GCSE

Mathematics A

General Certificate of Secondary Education

Component **J512/02:** Paper 2

Mark Scheme for January 2012

Annotations used in the detailed Mark Scheme.

Annotation	Meaning
✓	Correct
✗	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
∧	Omission sign

These should be used whenever appropriate during your marking.

The **M**, **A, B** etc annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks.
It is vital that you annotate these scripts to show how the marks have been awarded.
It is not mandatory to use annotations for any other marking, though you may wish to use them in some circumstances.

Subject-Specific Marking Instructions

1   **M** marks are for <u>using a correct method</u> and are not lost for purely numerical errors.
     A marks are for an <u>accurate</u> answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
     B marks are <u>independent</u> of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.
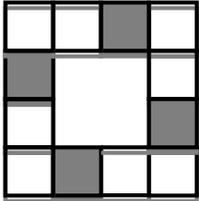   **SC** marks are for <u>special cases</u> that are worthy of some credit.

2   Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is <u>not from wrong working</u> **full marks** should be awarded.

     Do <u>not</u> award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen <u>and</u> the correct answer clearly follows from it.

3   Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

     Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT 180 × (*their* '37' + 16), or FT 300 – $\sqrt{(their\ '5^2 + 7^2)}$. Answers to part questions which are being followed through are indicated by eg FT 3 × *their* (a).

     For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4   Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.

5   The following abbreviations are commonly found in GCSE Mathematics mark schemes.

-     **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
-     **isw** means **ignore subsequent working** (after correct answer obtained).
-     **nfww** means **not from wrong working**.
-     **oe** means **or equivalent**.
-     **rot** means **rounded or truncated**.
-     **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
-     **soi** means **seen or implied**.

6   Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

7   As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).

8   When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

9   Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

10   If the correct answer is seen in the body of working

    i. and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

    ii. but the answer space is blank, allow full marks. Place the annotation ✓ next to the correct answer.

    iii. but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

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

12   For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

13   Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Question			Answer	Marks	Part Marks and Guidance	
1	(a)		$\dfrac{3}{7}$	1		
	(b)		(0).75	1		
	(c)		0.09, 0.28, 0.34, 0.5	2	**B1** for one error Or **SC1** if 9%, 28%, 34%, 50% oe	If error removed, remaining three should be in the correct order
	(d)		£19.60 (p)	2	Mark final answer **B1** for 19.6 or 1960 seen Or **SC1** for answer of 19.06	Accept 1960 p(ence) with units clearly shown
2	(a)		1063	1		
	(b)		443	2	**M1** for 2258 − 1815	
3	(a)		£10.51 (p)	3	**M2** for 15 × 53 + 32 × 8 or 795 + 256 or 1051 or 53 × 0.15 + 32 × 0.08 or 7.95 + 2.56 Or **M1** for 15 × 53 or 795 or 53 × 0.15 or 7.95 or 32 × 8 or 256 or 32 × 0.08 or 2.56	Accept 1051 p(ence) with units clearly shown
	(b)		£1.70 (p)	3	Mark final answer **M2** for 20 × 5 + 14 × 5 or 5 × 0.2[0] + 14 × 0.05 or 1.7 or 170 Or **M1** for *their*(19 – 5) × 5 or *their*(19 – 5) × 0.05 or figs 7	Accept 170 p(ence) with units clearly shown
4	(a)		5.3	1	± 0.2cm	Accept 53mm with units clearly shown 5.3 marked on the diagram not sufficient

Question			Answer	Marks	Part Marks and Guidance	
	(b)		107	1	± 2°	Accept on diagram
	(c)		Obtuse	1		One of the choices may be indicated
5	(a)	(i)	£3.53 (p)	2	**M1** for 72 × 1 + 53 × 2 + 35 × 5 or 72 × 0.01 + 53 × 0.02 + 35 × 0.05 or 72 + 106 + 175 or 0.72 + 1.06 + 1.75 or 353 seen	If clear intention to add by putting figures in a vertical column award **M1** Allow mixed units if the intention is clear
		(ii)	43	2	**M1** for 362 − (53 + 47 × 2) or 3.62 − (53 × 0.01 + 47 × 0.02) or sight of 215 or 2.15	Condone 43p
	(b)	(i)	$\dfrac{25}{87}$ or 0.29 or 0.287(…) or 29% or 28.7(…)%	1		Condone $\dfrac{25}{87}$ and unlikely on the answer line
		(ii)	29	2	Mark final answer **M1** for 87 ÷ 3	$\dfrac{29}{87}$ gets **M1** only
		(iii)	33	2FT	Mark final answer **M1** for 87 − (25 + *their* 29)	$\dfrac{33}{87}$ gets **M1** only No FT from non integer answer in b(ii) for 2 or M1

Question			Answer	Marks	Part Marks and Guidance	
6	(a)		132	2	Mark final answer **M1** for 3 × 34 or sight of 102	
	(b)		7.5 or 7½ or 7 h(ours) 30 m(inutes)	2	Mark final answer **M1** for 285 − 30 or sight of 255 or $\dfrac{15}{2}$, 7.5 or 7½ seen	Do not accept 7.3(0) hours 285 − 30 ÷ 34 is acceptable for **M1**
7	(a)		36.9[0]	2	**M1** for 147.6 ÷ 4 or 0.25 × 147.6 oe Or **SC1** for answer of 36.9%	If finding 10%, 10%, 5% etc percentages must be correct before addition is attempted
	(b)		21.6	2	**M1** for 50.4 ÷ 7 or 7.2 or 50.4 × 3 ÷ 7 or 50.4 × 0.42(8…) or 50.4 × 0.43	
	(c)		2.58[0]	2	**M1** for 0.04 × 64.5 oe or sight of 0.645 Or **SC1** for answer of 2.58%	
8	(a)		6.9	3	**M2** for 4.6 × 6 ÷ 4 oe Or **M1** for 4.6 × 6 or sight of 27.6 oe	
	(b)	(i)	3	1		
		(ii)		1		

Question			Answer	Marks	Part Marks and Guidance	
9	(a)	(i)	44	1		
		(ii)	46	2	**M1** for prices put in correct order (41, 44, 44, 48, 53, 56) seen Or **SC1** answer of 44, 48	**nfww**
		(iii)	15	1		
	(b)		1, 2, 3, 6, 6	2	**M1** for any 5 numbers with a median of 3 or 5 numbers with a mode of 6	
10	(a)	(i)	Student may not have one of the 5 choices given as their favourite meal or they might want to put more than one meal	1		Accept correct relevant alternatives in (a) See Exemplars Ignore other comments with a correct explanation
		(ii)	Put 'other' oe as one of the choices or tick one only	1		See Exemplars Ignore other comments with a correct explanation
	(b)		Spaghetti Bolognese 12 and Roast Beef 4 Correct tallying for 17 for Pizza	1 1		
	(c)		Bars for Spaghetti Bolognese and Roast Beef correct height Correct height for pizza	1 1	**FT** from *their* totals	Accept freehand Must be a block, not sticks Accept 17 ± 0.5 for pizza, ie, within the two lines on the overlay

Question			Answer	Marks	Part Marks and Guidance	
11	(a)	(i)	49	1		
		(ii)	19	1		
		(iii)	8	1		
	(b)	(i)	5 and 11 or 3 and 13	1		Accept 5 + 11 etc
		(ii)	2 and 23	1		
12	(a)		$y + 15$ oe	1		Accept L(l) = y + 15 Accept Y + 15 Do not accept n + 15, $y = y$ + 15 etc
	(b)		Less or fewer oe	1		
	(c)		3 (three)	1		Do not accept $3y$
	(d)		$5y - 7$	2	Mark final answer **M1** for $y + 3y + y - 7$ or $5y - 7$ or $y5 - 7$ seen Or **SC1** for $6y + 8$ or $5y + 8$ or $4y - 7$	Accept T(t) = $5y - 7$ for 2 marks Do not accept $y = 5y - 7$ etc
13			Second row = 4 × **11** Fourth row $8^2 - 6^2$ Fourth row = **4 × 7**	1 1 1	Following marks of 1,0,0 or 0,0,0 **SC1** for $6^2 - 4^2 = 4 × 5$ (complete) or $18^2 - 16^2 = 4 × 17$ etc	

Question			Answer			Marks	Part Marks and Guidance	
14	(a)		x　　　　　　　　　　　2　　　3 y　　　　　　　　　**4**　　**7**			1	For $y = 4$ and $y = 7$	
			x　　　0 y　　**−2**			1	For $y = -2$	
	(b)		Ruled straight line going through (0, −2) and (4, 10)			2	**M1** for plotting *their* 4 or more points correctly	Accuracy to half a square
	(c)		2.6			1	**FT** from *their* graph for $y = 5.8$ providing it is a ruled straight line from $x = 1$ to $x = 4$	Accuracy to half a square
15	(a)		136			1	Mark final answer	
	(b)		32			2	**M1** for (*their*(136) + 24) ÷ 5	**nfww** Accept *their*(136) + 24 ÷ 5 for **M1**
16			80			3	**M2** for 10 × 4 × 2 or (50 ÷ 5) × (60 ÷ 15) × (50 ÷ 25) or 150000 ÷ 1875 or 50 × 50 × 60 ÷ (5 × 15 × 25) Or **M1** for 50 ÷ 5 or 60 ÷ 15 or 50 ÷ 25 soi or 50 × 50 × 60 soi or 5 × 15 × 25 soi	Width is 10 cereal boxes implies 50 ÷ 5 (etc) Look for results on diagram

Question			Answer	Marks	Part Marks and Guidance	
17			Perimeter 32 Area 33	2 2	**M1** for 1 + 7 + 6 + 7 + 2 + 3 + 3 + 3 oe **M1** for (7 × 1) + (2 × 7) + (3 × 4) oe If answers 32 and 33 transposed allow also **SC1**	Allow shape split in different ways eg (7 × 6) – (3 × 3) It is possible to score **M2 SC1** or **M1 SC1** or **M0 SC1** For all marks ignore the words perimeter, area or units if written
18	(a)		Bearing for B, 320 ± 2° Distance for B, 9cm ± 2mm Bearing for D, 75 ± 2° Distance for D, 5cm ± 2mm	B1 B1 B1 B1	If lines for B and D drawn and not labelled assume longest is for B If no lines shown or points plotted explicitly for B and D, ie **B0** scored, then **SC1** for both letters B and D written in approximately the correct positions If **all** distances and bearings not from the dot L, but all from a single different place then treat as misread	Take care as lines may not be drawn; look for labelled points Condone B and D not labelled if points in correct place Approximately means part of each letter needs to be in the correct position
	(b)		12km ± 0.2km 118° ± 4°	B1 B1	FT *their* (a) ± 0.2km FT *their* (a) ± 4° FT provided both lines drawn or both points clearly marked.	If no diagram allow both 12km & 118° On FT condone bearing not given as 3 figures
19	(a)		H H H H H C C C C H H H H H	1		Ignore further working in this space as possibly for part (b)
	(b)		C 7 and H 16	2	**B1** for either correct If **B0** then **SC1** for 7 and 16 transposed	

Question			Answer	Marks	Part Marks and Guidance	
	(c)		C　　n oe eg $1 \times n$	1		Condone upper case N and C = n, Do not allow $+n$ or nC
			H　　$2n + 2$ oe eg $2(n + 1)$	2	**B1** for $2n$ oe eg $n2$ or $2 \times n$ or $n + n$ or $+2n$ Allow for $2n$ + a number If **B0** then **SC1** for $[n =]$ 2C + 2 or $[h] =$ 2C + 2	Allow unsimplified expression Condone H = $2n + 2$ for both marks Condone $2(n + 1$ for both marks Allow unsimplified equality for **SC1** Do NOT allow $n + $ C + 2
20			Rotation or rotate 90° [anticlockwise or to the left] or 270 clockwise or –270 (1, 0)	1 1 1	If more than one transformation award no marks throughout	90° to the right or clockwise scores 0 Condone brackets missing
21			4.81 or 4.808(…) **or 4.8 dep on M1**	3	Mark final answer **M2** for $\sqrt{3.4^2 + 3.4^2}$ or $\sqrt{23.12}$ or 4.80(…) seen or $\dfrac{3.4}{\sin45}$ or $\dfrac{3.4}{\cos45}$ Or **M1** for $3.4^2 + 3.4^2$ or sight of 23.12 Or $\sin45 = \dfrac{3.4}{x}$ or $\cos45 = \dfrac{3.4}{x}$ oe	

Exemplar responses for Question **10(a)(i)**

Acceptable Responses	Mark awarded
Students may have more than one favourite meal	**1**
They may not like any of the choices that they are given	**1**
They might like all of the food	**1**
There isn't enough variety	**1**
Their favourite might not be in the survey	**1**
There is no other choice (and the question is biased)	**1**
There isn't any way of stating which is favourite, also it doesn't state how many to choose	**1**
The question does not tell you that you must choose a meal from the list.	**1**
There is nowhere for them to answer	**1**
There are no instructions ie please tick one	**1**
They may be vegetarian	**1**
Needs another box that says none or other	**1**

Unacceptable Responses	Mark awarded
The choices are all meals from different nationalities	**0**
It is a direct question	**0**
They should have a tally chart to show how many students like each meal	**0**
The question is biased	**0**

Exemplar responses for Question **10(a)(ii)**

Acceptable Responses	Mark awarded
The survey needs an option which says other	**1**
Tick **one** box only	**1**
Which is your favourite meal out of the list below? Would be a better question	**1**

Unacceptable Responses	Mark awarded
By putting more options on the list	**0**
By letting them state what their favourite is without giving them an option	**0**
Don't give them a choice let them write down any kind of food	**0**
By asking what meal you would prefer	**0**
Add an answer box (where you can tally them)	**0**