GCSE
Mathematics

Paper 1 43651F

Mark scheme

43651F

June 2015

Version 1: Final Mark Scheme

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.

Further copies of this Mark Scheme are available from aqa.org.uk

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 ≤ 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.
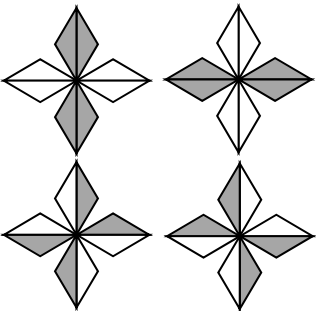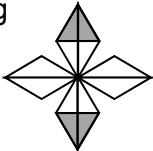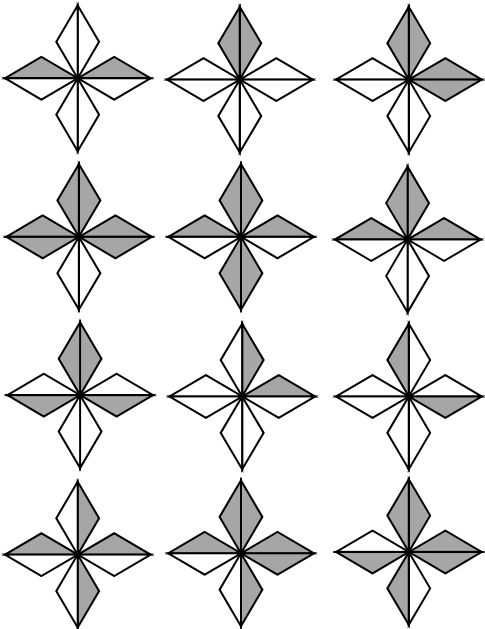
Paper 1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	Tallies correct for coffee and orange ie ||| Ⅲ|| |||	B1	Must use five bar gate for orange Milk tally must be as given
	Frequencies correct for milk, coffee and orange ie 5, 3 and 8	B1ft	ft their tallies for milk, coffee and orange
	Additional Guidance		
	Frequencies for coffee and orange may be correct or follow through from their tallies		

Q	Answer	Mark	Comments
1(b)	3 bars labelled M(ilk), C(offee), O(range) of equal width (1 square), with equal gaps and correct heights	Q2ft	Strand (i) Q1ft Fully correct apart from one error ie unequal widths, unequal or missing gaps, incorrect or missing labels or one height incorrect ft their table (tally or frequency)
	Additional Guidance		
	Heights may be correct or follow through from their table		
	Labelled bars may be in any order. Assume unlabelled bars are in the given order		
	Mark intention ie condone unruled bars		
	Bars do not need to be shaded or to have matching shading		
	Only check the gaps between the four bars so spacing of 1, 2, 2 squares is correct		
	Equal widths may be eg 2 squares if Tea bar is changed to 2 squares		
	Accept a key in place of labels		
	Allow the bar chart to be extended to show a height of 9, for example		

Q	Answer	Mark	Comments
2(a)	36 or 45 or 54 seen	M1	
	36 and 45 and 54 chosen	M1dep	
	135	A1ft	ft M1M0 correct total of their **three** numbers SC1 Correct total of **three** numbers between 31 and 59 inclusive
	Additional Guidance		
	39, 48 and 57 chosen and answer 144 (**must** be three numbers added)		SC1
	36, 45 and 54 chosen in working and answer 3		M2A0
	36, 45 and 56 chosen and answer 137		M1M0A1ft
	135 must **not** come from incorrect working		A0

Q	Answer	Mark	Comments
2(b)	At least one of 9, 19, … 89 **and** at least one of 90, 91, … 97 seen	M1	
	20	A1	SC1 Answer 19

Q	Answer	Mark	Comments
3(a)	Plot at (1, 2)	B1	Allow for vertex of rectangle at (1, 2)

Q	Answer	Mark	Comments
3(b)	20	B1	
	cm^2	B1	

Q	Answer	Mark	Comments
4(a)	triangle	B1	

Q	Answer	Mark	Comments
4(b)	pentagon	B1	

Q	Answer	Mark	Comments
4(c)	square	B1	

Q	Answer	Mark	Comments
5	less than greater than equal to	B2	B1 for 2 correct

Q	Answer	Mark	Comments
	Alternative method 1 (Price per tin or for 2 tins)		
	300 ÷ 6 **and** 180 ÷ 4 or 300 ÷ 3 **and** 180 ÷ 2	M1	oe
	50 **and** 45 or 100 **and** 90	A1	oe
	Box of 4 tins identified eg £1.80	Q1ft	Strand (iii) ft their values if M1 awarded SC2 45 **and** 50 seen SC1 45 **or** 50 seen
	Alternative method 2 (Scaling to an equal number of tins eg multiple of 12)		
	eg 12 tins 2 × 3 **and** 3 × 1.8(0)	M1	oe
	6 **and** 5.4(0)	A1	oe
6	Box of 4 tins identified eg £1.80	Q1ft	Strand (iii) ft their values if M1 awarded SC2 45 **and** 50 seen SC1 45 **or** 50 seen
	Alternative method 3 (Using small box to work out cost of 6 tins)		
	180 ÷ 4 or 45 or 180 ÷ 2 or 90 **and** 180 + their 45×2 or their 45×6	M1	oe 180 + their 90 or their 90 × 3
	(6 tins =) 270	A1	oe
	Box of 4 tins identified eg £1.80	Q1ft	Strand (iii) ft their values if M1 awarded SC2 45 **and** 50 seen SC1 45 **or** 50 seen
	Alternative method 4 (Using large box to work out cost of 4 tins)		
	300 ÷ 6 or 50 or 300 ÷ 3 or 100 **and** 300 – their 50×2 or their 50×4	M1	oe 300 – their 100 or their 100 × 2
	(4 tins =) 200	A1	oe
	Box of 4 tins identified eg £1.80	Q1ft	Strand (iii) ft their values if M1 awarded SC2 45 **and** 50 seen SC1 45 **or** 50 seen

Additional Guidance on next page

	Additional Guidance	
6 cont	Allow working in **£ and/or pence** with or without units throughout	
	Check the diagram for values	
	All schemes work in the same way: M1 for full method to work out two directly comparable values (may only need one if they are matching to one given in the question). The M mark can be implied by the correct A value(s). A1 for evaluating their value(s) Q1ft, if M1A0 awarded and correct decision made for their evaluation(s)	
	Some students work out 45 and 50 correctly but then do an incorrect calculation which still means that 4 tins is the best offer. Do **not** award full marks if a calculation error is seen that is part of their chosen working. However SC2 will always be available for these students.	

Useful values:

	1	**2**	**3**	**4**	**6**	**8**	**12**	**24**
Box of 6	50p	£1	£1.50	£2	(£3)	£4	£6	£12
Box of 4	45p	90p	£1.35	(£1.80)	£2.70	£3.60	£5.40	£10.80

They must have two values to compare (one may have been given) otherwise they will not score (apart from possible SC marks) eg Using box of 4, 8 tins cost £3.60 You get two tins more for only 60p (or each extra tin only costs 30p) Box of 4	M0 A0 Q0
Working out tins per £ is impractical on a non-calculator paper. If seen, the divisions must be correct so use this scheme: 6 ÷ 3 and 4 ÷ 1.8(0) 2 and 2. ... 4 tins	M0 at this stage M1A1 M1A1Q1
Box of 4 with no correct working	M0A0Q0

Q	Answer	Mark	Comments
7(a)	Any correct shading eg	B1	Condone part triangles shaded if unambiguous eg Ignore any lines of symmetry drawn

7(b)	Any correct shading eg a rotation of any of these	B1	Condone part triangles shaded if unambiguous Ignore any lines of symmetry drawn
	Additional Guidance		
	If there is working seen for Q8 below the centre line of the diagram, do **not** escalate the clip as this will be seen in Q8. Any working seen above must be escalated.		

8	$20 \div 4$ or 5 or 4×5	M1	May be on a diagram
	25	A1	

Q	Answer	Mark	Comments
	(Area A =) 8	B1	May be on diagram Accept $\frac{8}{16}$ oe
	(Area B =) 8	B1	May be on diagram Accept $\frac{8}{16}$ oe
	A has the **same** area as B indicated	B1ft	correct ft decision for their two areas if B1 awarded

	Additional Guidance	
9	They don't need to explicitly state **both** areas if same area box is indicated eg Area B = 8 and correct box indicated implies the first B1 or Both are 8 and correct box indicated	B3 B3
	Only indicating the same area box (with no incorrect values for areas)	B0B0B1
	Area A = 4, Area B = 8 and A < B box indicated	B0B1B1ft
	Perimeter Where possible award benefit of doubt eg student appears to be counting around the edge of shape A when they may just be counting squares/ unshaded squares If student mentions both area and perimeter, just mark the area part Even if student mentions only perimeter, you can still award the third B1 for ticking A has the same area as B, however there would be no B1ft available for ticking one of the other boxes However, stating A = 2 + 2 + 2 + 2 (ie 8) **and** B = 1 + 4 + 1 + 1 + 2 + 2 + 2 + 1 or 14 is clearly perimeter so do not give credit	 B0B0B1 B0B0B0
	Condone no units or incorrect units	
	Two areas seen that are not labelled and not linked to the diagram eg 2 $\times$ 2 = 4 and 1 $\times$ 4 + 2 $\times$ 2 = 8, then A < B	B0B1B1ft

Q	Answer	Mark	Comments
10(a)	0.15×70 oe	M1	If using build-up, must see completely correct, full method
	10.50	Q1	Strand (i) 10.5 or £10.50p is M1Q0 SC1 59.5(0)

	Additional Guidance	
Build-up must be correct or have full correct method		
10% = 7, 5% = 2.5 Answer 9.50		M0Q0
10% = 7, 7 ÷ 2 = 2.5 Answer 9.50		M1Q0
10.5(0) seen in working but then added to or deducted from 70		M1Q0

Q	Answer	Mark	Comments
10(b)	**Alternative method 1**		
	$40 \div 200$ ($\times$ 100) or $\dfrac{40}{200}$	M1	oe
	20	A1	SC1 80
	Alternative method 2		
	£20 = 10% or £10 = 5% or £2 = 1%	M1	Correct % for any factor/multiple of £40
	20	A1	SC1 80

	Additional Guidance	
40 = 20% seen, then answer 40		M1A0
Assume 20 on the answer line is 20% not £20		M1A1

Q	Answer	Mark	Comments
11(a)	Scalene	B1	

Q	Answer	Mark	Comments
11(b)	Fully correct ie Angle at either end of line of [68, 72] Angle at other end of line of [58,62] Triangle drawn with ruled straight lines	B2	B1 one angle drawn within tolerance Ignore angle labels
	Additional Guidance		
	If student uses own base line must be 9 cm ± 2 mm		
	Angles must be at the ends of the lines, allow tolerance of ± 2 mm (but judge by eye)		

Q	Answer	Mark	Comments
12(a)	20 + 10 – 8 – 8 or 30 or 16	M1	May be on diagram 30 for LHS total 16 for two hearts
	14	A1	

Q	Answer	Mark	Comments
12(b)	20 + 8 + 8 – 10 or 36 – 10 or 26 or 10 + 26 = 36	M1	May be on diagram 26 for two stars
	13	A1	

Q	Answer	Mark	Comments
13(a)	–33	B1	Ignore units eg ºC

Q	Answer	Mark	Comments
13(b)	(+)1	B1	Ignore units

Q	Answer	Mark	Comments
13(c)	$K = \dfrac{5}{9}\,(F - 32) + 273$	B1	

Q	Answer	Mark	Comments
14	One correct value in table (–3, –11) or (3, 7)	B1	May be implied from graph if table blank
	Accurately plots at least two points	M1	± ½ square ft their table
	Correct table **and** ruled straight line from (–3, –11) to (3, 7)	A1	Must be completed No incorrect plots ± ½ square

Q	Answer	Mark	Comments
15(a)	10xy	B1	

Q	Answer	Mark	Comments
15(b)	6	B2	B1 18 = (1 ×) 2 (×) 3 (×) 3 **or** 30 = (1 ×) 2 (×) 3 (×) 5 or **one** correct prime factor tree or **one** correct prime factor ladder or **one** complete set of factors (may be in product pairs) 1, 2, 3, 6, 9, 18 **or** 1, 2, 3, 5, 6, 10, 15, 30 SC1 Answer 2 and/or 3 or 2 × 3

Q	Answer	Mark	Comments
16	**Alternative method 1**		
	3 × 4.5 or 13.5 or 3 × 4500 or 13500	M1	oe
	their 13.5 ÷ 10 × 200 or $\dfrac{\text{their } 13500 \div 10 \times 200}{1000}$	M1dep	oe
	270	A1	SC1 digits 27
	Alternative method 2		
	(200 × 4.5) ÷ 10 or 90 (ml)	M1	oe
	their 90 × 3	M1dep	
	270	A1	SC1 digits 27
	Alternative method 3		
	200 : 10000 or $\dfrac{1}{50}$ **and** $\dfrac{1}{50}$ × 3 or 0.06	M1	oe
	their 0.06 × 4.5 × 1000	M1dep	oe
	270	A1	SC1 digits 27

Additional Guidance on next page

Q	Answer	Mark	Comments

	Additional Guidance		
	Students may convert wrongly to millilitres using a factor of 10 (ie 450) then convert back using the same 'wrong' factor to get the correct answer. Allow this, as the method is valid. However, partial marks cannot be awarded if a wrong conversion factor is used but if digits 27 seen allow SC1		
16 cont	(1 gallon =) 45 millilitres (3 gallons =) 135 millilitres 135 millilitres ÷ 10 = 13.5 litres 13.5 ÷ 10 × 200 = 270	M1, M1dep, A1	
	(1 gallon =) 45 millilitres (3 gallons =) 135 millilitres 135 ÷ 10 × 200 = 2700	SC1	
	If a 'build up' method is used to get millilitres equivalent to 13.5 litres then it must be fully correct to get the M1dep		
	13.5 10 = 200, 1 = 20, 3 × 20 = 80, 0.5 = 10 200 + 80 + 10 = 290	M1 M1dep A0	
	13.5 10 = 200, 1 = 20, 3 = 60, 0.5 = 10 200 + 20 + 60 + 10 = 290	M1 M0 A0	

Gallons	1	×3	3		
Litres	4.5	10	13.5	13.5	M1 M1dep A1
Lawn feed (ml)		200	×1.35	270	

Q	Answer	Mark	Comments
	Alternative method 1		
	6 × 18 or 108	M1	(16.2 + 18.1 + 15.9 + 17.8 + 21 + x) ÷ 6 = 18
	their 108 – (16.2+18.1+15.9+17.8+21)	M1 dep	oe eg complete repeated subtraction Look for total written under or by table
	19	A1	SC1 89 seen
	Alternative method 2		
	18 – each value in table, eg 1.8, –0.1, +2.1, +0.2, –3	M1	Allow one error
17	Totals their subtractions their (1.8 + –0.1 + 2.1 + 0.2 + –3) or 1 **and** adds to 18	M1dep	
	19	A1	

Additional Guidance

16.2 + 18.1 = 34.2, 34.2 + 15.9 = 60.1 60.1 + 17.8 = 77.9, 77.9 + 21.0 = 88.9 6 × 18 = 118 118 – 88.9 = 30.9		M1 M1dep A0
(16.2 + 18.1 + 15.9 + 17.8 + 21 + x) ÷ 6 = 18 x = 118 – 89.7 x = 28.3	Allow incorrect solution of equation if full method	M1 M1dep A0
1.8 – 0.1 + 2.1 + 0.3 –3 = 1.1 19.1		M1, M1dep, A0

Q	Answer	Mark	Comments
18(a)	$5x$	B1	

18(b)	$w = z - 3$ or $w = -3 + z$ or $z - 3 = w$ or $-3 + z = w$	B1	Must have $w =$ or $= w$
	Additional Guidance		
	Many students write z like the number 2. Allow for this		

18(c)	$2y(2y + 3)$	B2	B1 for $2(2y^2 + 3y)$ or $y(4y + 6)$
	Additional Guidance		
	Allow $\times$ signs between numbers, brackets and letters, eg $2y \times (2y + 3)$ or $2(2 \times y^2 + 3 \times y)$		
	Factorising may be done in two 'steps', ie $y(4y + 6)$ followed by $2y(2y + 3)$. If the second attempt is done wrongly, B1 can still be awarded.		
	$y(4y + 6)$ $2y(2y + 6)$		B1 B0
	$2(2y^2 + 3y)$ $2y(y + 3)$		B1 B0

Q	Answer	Mark	Comments
19	Two of the four correct approximations 21.6 → 20, 98 → 100, 34 → 30, 18.6 → 20 **or** denominator → 50	M1	50 must not come from an incorrect method eg 54 → 50
	Three correct approximations used in the correct calculation **or** All four correct approximations 21.6 → 20, 98 → 100, 34 → 30, 18.6 → 20	M1 dep	eg $\dfrac{22 \times 100}{30 + 20}$ or $\dfrac{20 \times 98}{30 + 20}$ or $\dfrac{20 \times 100}{34 + 20}$ or $\dfrac{20 \times 100}{30 + 19}$ or $\dfrac{22 \times 100}{50}$ or $\dfrac{20 \times 98}{50}$ 30 and 20 may be implied by 50 but 50 must not come from an incorrect method
	40 **and** all approximations correct	A1	
	Additional Guidance		
	Must show correct approximations Answer only of 40 $\dfrac{22 \times 100}{30 + 20}$ and answer 40 34 + 19 = 53, 20 × 100 = 2000, 2000 ÷ 50 = 40 (50 from wrong method) $\dfrac{22 \times 100}{35 + 20} = \dfrac{2200}{55}$, answer 40 $\dfrac{2000}{50} = 40$		M0M0A0 M1M1A0 M1M0A0 M1M0A0 M1M0A0

Q	Answer	Mark	Comments
20	**Alternative method 1**		
	Correctly lists first three bus times to X or Y ie 7 25, 7 50, 8 15, … **or** 7 20, 7 40, 8 00, …	M1	Accept any notation for time eg 7.20, 7:20 7 20, 0720, 7-20, 20 past 7, 720
	Continues **both** lists at least as far as a common time ie 7 25, 7 50, 8 15, 8 40, ... **and** 7 20, 7 40, 8 00, 8 20, 8 40, ...	M1dep	Allow one error up to and including their common time, ignore errors after
	8.40 (am) or 08 40 or after/in 100 minutes or after/in 1h 40 minutes	A1	SC2 No other working and any time that is 7 am + 100n minutes eg 10 20, 12 00, 13 40 etc
	Alternative method 2		
	Correctly lists first three multiples of 25 or 20 ie 25, 50, 75, … **or** 20, 40, 60, …	M1	25 × 4 and 20 × 5
	Stops both lists at 100 or identifies 100 or 1 hour 40 minutes	M1dep	
	8.40 (am) or 08 40 or after/in 100 minutes or after/in 1h 40 minutes	A1	SC2 No other working and any time that is 7 am + 100n minutes eg 10 20, 12 00, 13 40 etc

Additional Guidance on next page

	Additional Guidance		
20 cont	7 25, 7 50, 8 15, 8 40, 9 05, … 7 20, 7 40, 8 00, 8 20, 8 40, 9 00, .. (Answer =) 8 40 pm	pm is wrong	M1 M1dep A0
	(No working) (Answer =) 8 40 pm	Method by implication	M2
	7 25, 7 50, 8 05, 8 30, 8 55, 9 20 7 20, 7 40, 8 00, 8 20, 8 40, 9 00 9 20 (Answer =) 9 20	Second list correct for 3 values. One error in first list. Both lists taken to a common value	M1 M1dep A0
	7 25, 7 50, 8 10, 8 30, 9 00, 9 15 7 20, 7 40, 8 00, 8 20, 8 40, 9 00 (Answer =) 9 00	Second list correct for 3 values. Both lists taken to a common value but more than one error in first list.	M1 M0dep A0
	25, 50, 75, 80, 20, 40, 60, 80, (Answer =) 8 10	At least one list correct for 3 values. Does not get to 100	M1 M0 A0
	7 00, 25, 50, 8 15, 40, 9 05, … 7 00, 20, 40, 8 00, 20, 40, 9 00 8 40	Intention to list times clear	M1 M1dep A1
	As question asks for 'When..' rather than 'What time..' then the students do not have to say 8.40 but could qualify it as a length of time after 7am. If so then the wording must be clear.		
	7 25, 7 50, 8 15, 8 40, 9 05, … 7 20, 7 40, 8 00, 8 20, 8 40, 9 00, .. (Answer =) 1 h 40 after 7	Must make it clear that the time is after 7 (am)	M1 M1dep A1
	7 25, 7 50, 8 15, 8 40, 9 05, … 7 20, 7 40, 8 00, 8 20, 8 40, 9 00, .. (Answer =) 1 h 40	Not clear that the time is after 7 am	M1 M1dep A0

Q	Answer	Mark	Comments
21	7, 8, 9, 11, 11, 11 7, 7, 9, 11, 11, 11 7, 9, 9, 11, 11, 11	B3	B2 All three conditions met but not all whole numbers B2 two conditions met with six numbers (need not be integers) B1 one condition met with six numbers (need not be integers) Numbers do not have to be in order

<table>
<tr><td colspan="3" align="center">Additional Guidance</td></tr>
<tr><td colspan="3">Mark answer line unless blank, then look for an obvious set of 6 numbers.
Must be 6 numbers.</td></tr>
<tr><td>$7, 9, 9\frac{1}{2}, 10\frac{1}{2}, 11, 11$</td><td>Mode, range and median but not all whole numbers</td><td>B2</td></tr>
<tr><td>7 8 10 11 11 11</td><td>Mode and range</td><td>B2</td></tr>
<tr><td>7 8 9 10 11 11</td><td>Mode and range</td><td>B2</td></tr>
<tr><td>8 9 10 10 11 12</td><td>Median and range</td><td>B2</td></tr>
<tr><td>8 9 10 11 12 11</td><td>Mode and range (unordered ok)</td><td>B2</td></tr>
<tr><td>7.5, 8, 10, 11, 11, 11.5</td><td>Mode and range</td><td>B2</td></tr>
<tr><td>8 9 10 10 11 11</td><td>Median</td><td>B1</td></tr>
</table>

Q	Answer	Mark	Comments
22(a)	0.4 (relative frequency of carp) or 1 (bream)	B1	oe
	their roach frequency ÷ 10 (must be less than 1) or 1 − their carp relative frequency − 0.1 or 0.5	M1	oe
	Fully correct table ie | (4)	1	5
0.4	(0.1)	0.5		A1	oe accept equivalent fractions or percentages for relative frequencies throughout

Additional Guidance
If table fully correct award 3 marks. If not check for 0.4 **or** 1. Either scores B1. Then check last column/bottom row. If the roach relative frequency = roach frequency ÷ 10 **or** if the total of the relative frequencies is 1 then award M1.

Q	Answer	Mark	Comments
22(b)	Increase sample size Repeat it Check some more Catch more fish	B1	oe

Additional Guidance		
Count it again, catch more fish	Last bit scores	B1
Fish on more days	More implies increased sample	B1
Fish for longer	Longer implies increased sample	B1
Fish on different days	Different does not imply increased sample	B0
Do the estimate twice	Not implying increasing sample	B0
Catch them all	Not a sample	B0
Experiment at different times of day	Not implying increasing sample	B0