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# GCSE MATHEMATICS 8300/2F

Foundation Tier Paper 2 Calculator

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Mark scheme

November 2023

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Version: 1.0 Final



2 3 B G 8 3 0 0 / 2 F / M S

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.

<b>M</b>	Method marks are awarded for a correct method which could lead to a correct answer.
<b>A</b>	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>B</b>	Marks awarded independent of method.
<b>ft</b>	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
<b>SC</b>	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
<b>M dep</b>	A method mark dependent on a previous method mark being awarded.
<b>B dep</b>	A mark that can only be awarded if a previous independent mark has been awarded.
<b>oe</b>	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
<b>[a, b]</b>	Accept values between a and b inclusive.
<b>[a, b)</b>	Accept values $a \leq \text{value} < b$
<b>3.14 ...</b>	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
<b>Use of brackets</b>	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.

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
1	8	B1	

Q	Answer	Mark	Comments
2	−6	B1	

Q	Answer	Mark	Comments
3(a)	60(%)	B1	

Q	Answer	Mark	Comments
3(b)	20(%)	B1	

Q	Answer	Mark	Comments
4(a)	18	B1	
	Additional Guidance		
	Embedded answer with no or incorrect answer eg $\frac{18}{3} = 6$		B0

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
4(b)	$2x = 27 - 3$ or $2x = 24$ or $\frac{27-3}{2}$ or $\frac{24}{2}$ or $x + 1.5 = 13.5$	M1	oe eg $2x + 3 = 27$ $-3 \quad -3$ or $-2x = 3 - 27$ or $-2x = -24$
	12	A1	
	<b>Additional Guidance</b>		
	Embedded answer with no or incorrect answer eg $2 \times 12 + 3 = 27$ without 12 selected or with incorrect answer		M1A0
	Trial and improvement with answer 12		M1A1
	Trial and improvement with no answer or answer other than 12		M0A0

Q	Answer	Mark	Comments
5	2.25	B1	
	<b>Additional Guidance</b>		
	2.25%		B0

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
6	286.28	B1	
	311.28	B1ft	correct or ft their 286.28 + 25.00
	2141.57	B1ft	correct or ft their 311.28 + 1830.29
	<b>Additional Guidance</b>		
	Mark the answer lines and ignore any numbers in the grey cells		
	Ignore units		
	286.28 261.28 2091.57	B1 B0 B1ft	
	1186.28 1211.28 3041.57	B0 B1ft B1ft	

Q	Answer	Mark	Comments									
7	<table><tr><td>4</td><td>3</td><td>10</td></tr><tr><td>5</td><td>2</td><td>12</td></tr><tr><td>6</td><td>20</td><td>1</td></tr></table>	4	3	10	5	2	12	6	20	1	B3	B2 3 or 4 correct B1 1 or 2 correct
	4	3	10									
	5	2	12									
	6	20	1									
Additional Guidance												
Mark the grid												
Ignore repeats for B1 or B2												

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
8(a)	60	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	eg $1200 \times 5$ or $1200 \times 4 + 600 \times 2$							
	6000	A1								
	Alternative method 2									
	$500 \times \frac{720}{\text{their } 60}$ or $500 \times 12$	M1	oe							
	6000	A1ft	correct or ft their 60							
	Additional Guidance									
	A correct ft answer implies both marks eg1 answer 62 in (a) and answer 5806(.45) or 5806.5 in (b) eg2 answer 72 in (a) and answer 5000 in (b)		M1A1ft M1A1ft							
	Further work eg $1200 \times 5 + 100 \times 5$		M0A0							
	For information: <div><table><tr><td>£100</td><td><math>1200 \times 5</math></td></tr><tr><td>£50</td><td><math>600 \times 10</math></td></tr><tr><td>£20</td><td><math>240 \times 25</math></td></tr><tr><td>£10</td><td><math>120 \times 50</math></td></tr></table></div>		£100	$1200 \times 5$	£50	$600 \times 10$	£20	$240 \times 25$	£10	$120 \times 50$
£100	$1200 \times 5$									
£50	$600 \times 10$									
£20	$240 \times 25$									
£10	$120 \times 50$									



## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
9(a)	390 or 1480	M1	
	1870	A1	
	<b>Additional Guidance</b>		
	Answer only		M1A1
	Ignore calculation of 1864 but 1870 only coming from incorrect rounding of 1864 is M0		

Q	Answer	Mark	Comments
9(b)	Valid explanation referring to <b>both</b> of the original numbers being rounded <b>up</b>	B1	eg he rounded each number up or each rounded number is bigger than the actual number or 390 is bigger than 385 and 1480 is bigger than 1479
	<b>Additional Guidance</b>		
	Ignore irrelevant, non-contradictory statements		
	Ignore 1864 alongside a correct explanation		
	Incorrect rounding or values seen in this part even alongside a correct explanation		B0
	The numbers are rounded <b>up</b> (to the nearest 10)		B1
	385 became 390 and 1479 became 1480		B1
	One number increased 5 and the other 1 (so it will be 6 bigger)		B1
	385 became 390 and 1479 became 1500		B0
	The numbers are rounded to the nearest 10		B0
	It's rounding so the answer is bigger		B0
	1870 is bigger than 1864		B0

Q	Answer	Mark	Comments
10(a)	$(18\,300 + 20\,700 + 21\,500 + 21\,500 + 21\,500 + 99\,000) \div 6$ or $202\,500 \div 6$	M1	oe allow missing brackets
	33 750	A1	SC1 120 000 or [30 166, 30 167]
	<b>Additional Guidance</b>		
	Correct answer followed by rounding eg 33 750 followed by 30 000		M1A1
	Special cases are for missing brackets or omitting one 21 500		
	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 33 750.0 eg2 30 166.6		M1A1 SC1

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
10(b)	Valid explanation	B1	accept any indication that one of the values is non-typical, or that the mean would be non-typical
	<b>Additional Guidance</b>		
	Ignore any attempt to state the best average		
	Ignore irrelevant, non-contradictory statements		
	Accept any indication that 99 000 is <b>significantly</b> 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	
	99 000 / one number is <b>much</b> bigger	B1	
	99 000 / 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	

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
11	$55 \times 2.2$ or 121	M1	oe
	their $121 \div 14$ or 8.6(...) or 121 and $(8 \times 14 =)$ 112	M1dep	oe
	8 stones 9 pounds	A1	SC2 8 stones 6 pounds
	<b>Additional Guidance</b>		
	Answer of 8 stones 6 pounds (from incorrect conversion of 8.6...)		SC2
	Answer 8.6... stones 121 pounds		M2A0

Q	Answer	Mark	Comments
12(a)	$80 \times 6$ or 480 or $80 \times 7$ or $480 + 80$	M1	oe implied by $80 : 480$
	560	A1	

Q	Answer	Mark	Comments
12(b)	$\frac{1}{15}$	B1	oe fraction
	<b>Additional Guidance</b>		
	Decimal, percentage or ratio answer		B0
	Do not allow 1 in 15 or 1 out of 15 unless the correct fraction seen		
	$\frac{6}{100}$ or $\frac{7}{100}$ or $\frac{6.\dot{6}}{100}$ or $\frac{6.7}{100}$		B0

Q	Answer	Mark	Comments
13(a)	$6y = y + 15$	B2	correct single equation with $6y$ and $y + 15$ eg $15 + y = y \times 6$ B1 $6y$ or $y + 15$ or rearranged equation eg $6y - 15 = y$ or $5y = 15$ but not $y = 3$ only
	<b>Additional Guidance</b>		
	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 $6y + 15$ or $6y + 15y$ or $6(y + 15)$		
	Allow any variable for B1 but must be consistent for B2		
	Allow unprocessed terms for B1 or B2 eg $6 \times y$ or $y6$		
	$6y = y + 15$ seen, but then correctly simplified or solved		B2
	$6y = y + 15$ seen, but then incorrectly simplified or solved		B1
	$6y = 18$ or $y + 15 = 18$ or both (unless combined to a single equation)		B1
	No work worth B2 or B1 and answer $y = 3$		B0

Q	Answer	Mark	Comments
13(b)	<b>Alternative method 1: substitutes <math>y = 4</math> into both sides</b>		
	$(6y =) 24$ and $(y + 15 =) 19$	B1ft	oe eg $4 \times 6 = 24$ and $4 + 15 = 19$ correct or ft their equation if their equation has a term in $y$ on each side
	<b>Alternative method 2: solves equation</b>		
	$(y =) 3$	B1ft	oe eg $3 \times 6 = 18$ and $3 + 15 = 18$ correct or ft their equation if their equation has a term in $y$ on each side
	<b>Additional Guidance</b>		
	Allow any variable		
	Only allow $(y =) 3$ 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 $4 \times 6 = 24$ and $24 - 15 = 9$		B1

Q	Answer	Mark	Comments
14	$18.5(0) \times 2$ or 37	M1	implied by $18.5(0) \times 84$ or 1554
	$42 \div 15$ or $\frac{14}{5}$ or 2.8 or 3	M1	minibuses needed implied by $3 \times 450$ or 1350 or $3 \times 26$ or 78
	$450 \times \text{their } 3 + 26 \times \text{their } 3$ or $1350 + 78$ or $476 \times 3$ or 1428	M1dep	oe dep on 2nd mark allow their 3 to be a decimal eg 2.8 1332.8 scores 2nd & 3rd marks 2982 or 2886.8 scores M3
	their $1428 \div 42 + \text{their } 37$ or $(\text{their } 1428 + 42 \times \text{their } 37) \div 42$ or $2982 \div 42$	M1dep	oe eg $(450 \times \text{their } 3 + 26 \times \text{their } 3 + 42 \times \text{their } 37) \div 42$ dep on M3
	71(.00)	A1	SC4 52.50 SC3 52.5
	<b>Additional Guidance</b>		
	Up to M4 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	Using 2.8 throughout gives an answer of 68.73(...)		M4A0
	Only 1 game of golf gives an answer of 52.50		SC4
	1350 + 78 may be seen embedded with an incorrect number of games of golf eg $(1350 + 78 + 37) \div 42$		M1M1M1M0

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

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
	<b>Additional Guidance</b>		
	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 : 16 or $1^2 : 4^2$	B1	oe ratio
	<b>Additional Guidance</b>		
	1r : 16w		B0

Q	Answer	Mark	Comments
17(a)	2 by 4 or 4 by 2 rectangle drawn	B1	accept overlap with given rectangle mark intention
	<b>Additional Guidance</b>		
	Ignore shading and internal lines		
	If more than one shape drawn apply the rules of choice		

Q	Answer	Mark	Comments
17(b)	Rectangle with dimensions in ratio 1 : 2 or 2 : 1, but not 2 by 4 or 4 by 2	B1	accept overlap with given rectangle mark intention
	<b>Additional Guidance</b>		
	Ignore shading and internal lines		
	If more than one shape drawn apply the rules of choice		

Q	Answer	Mark	Comments									
18(a)	$36 \times \frac{4}{9}$ or 16 (Soft)  or $36 \times \frac{5}{9}$ or 20 (Hard)  or $36 \times \frac{1}{3}$ or 12 (Dark)  or $36 \times \frac{2}{3}$ or 24 (Milk)	M1	oe  implied by the numbers in the relevant row or column making the correct total  accept 16 seen in Milk Soft  accept 12 in Dark Hard									
	<table><tr><td></td><td>Hard</td><td>Soft</td></tr><tr><td>Milk</td><td>13</td><td>11</td></tr><tr><td>Dark</td><td>7</td><td>5</td></tr></table>		Hard	Soft	Milk	13	11	Dark	7	5	A3	A2 two of Milk Soft = 11, Dark Hard = 7 and Milk Hard = 13  A1 Milk Soft = 11 or Dark Hard = 7
		Hard	Soft									
	Milk	13	11									
	Dark	7	5									
Additional Guidance												
<table><tr><td></td><td>Hard</td><td>Soft</td></tr><tr><td>Milk</td><td>10</td><td>11</td></tr><tr><td>Dark</td><td>7</td><td>5</td></tr></table>		Hard	Soft	Milk	10	11	Dark	7	5		M1A2	
	Hard	Soft										
Milk	10	11										
Dark	7	5										
<table><tr><td></td><td>Hard</td><td>Soft</td></tr><tr><td>Milk</td><td>10</td><td>11</td></tr><tr><td>Dark</td><td>10</td><td>5</td></tr></table>		Hard	Soft	Milk	10	11	Dark	10	5		M1A1	
	Hard	Soft										
Milk	10	11										
Dark	10	5										
For M1 the values must be seen outside the table or implied by the table but also accept 16 seen in Milk Soft or 12 in Dark Hard												
	<table><tr><td></td><td>Hard</td><td>Soft</td></tr><tr><td>Milk</td><td>10</td><td>16</td></tr><tr><td>Dark</td><td>5</td><td>5</td></tr></table>		Hard	Soft	Milk	10	16	Dark	5	5		M1
	Hard	Soft										
Milk	10	16										
Dark	5	5										



## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
18(b)	$\frac{5}{36}$ or $0.13\dot{8}$ or $13.\dot{8}\%$	B1	oe fraction, decimal or percentage accept rounding to 2 sf or better
	<b>Additional Guidance</b>		
	Ignore incorrect simplification or conversion attempt to fraction, decimal or percentage (but not ratio) after correct probability seen		
	Do not allow eg 5 in 36 or 5 out of 36 unless the correct probability seen		
	Do not allow ratio		
	Ignore words if correct probability seen		

Q	Answer	Mark	Comments
18(c)	$\frac{\text{their } 20}{36}$ or $\frac{5}{9}$ or $0.\dot{5}$ or $55.\dot{5}\%$	B1ft	oe fraction, decimal or percentage correct or ft their Hard total from the table accept rounding to 2 sf or better
	<b>Additional Guidance</b>		
	Ignore incorrect simplification or conversion attempt to fraction, decimal or percentage (but not ratio) after correct probability seen		
	Do not allow eg 20 in 36 or 20 out of 36 unless the correct probability seen		
	Do not allow ratio		
	Ignore words if correct probability seen		

Q	Answer	Mark	Comments
19	<b>Alternative method 1</b>		
	Rotation	B1	
	180° or half turn	B1	ignore clockwise or anticlockwise
	Origin or (0, 0) or <i>O</i>	B1	
	<b>Alternative method 2</b>		
	Enlargement	B1	
	(Scale factor) –1	B1	
	Origin or (0, 0) or <i>O</i>	B1	
	<b>Additional Guidance</b>		
	Accept eg rotate for rotation and condone rotational symmetry		
	Do not accept turn for first B1		
	Accept 180 for 180°		
	Accept 0, 0 for origin		
	Do not accept centre of grid for origin		
	Reflection on (0, 0)		B0B0B1
	Choice of transformations eg rotation (and) $\begin{pmatrix} 4 \\ 4 \end{pmatrix}$ or rotation (and) flip		1st B0
	Combined transformation		max B0B1B1

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comment
20	$12.9^2$ or 166.41 and $17.2^2$ or 295.84	M1	implied by 462.25 or 129.43 or $\sqrt{129.43}$ or 11.37... or 11.38 or 11.4
	$\sqrt{12.9^2 + 17.2^2}$ or $\sqrt{166.41 + 295.84}$ or $\sqrt{462.25}$	M1dep	
	21.5	A1	oe
	<b>Additional Guidance</b>		
	Correct answer with no working		M1M1A1
	21.5 with error seen is A0 eg $\sqrt{12.9^2 + 17.2^2} = \sqrt{461.95}$ Answer 21.5		M1M1A0
	Answer from trigonometry or drawing		M0M0A0

Q	Answer	Mark	Comments
21	$21 + 58$ or 79	M1	may be marked on diagram
	079	A1	
	<b>Additional Guidance</b>		
	21 + 58 followed by further work leading to the answer eg $21 + 58 = 79$ , $90 - 79 = 11$		M0A0

Q	Answer	Mark	Comments
22	9	B1	

	Answer	Mark	Comment
23	<b>Alternative method 1: price of buying 8 from each shop</b>		
	$2.39 \times 8$ or 19.12	M1	oe shop A
	$3.08 \times 4 + 3.08 \div 2 \times 4$ or 18.48	M1	oe shop B
	$11.4 \div 6$ or 1.9(0) or $11.4 \times 2 \div 6$ or 3.8(0)	M1	oe shop C
	$11.4 \times 2 - \text{their } 1.9(0) \times 2$ or $11.4 \times 2 - \text{their } 3.8(0)$ or 19(.00)	M1dep	oe dep on previous mark $11.4 \times \frac{5}{6} \times 2$ oe scores 3rd & 4th marks
	B and 18.48 with 19.12 and 19(.00) seen	A1	
	<b>Alternative method 2: compares price of individual sticks first</b>		
	$3.08 \times 1.5 \div 2$ or 2.31	M1	oe shop B
	$(11.4 \div 4) \div 6$ or 0.47(5) or 0.48	M1	oe shop C
	$11.4 \div 4 - \text{their } 0.475$ or 2.37(5) or 2.38	M1dep	oe dep on previous mark $11.4 \times \frac{5}{6} \div 4$ oe scores 2nd & 3rd marks
	their $2.31 \times 8$ or 18.48 with M3 awarded	M1dep	oe
	B and 18.48 with 2.31 and 2.37(5) or 2.38 seen	A1	

**Mark scheme and Additional Guidance continue on the next page**

23 cont	<b>Alternative method 3: compares the price of 4 sticks first</b>		
	2.39 × 4 or 9.56 and 3.08 × 1.5 × 2 or 9.24	M1	oe shops A and B
	11.4 ÷ 6 or 1.9(0)	M1	oe shop C
	11.4 – their 1.9(0) or 9.5(0)	M1dep	dep on previous mark $11.4 \times \frac{5}{6}$ oe scores 2nd & 3rd marks
	their 9.24 × 2 or 18.48 with M3 awarded	M1dep	oe
	B and 18.48 with 9.56 and 9.24 and 9.5(0) seen	A1	
	<b>Alternative method 4: compares the price of 2 sticks first</b>		
	2.39 × 2 or 4.78 and 3.08 × 1.5 or 4.62	M1	oe shops A and B
	(11.4 ÷ 2) ÷ 6 or 0.95	M1	oe shop C
	11.4 ÷ 2 – their 0.95 or 4.75	M1dep	dep on previous mark $11.4 \times \frac{5}{6} \div 2$ oe scores 2nd & 3rd marks
	their 4.62 × 4 or 18.48 with M3 awarded	M1dep	oe
	B and 18.48 with 4.78 and 4.62 and 4.75 seen	A1	

**Additional Guidance continues on the next page**

23 cont	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																							
	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 18.48 always implies M1 by Alt 1																							
	If students use different numbers of sticks for different shops do not combine marks from different schemes  but note that there are possible valid methods that compare eg 2 sticks from A and B and then 4 sticks from B and C (escalate if seen)																							
	All schemes can be oe in pence and allow work in a mix of pounds or pence for up to M4																							
	Allow $\times 0.16(6\dots)$ or $\times 16(.6\dots)\%$ or $\times 0.167$ or $\times 16.7\%$ or $\times 0.17$ or $\times 17\%$ if seen for method for one sixth for shop C but must recover to given values for A mark																							
	Allow $\times 0.83(3\dots)$ or $\times 83(.3\dots)\%$ if seen for method for five sixths for shop C but must recover to given values for A mark																							
	<table><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><tr><td>A</td><td>2.39</td><td>4.78</td><td>9.56</td><td>19.12</td></tr><tr><td>B</td><td>2.31</td><td>4.62</td><td>9.24</td><td>18.48</td></tr><tr><td>C</td><td>2.37(5) or 2.38</td><td>4.75</td><td>9.5(0)</td><td>19(.00)</td></tr></table>				Shop	Cost for 1	Cost for 2	Cost for 4	Cost for 8	A	2.39	4.78	9.56	19.12	B	2.31	4.62	9.24	18.48	C	2.37(5) or 2.38	4.75	9.5(0)	19(.00)
Shop	Cost for 1	Cost for 2	Cost for 4	Cost for 8																				
A	2.39	4.78	9.56	19.12																				
B	2.31	4.62	9.24	18.48																				
C	2.37(5) or 2.38	4.75	9.5(0)	19(.00)																				

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comments
24	$8 \times 10$ or 80 or $0.5 \times 8 \times (14 - 10)$ or $0.5 \times 8 \times 4$ or 16 or $8 \times 14$ or 112	M1	oe may be seen in an incorrect attempt to calculate the population eg $\frac{9450}{112}$
	$8 \times 10 + 0.5 \times 8 \times (14 - 10)$ or $8 \times 10 + 0.5 \times 8 \times 4$ or $80 + 16$ or $8 \times 14 - 0.5 \times 8 \times (14 - 10)$ or $8 \times 14 - 0.5 \times 8 \times 4$ or $112 - 16$ or $0.5 \times (10 + 14) \times 8$ or 96	M1dep	oe may be seen in an incorrect attempt to calculate the population eg $\frac{9450}{96}$
	their $96 \times 9450$	M1	oe their 96 must be from a calculation using at least two of 8, 10 and 14
	907 200	A1	
	<b>Additional Guidance</b>		
	The first M1 may be awarded for a correct partial area even if this is seen amongst multiple attempts		
	eg1 $(8 + 10 + 14) \times 9450 = 302\,400$ eg2 $32 \times 9450 = 302\,400$ (working not seen)		M0M0M1A0 M0M0M0A0

## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

Q	Answer	Mark	Comment
25(a)	3	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 72
	<b>Additional Guidance</b>		
	Yes indicated		B0
	If neither box is ticked then No may be implied by the reason eg She hasn't used $360^\circ$ 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 20%		B1
	No and she still needs to work out 20% of 360		B1
	No and a circle is $360^\circ$		B1
	No and angles in a pie chart are 360		B1
	No and she needs to divide 360 by 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 <b>not 180</b>		B0
	No and it's not big enough		B0



## MARK SCHEME – GCSE MATHEMATICS – 8300/2F – NOVEMBER 2023

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 6 cm	M1	eg $5 \times 6$ or 30 or $2 \times 6$ or 12 or $3 \times 6$ or 18 or $4 \times 6$ or 24 or $2 \times 5 + 2 \times 2$ or $10 + 4$ or 14 or $2 \times 5 \times 6$ or 60 or $2 \times 2 \times 6$ or 24 or $2 \times 3 \times 6$ or 36 or $4 \times 2 \times 6$ or 48 or $5 \times 4 \times 6$ or 120
	Correct method for volume of prism	M1dep	eg $2 \times 5 \times 6 + 2 \times 2 \times 6$ or $60 + 24$ or $14 \times 6$
	84	A1	
	<b>Additional Guidance</b>		
	The first M1 may be awarded even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comment
27	$3 \times 45$ or 135 or 63	M1	may be seen embedded in an expression, equation or calculation eg $3 \times 45 + 31.5x = 198$
	$\frac{198 - 3 \times 45}{31.5}$ or $(198 - 135) \div 31.5$ or $63 \div 31.5$ or 2 (hours)	M1dep	oe eg $31.5 \times 2 = 63$ implied by total of 5 (hours)
	$198 \div (3 + \text{their } 2)$ or $198 \div 5$	M1dep	
	39.6	A1	accept 40 with M3 awarded
	<b>Additional Guidance</b>		
	Up to M2 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	NB $31.5 \div (45 \div 3) = 2$ (hours)		M0M0

Q	Answer	Mark	Comment
28	$8a + 29$	B1	oe eg $2(4a + 13) + 3$
	$15a + 48$	B1ft	correct or ft B0 only their $8a + 29$ must be in the form $na + c$ where $n \neq 0$ and $c \neq 0$ implied by $3(5a + 16)$
	$3(5a + 16)$ or $15 = 5 \times 3$ and $48 = 16 \times 3$	B1	oe eg $5a + 16$ so it divides by 3
	<b>Additional Guidance</b>		
	Ignore use of substitution as an attempt to show divisibility		
	Ignore further non-contradictory statements		
	Further simplification eg $15a + 48 = 63$ which is $21 \times 3$		B1B1B0
	For the 1st B1 accept $8a + 29$ embedded in a calculation for the sum of the first four terms eg $a + 1 + 2a + 5 + 4a + 13 + 8a + 29$		
	For the 2nd B1 accept $15a + 48$ embedded in a calculation to show divisibility eg $\frac{15a+48}{3} = 5a + 16$		
	For the 3rd B1 accept 15 is a multiple of 3 and 48 is a multiple of 3		
	$8a + 29$ $a + 2a + 4a + 8a = 15a$ $1 + 5 + 13 + 29 = 48$ but $15a + 48$ not seen $15 = 5 \times 3$ and $48 = 16 \times 3$		B1 B0 B1

Q	Answer	Mark	Comment
29	<b>Alternative method 1</b>		
	$\frac{32-14}{12-3}$ or $\frac{18}{9}$ or $(m =) 2$	M1	oe eg $\frac{14-32}{3-12}$ implied by $y = 2x \dots$
	14 = their $2 \times 3 + c$ or $32 = \text{their } 2 \times 12 + c$ or $(m =) 2$ and $c = 8$ or $y - 14 = \text{their } 2(x - 3)$ or $y - 32 = \text{their } 2(x - 12)$	M1dep	oe
	$y = 2x + 8$	A1	
	<b>Alternative method 2</b>		
	$14 = 3m + c$ and $32 = 12m + c$ and $32 - 14 = 12m - 3m$ or $m = 2$ or $56 = 12m + 4c$ and $32 = 12m + c$ and $56 - 32 = 4c - c$ or $c = 8$	M1	oe correct method to work out $m$ or $c$ using simultaneous equations implied by $y = 2x \dots$ or $y = mx + 8$
	Correct substitution of their $m$ into one of the original equations or correct substitution of their $c$ into one of the original equations or $m = 2$ and $c = 8$	M1dep	
	$y = 2x + 8$	A1	