 51$ must be in the form $na + c$ where $n \neq 0$ and $c \neq 0$ implied by $5(3a + 17)$
	$5(3a + 17)$ or $15 = 3 \times 5$ and $85 = 17 \times 5$	B1	oe $3a + 17$ so it divides by 5
	Additional Guidance		
	Ignore use of substitution as an attempt to show divisibility		
	Ignore further non-contradictory statements		
	For the 1st B1 accept $8a + 51$ embedded in a calculation for the sum of the first four terms eg $a + 2 + 2a + 9 + 4a + 23 + 8a + 51$		
	For the 2nd B1 accept $15a + 85$ embedded in a calculation to show divisibility eg $\frac{15a+85}{5} = 3a+17$		
	For the 3rd B1 accept 15 is a multiple of 5 and 85 is a multiple of 5		
	$8a + 51$ $a + 2a + 4a + 8a = 15a$ $2 + 9 + 23 + 51 = 85$ but $15a + 85$ not seen $15 = 3 \times 5$ and $85 = 17 \times 5$		B1 B0 B1

Q	Answer	Mark	Comment
29	Alternative method 1		
	$\frac{31-16}{7-2}$ or $\frac{15}{5}$ or ($m =$) 3	M1	oe eg $\frac{16-31}{2-7}$ implied by $y = 3x$
	16 = their $3 \times 2 + c$ or $31 = \text{their } 3 \times 7 + c$ or ($m =$) 3 and $c = 10$ or $y - 16 = \text{their } 3(x - 2)$ or $y - 31 = \text{their } 3(x - 7)$	M1dep	oe
	$y = 3x + 10$	A1	
	Alternative method 2		
	16 = $2m + c$ and $31 = 7m + c$ and $31 - 16 = 7m - 2m$ or $m = 3$ or $112 = 14m + 7c$ and $62 = 14m + 2c$ and $112 - 62 = 7c - 2c$ or $c = 10$	M1	oe correct method to work out m or c using simultaneous equations
	Correct substitution of their m into one of the original equations or correct substitution of their c into one of the original equations or $m = 3$ and $c = 10$	M1dep	
	$y = 3x + 10$	A1	