AQA

GCSE
Mathematics

Paper 2 43652F

Mark scheme

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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 Assessment Writer.

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. e.g. 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 e.g. 3.14, 3.142, 3.1416
Q	Marks awarded for quality of written communication
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 candidate has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised.

Questions which ask candidates to show working

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

Questions which do not ask candidates to show working

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

Misread or miscopy

Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate 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 candidate intended it to be a decimal point.

Paper 2 Foundation Tier

Q	Answer	Mark	Comments
1(a)	36	B1	
	Additional Guidance		
1(b)	4	B1	
	Additional Guidance		
1(c)	1000	B1	
	Additional Guidance		
2(a)	Evens or even	B1	
	Impossible	B1	
	Additional Guidance		
2(b)	B B B B C D D	B2	Any order B1 for 4 or 5 or 6 Bs or 1 C and 2 Ds or 2 Cs and 4 Ds
	Additional Guidance		
	B B B C D E F B is most likely, but not likely – not B is likely		B0
	B B B B B B B		B0

Q	Answer	Mark	Comments
2(c)	4 4 4 2 3	B2	B1 for 4 2 2 3 3 or 4 4 4 4 3 or 4 4 4 4 2 Any order
	Additional Guidance		
	If more than one number on a card take as choice and mark accordingly Note, must only use 2, 3 or 4 and must use all five cards, eg 2, 3, 4, blank, blank		B0
	4 4 4 4 5		B0
	4 4 4 4 4		B0

3(a)	Bar chart showing **Walking** Men = 12 Women = 3 and **Climbing** Men = 8 Women = 6	B3	B2 for **Walking** Bar for Men = 12 and **Climbing** Men = 8 Women = 6 or **Walking** Bar for Men = 12 and **Climbing** Men = 8 or bar for climbing men 2 more than climbing women and women total 10 B1 for **Climbing** Men = 8 or bar for walking men = 12 or men total 30 or women total 10
	Additional Guidance		
	Assume 1st bar is men and 2nd bar is women if no or same shading Condone missing gaps for B1 or B2 For B3 bars must be in correct order with equal gaps Unless specified for B1 and B2 accept either calculation or bar		
	Bar for Walking men = 12, Bar for Climbing men = 7, Bar for Climbing women = 5, Bar for Walking women = 4 (one error)		B2
	Bar for Walking men = 12, Bar for Climbing men = 7, Bar for Climbing women = 5, Bar for Walking women = 5 (two errors)		B1
	Bar for Walking men = 12, Bar for Climbing men = 8, Bar for Climbing women = 5, Bar for Walking women = 3 (two errors)		B1

Q	Answer	Mark	Comments
3(b)	(3 2 1) 6	B3	B2 for two of 3 2 1 correct B1 for one of 3 2 1 correct
	Additional Guidance		
	6 on its own		B3
	6 from incorrect subtotals can only score B2 or B1 eg 3 1 2 6		B1
	38 ÷ 8 implies total 5 and is incorrect method		B0
4(a)	35 × 10.5 or 367.5 or 36 750	M1	
	367.50	Q1	Strand (i) Correct money notation in £
	Additional Guidance		
	(£) 367.50p		M1Q0

Q	Answer	Mark	Comments
4(b)	5.25 + 10.5 or 15.75 seen or 21 or 42 or 5.25 × 4 + 10.5 × 4 or 15.75 × 4 or 63.0	M1	525 + 1050 or 1575 seen or 2100 or 4200 or 525 × 4 + 1050 × 4 or 1575 × 4 or 6300
	63 or 63.00	A1	
	Additional Guidance		
	Condone (£) 63.00p		M1A1
	5.25 + 10.5 × 4		M1

4(c)	**Alternative method 1**		
	28 × 10.5 or 294	M1	
	372.75 – their 294 or 78.75 or 7.5	M1dep	
	5	A1	
	Alternative method 2		
	28 × 10.5 or 294	M1	
	28 × 10.5 + 1 × 15.75 = 309.75 or 28 × 10.5 + 2 × 15.75 = 325.50 or 28 × 10.5 + 3 × 15.75 = 341.25 or 28 × 10.5 + 4 × 15.75 = 357 or 28 × 10.5 + 5 × 15.75 = 372.75	M1dep	
	5	A1	
	Additional Guidance		
	Note, 7.5 comes from 78.75 ÷ 10.5		
	Ignore fw, eg 28 + 5 = 33		M1M1A1
	28 × 10.5 + 15 × 5.25 = 372.75, answer 15		M1M1A0

Q	Answer	Mark	Comments
5(a)	16	B1	
	cm^2	B1	
	Additional Guidance		
	16 cm		B1B0
	16^2		B1B0
	16^2cm		B1B0
	20 cm^2		B0B1
	cm^2		B0B1
5(b)	2^{nd} and 4^{th} boxes ticked or clearly indicated	B2	B1 for 1 correct and 1 incorrect or 1 correct or 2 correct and 1 incorrect
	Additional Guidance		
	Any clear indication		

Q	Answer	Mark	Comments
5(c)	Draws a 6 by 1 rectangle	B2	B1 for different rectangle with perimeter 14 ie 4 by 3 B1 for rectangle with smaller area ie 4 by 2 3 by 2 1 by 2 9 by 1 (will not fit on grid) 8 by 1 7 by 1 5 by 1 4 by 1 3 by 1 B1 for use of half squares with same perimeter and smaller area, ie 5.5 by 1.5, 6.5 by 0.5
	Additional Guidance		
	Rectangle need not be ruled		

Q	Answer	Mark	Comments
6(a)	20 000 ÷ 8 (× 3) or 2500 (× 3) or 20 000 × 3 (÷ 8) or 60 000 (÷ 8) or 0.375 × 20 000	M1	oe
	7500	A1	SC1 for 12 500
	Additional Guidance		
6(b)	$\frac{6000}{32\ 000}$ (× 100) or 0.1875 or 0.188 or 0.19 or $1 - \frac{32\ 000 - 6000}{32\ 000}$	M1	oe eg $\frac{6}{32}$ or $\frac{3}{16}$
	18.75 or 18.8 or 19	A1	
	Additional Guidance		
	Accept 18.8 or 19 if no evidence of clearly incorrect working leading to the answer		
	18.75 or 18.8 then answer 18 is fw		M1A1
	32 000 ÷ 6000 = 5.3 and 100 ÷ 5.3 = 18.86 Answer 19 (premature approximation)		M1 A0
	6000 ÷ 320		M1

Q	Answer	Mark	Comments
7	4 × 2.5 or 10 or 2 × 2.5 or 5 or 5 × 2.5 or 12.5 or x + 4x + 5x + 2x or 12x seen or 12 × 2.5	M1	May be on diagram 3 × 2.5 or 7.5 or 6 × 2.5 or 15 or 7 × 2.5 or 17.5 or 8 × 2.5 or 20 or 9 × 2.5 or 22.5 or 10 × 2.5 or 25 or 11 × 2.5 or 27.5
	30	A1	
	Additional Guidance		
	1 + 2 + 4 + 5 = 12 12 × 2.5 = 30		M1A1
	2.5 + 4x + 5x + 2x		M1
	1 + 2 + 4 + 5 = 12		M0

8(a)	10 000 (m) or 1500 (m) or 1000 m = 1 km seen or implied	M1	eg 0.5 (km) or 12 (km)
	12 000	A1	
	Additional Guidance		
	Any one correct conversion		M1

Q	Answer	Mark	Comments
8(b)	2000 or 0.125 seen or 1000 (ml) = 1 litre seen or implied or any division of 2 by 125 with or without a change of units or digits 16 seen	M1	
	16	A1	
	Additional Guidance		
	1000 ÷ 8	M1	

Q	Answer	Mark	Comments
8(c)	**Alternative method 1**		
	240 × 8 ÷ 5 or 240 × 1.6	M1	oe 380 ÷ 8 × 5 or 380 ÷ 1.6
	384	A1	237.5(0)
	Alternative method 2		
	240 ÷ 5 or 48 and 380 ÷ 8 or 47.5	M1	oe
	48 and 47.5	A1	
	Alternative method 3		
	8 ÷ 5 or 1.6 and 380 ÷ 240 or 1.58(…)	M1	oe 5 ÷ 8 or 0.625 and 240 ÷ 380 or 0.63(…)
	1.6 and 1.58(…)	A1	0.625 and 0.63(…)
	Additional Guidance		
	240 × 8 or 1920 and 380 × 5 or 1900 Answer 1920 and 1900		M1 A1
	380 ÷ 8 = 47.5 and 240 ÷ 47.5 = 5.05(…) or 5.1		M1A1
	240 ÷ 5 = 48 and 380 ÷ 48 = 7.9(…)		M1A1
	250 × 8 ÷ 5 = 400		M0

Q	Answer	Mark	Comments
9(a)	(–1, –3)	B1	Coordinates may be on diagram
	Additional Guidance		
	Answer line takes precedence		
9(b)	(2, –3)	B2	Coordinates may be on diagram B1 for (–1, 0) or (–4, –3) or (–4, 3) or *C* correctly marked on the diagram or a single mark at (2, –3)
	Additional Guidance		
	(–1, 3)		B0

Q	Answer	Mark	Comments

10(a)	39	B1	May be on diagram
	Additional Guidance		

10(b)	360 – (130 + 75 + 43) or 360 – 248 or 112	M1	May be on diagram oe
	68	A1	
	Additional Guidance		
	360 – 248 = 112, 112 ÷ 2 = 56		M1A0
	360 – 130 + 75 + 43 = 112 (recovered)		M1
	360 – 130 + 75 + 43		M0

10(c)	**Alternative method 1**		
	$\frac{180-50}{2}$ or 65	M1	oe May be on diagram
	360 – their 65 or 180 + (180 – their 65) or 180 + 115	M1dep	oe
	295	A1	
	Alternative method 2		
	50 ÷ 2 or 25	M1	oe
	270 + their 25	M1dep	oe
	295	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
11(a)	$3a + 5b$	B2	B1 for $3a$ or $5b$ Do not ignore fw for B2
	Additional Guidance		
	$3a + 5b = 8ab$		B1
	$3a - 2b = ab$		B1
	$3a$, $5b$		B1
	$3a - 5b$		B1
11(b)	$4x = 9 + 7$	M1	oe 9 → +7 → ÷4 or $\frac{9+7}{4}$
	4	A1	
	Additional Guidance		
	4 × 4 – 7 = 9 (embedded answer)	(unless recovered)	M1A0
	9 + 7 ÷ 4	(unless recovered)	M0

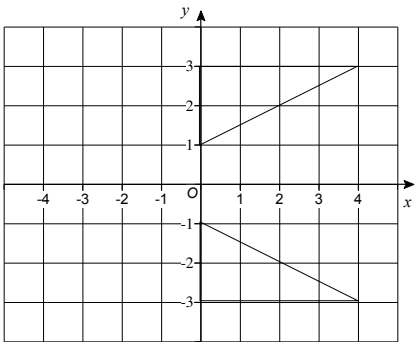
Q	Answer	Mark	Comments

12	SC SB MC MB PC PB	B2	oe B1 for 3, 4 or 5 correct Ignore repeats, reversed or incorrect for B1	
	Additional Guidance			
	For B2 must have all 6 pairs (letters may be reversed) and no extras eg accept CS for SC etc			
	SC SB MC MB PC PB CS BS CM BM CP BP			B1
	soup curry/burger melon curry/burger pate curry/burger			B0
	Two-way table is B0 unless recovered by listing the combinations			B0

13(a)	551.3(68)	B1	Must be a decimal	
	551.4	B1ft	ft their 2 dp value or better	
	Additional Guidance			
	Note 551.4 on its own implies			B1B1
	551.40			B1B0
	67.24 = 67.2			B0B1ft
	551 on its own			B0

13(b)	1.04 or $\frac{26}{25}$ or $1\frac{1}{25}$	B1		
	Additional Guidance			

Q	Answer	Mark	Comments
14	3 As 6 Bs 3 Cs	B2	B1 for 3 As or 6 Bs or 3 Cs or $\frac{2}{8} = \frac{3}{12}$ or $\frac{4}{8} = \frac{6}{12}$
	Additional Guidance		
	2 As, 4 Bs, 2 Cs with others left blank		B0

15(a)	Correct reflection  	B1	Mark intention Vertices at (0, – 1), (0, – 3) and (4, – 3)
	Additional Guidance		
	Must join the vertices to form a triangle		

15(b)	3 or ×3	B1	
	Additional Guidance		
	Condone times 3 or 3 times		B1

Q	Answer	Mark	Comments
16	2 (less than 30) or 4 (30 to 45) or 9 (more than 45) or correct group of 4 identified or correct group of 9 identifed	M1	oe May be on diagram
	9 × 2 or 18	M1dep	oe
	22	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
17(a)	720 + 430 or 1150 or 0.15 × 720 or 108 or 0.15 × 430 or 64.5(0)	M1	oe 1 – 0.15 or 0.85
	0.15 × their 1150 or their 108 + their 64.5(0) or their 1150 – 1000 or 1000 – their 1150 or 150 or –150	M1dep	oe their 0.85 and their 1150 or their 0.85 × 720 or 720 – their 108 or 612 or their 0.85 × 430 or 430 – their 64.5(0) or 365.5(0) or 1000 ÷ their 0.85 or [1176, 1177]
	172.5 or 0.15 × their 1150 and (–)150 or their 108 + their 64.5(0) and (–)150 or their 1150 – their 172.5(0)	M1dep	oe their 0.85 × their 1150 or their 612 + their 365.5(0) or 1000 ÷ their 0.85 and their 1150
	977.5 or 977 or 978 or 172.5(0) and (–)150 or 22.5(0) or –22.5(0)	A1	[1176, 1177] and 1150
	Yes	Q1ft	Strand (iii) decision to match their answer provided all method marks are correct.
	Additional Guidance on next page		

17(a) AG	**Additional Guidance**	
	Allow rounding or truncation to £ for 64.5, 365.5, 172.5, 22.5 and 977.5	
	Ignore fw after 977.5 eg 1000 – 977.5 = 32.5 so Yes	5 marks
	15% of 1000 = 150, so 15% of 1150 > 150 so when you subtract the final cost will be < 1000	5 marks
	0.15 × 1150 = 172.5, 172.5 without (–) 150 cannot score the Q mark as they have nothing to compare the 172.5 with	M1M1M1
	Beware: 0.15 × 1000 = 150 with no correct working	M0

17(b)	800 × 1.25 or 1000	M1	oe
	their 1000 – 895 or 105	M1dep	
	their 105 ÷ 1.4(0)	M1dep	oe
	75	A1	SC2 for 84 or 160.(71…) or 161 SC1 for 639.(28…) or 639.29 or 640
	Additional Guidance		
	84 implies 105 ÷ 1.25 or 895 Euros to pounds and subtracting from £800		
	160.(71…) implies 800 × 1.4		
	895 ÷ 1.25 = 716 800 – 716 = 84 84 × 1.25 ÷ 1.4 = 75		4 marks
	895 ÷ 1.25 = 716 800 – 716 = 84 84 ÷ 1.4 = 60		SC2

Q	Answer	Mark	Comments
18	$\frac{20}{8}$ or 2.5 seen or implied or $\frac{8}{20}$ or 0.4 seen or implied or 75 + 75 + 37.5 or 187.5 or 50 + 50 + 25 or 125 or 40 + 40 + 20 or 100 or 2 + 2 + 1 or 5	M1	oe
	Two from 187.5 or 125 or 100 or 5	A1	For 187.5 allow [187, 188] or 190
	187.5 and 125 and 100 and 5	A1	For 187.5 allow [187, 188] or 190 SC1 for [112, 113] and 75 and 60 and 3
	Additional Guidance		

Q	Answer	Mark	Comments
19	$\frac{9}{5}$ × 28 or 50.4	M1	oe
	82.4 or $82\frac{2}{5}$ or 82 remainder 2	A1	oe
	82	B1ft	ft their answer provided not an integer
	Additional Guidance		
	82 on its own		M1A1B1
	$\frac{9}{5}$ × 28 + 32 on its own		M1
	$\frac{9}{5}$ of 28 + 32 on its own		M0
	$\frac{9}{5}$ × 28 + 32 = $\frac{9}{5}$ × 60 (incorrect order of operations) = 108 (no ft as not from a decimal answer)		M0A0B0
20(a)	4, 2 and 0	B2	B1 for 4, 2, x or 4, x, x – 2 or 4, x, 0 or x, x – 2, x – 4 or x, 2, 0 or 0, 2, 4 eg 4, 2, 1 4, 3, 1 4, 3, 0 6, 4, 2 6, 2, 0

Q	Answer	Mark	Comments
20(b) Alt 1 of 3 Alt 2 of 3	**Alternative method 1**		
	(31 + 3) ÷ 2 or 17	M1	oe 2 × 17 – 3 (= 31)
	(their 17 + 3) ÷ 2	M1dep	oe 2 × 10 – 3 (= 17)
	10	A1	Ignore fw continuing the sequence SC1 for 12.25
	Alternative method 2		
	Inputs a number for first term and evaluates third term correctly.	M1	eg First term = 1 implies third term = –5 First term = 2 implies third term = –1 First term = 3 implies third term = 3 First term = 4 implies third term = 7 First term = 5 implies third term = 11 First term = 6 implies third term = 15 First term = 7 implies third term = 19 First term = 8 implies third term = 23 First term = 9 implies third term = 27 First term = 9.5 implies third term = 29
	Inputs another number for first term and evaluates third term correctly.	M1dep	
	10	A1	Ignore fw continuing the sequence SC1 for 12.25

Q	Answer	Mark	Comments

20(b) Alt 3 of 3	**Alternative method 3**			
	$2(2x - 3) - 3 = 31$	$2x - 3 = 31$ or $2x = 34$ or $x = 17$	M1	oe with any variable
	$4x - 6 - 3 = 31$ or $4x - 9 = 31$ or $4x = 40$	$2x - 3 = 17$ or $2x = 20$	M1dep	oe with any variable
	10		A1	Ignore fw continuing the sequence SC1 for 12.25
	Additional Guidance			
	10 + 3 = 13, answer 13	(allow as fw continuing the sequence)		M1M1A1
	10 + 3 = 13, answer 6.5	(allow as fw continuing the sequence)		M1M1A1
	10 – 3 = 7, answer 7	(do not allow A mark as not continuing the sequence)		M1M1A0
	$((31 + 3) \div 2 + 3) \div 2$ or $\frac{31 + 3 + 6}{4}$			M1M1

21(a)	$15 < x \leq 25$	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
21(b)	Mid values seen	B1	10, 20, 30, 40 and 50 or 10.005, 20.005, 30.005, 40.005, 50.005 or 10.01, 20.01, 30.01, 40.01, 50.01
	10 × 14 (+) 20 × 12 (+) 30 × 11 (+) 40 × 2 (+) 50 (× 1) or 140 (+) 240 (+) 330 (+) 80 (+) 50 or 840	M1	Accept use of mid values 10.005, 20.005 etc or 10.01, 20.01 etc Allow one error eg one mid value incorrect or one calculation incorrect
	their 840 ÷ 40	M1dep	
	21 or 21.01	A1	Accept 21.005 SC2 for 16 or 16.005 or 16.01 or 21.5(0) or 21.505 or 21.51 or 26 or 26.005 or 26.01 or 791.25
	Additional Guidance		
	21 and then states answer is in 15 < x ≤ 25 class is fw and can be ignored		4 marks
	140 + 240 + 330 + 80 + 50 ÷ 40 = 21 (recovered)		4 marks
	$\frac{140 + 240 + 330 + 80 + 50}{40}$ = 791.25		B1M1M1A0
	140 + 240 + 330 + 80 + 50 ÷ 40 = 791.25		B1M1
	Answer 791.25 implies at least B1M1		
	840		B1M1
	840 ÷ 5 = 168		B1M1M0
	140, 240, 330, 80, 50		B1M1
	168 with no working		M0
	Note: Two or more midpoints incorrect		B0M0

Q	Answer	Mark	Comments
22(a)	$\pi \times 6^2$ or 3.14×6^2 or [113, 113.2]	M1	May be embedded oe
	$\pi \times 6^2 \times 15$ or $3.14 \times 6^2 \times 15$ or [113, 113.2] × 15	M1dep	oe
	[1695, 1698] or 1700 or 540π	A1	Ignore fw after 540π
	Additional Guidance		
	$\pi \times 6^2 = \pi \times 12 \times 15$		M1M1
	$\pi \times 6^2 \times 15 = \pi \times 12 \times 15$		M1M1
	$\pi \times 6^2 \times 30$		M1M0
	$2 \times \pi \times 6^2 \times 15$		M1M0
	$\pi \times 6^2 = \pi \times 12$		M1M0
	$\pi 6^2$		M1
	$\pi \times 12$		M0
	$\pi \times 12 \times 15$		M0

Q	Answer	Mark	Comments
22(b)	**Alternative method 1**		
	45 000 ÷ 1000 or 45	M1	
	45 ÷ 0.75 or 45 × 1.33… or their 45 ÷ 0.75	M1	oe eg 45 ÷ 3 × 4
	60	A1	
	60 minutes or 60 min(s) or 1 hour or 1h(r)	Q1	Strand (i) Correct notation
	Alternative method 2		
	0.75 × 1000 or 750	M1	
	45 000 ÷ 750 or 45 000 ÷ their 750	M1	oe
	60	A1	
	60 minutes or 60 min(s) or 1 hour or 1h(r)	Q1	Strand (i) Correct notation
	Additional Guidance		
	For the Q mark 60 minutes or 1 hour must not come from incorrect working		
	Ignore fw after 60 minutes or 1 hour		
	Digit 6 implies M0M1 eg 60 000, 6000, 600, 6 or 0.6		M0M1
	750 ÷ 45 000 = 0.016… (units would be minutes^{-1})		M1M0A0Q0
	750 ÷ 45 000 = 0.016… and 0.016… × 60 = 1 hour (method is incorrect)		M1M0A0Q0
	Do not accept 60 m for the Q mark		M1M1A1Q0

Q	Answer	Mark	Comments
23	**Alternative method 1**		
	6 : 3 : 1 or 10 seen or implied	M1	oe Any order
	130 ÷ 10 × 6 or 78 or 130 ÷ 10 × 3 or 39 or 130 ÷ 10 or 13	M1dep	
	White 78 Brown 39 Granary 13	A1	
	Alternative method 2		
	$6x + 3x + x = 130$ or $10x = 130$	M1	oe eg $y + \frac{y}{2} + \frac{y}{6} = 130$ or $\frac{5y}{3} = 130$
	130 ÷ 10 or 13	M1dep	oe eg 3 × 130 ÷ 5 or 78
	White 78 Brown 39 Granary 13	A1	
	Alternative method 3		
	A correctly evaluated trial where white : brown : granary = 6 : 3 : 1	M1	eg (white =) 6, (brown =) 3, (granary =) 1, total 10
	A different correctly evaluated trial where white : brown : granary = 6 : 3 : 1	M1dep	eg (white =) 12, (brown =) 6, (granary =) 2, total 20
	White 78 Brown 39 Granary 13	A1	
	Additional Guidance on next page		

Q	Answer	Mark	Comments

	Additional Guidance	
23 AG	Allow decimals in a correctly evaluated trial, eg 75, 37.5, 12.5, total 125	
	6 : 3 : 1	M1
	6, 3, 1 Total = 10	M1
	6, 3, 1	M0
	7 : 2 : 1 = 10, 130 ÷ 10 = 13	M0

Q	Answer	Mark	Comments
24 Alt 1 of 3 Alt 2 of 3	**Alternative method 1**		
	$5x - x$ or $4x$ or $5x + 5x - x - x$ or $8x$	M1	oe $5x + 5x$ or $10x$ or $5x + x + x$ or $7x$
	$8x \times 5x$ or $40x^2$ or $x \times 5x$ or $5x^2$	M1	oe $10x \times 7x$ or $70x^2$ or $6 \times x \times 5x$ or $30x^2$
	$8x \times 5x = 1440$ or their $40x^2 = 1440$ or $x^2 = 36$	M1dep	oe $10x \times 7x - 6 \times x \times 5x = 1440$ or their $70x^2$ – their $30x^2 = 1440$
	$(x =)$ 6 or 5×36 or $(5x^2 =)$ 1440 ÷ 8	M1dep	oe Must be correct
	180	A1	
	Alternative method 2		
	$5x - x$ or $4x$ or $5x + 5x - x - x$ or $8x$	M1	oe
	4 small rectangles fit in half white rectangle	M1	May be implied from diagram
	8 small rectangles fit in white rectangle	M1dep	May be implied from diagram
	1440 ÷ 8	M1dep	oe Must be correct
	180	A1	

Q	Answer	Mark	Comments

24 Alt 3 of 3	**Alternative method 3**			
	5 – 1 or 4 or 5 + 5 – 1 – 1 or 8	M1	5 + 5 or 10 or 5 + 1 + 1 or 7 May be on diagram	
	8 × 5 or 40	M1	oe 10 × 7 or 70 or 6 × 1 × 5 or 30	
	1440 ÷ their 40 or 36 or $\sqrt{\text{their 36}}$	M1dep	oe	
	6	M1dep	Must be correct	
	180	A1		
	Additional Guidance			
	x = 6 with no clearly incorrect working			M1M1M1M1
	Answer 180^2 scores A0			M1M1M1M1
	4 small rectangles fit in half white rectangle implies $4x$			M1M1
	Just $5x^2$			M0M1