AQA Qualifications

GCSE

Mathematics

Unit 2 43602F

Mark scheme

43602F
November 2014

Version/Stage: v1.1

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.

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.
Q	Marks awarded for Quality of Written Communication
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme 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.
3.14 …	Allow answers which begin 3.14 eg 3.14, 3.142, 3.149.
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.

Q	Answer	Mark	Comments
1(a)	5000 or five thousand or (5) thousand or five thousands or (5) thousands	B1	
1(b)	5300	B1	
1(c)	8543	B1	
1(d)	3485	B1	
2(a)	35	B1	any clear indication
2(b)	12	B1	any clear indication
2(c)	48	B1	any clear indication
3(a)	4 × 65 or 260 or 4 × 0.65 or 2.6(0)	M1	oe
	(£)2.60	Q1	Strand (i) must have correct units do not accept 2.60p or 260p or 2.6

3(a)	**Additional Guidance**
	(£)2.60p or 260p or 2.6 M1

3(b)	(£)2.40	B1ft	ft from their 2.60

3(b)	**Additional Guidance**
	Accept 240p with £ sign crossed out B1
	Accept 2.40p B1
	Do not allow 2.4
	Allow ft from £2 in part (a)

4(a)	$\frac{30}{100}$ or $\frac{3}{10}$	B1	oe any equivalent fraction eg $\frac{15}{50}$, $\frac{6}{20}$

4(a)	**Additional Guidance**
	Accept equivalent fractions such as $\frac{15}{50}$, $\frac{6}{20}$ etc
	Do not accept decimal answer such as 0.3, 0.30 etc.
	Note: $\frac{1}{3}$ in working with $\frac{3}{10}$ on answer line is B1

4(b)	0.8 or 0.80	B1	oe decimal

4(b)	**Additional Guidance**
	Accept 0.8, 0.80, 0.800, 0.8000 etc
	Do not accept fraction answer such as $\frac{80}{100}$, $\frac{8}{10}$ etc.

4(c)	$0.\dot{6}$ and $\frac{66}{99}$	B2	B1 one correct or one correct and one incorrect or two correct and one incorrect any clear indication

5	7 seen or 21 seen	M1	
	19	A1	

5	**Additional Guidance**
	Seven discs drawn in a bag is equivalent to 7 seen

6	2 × 16 + 4 or 32 + 4 or 36 or 16 + 20 or 2 × their 36 + 4 or 72 + 4 or their 36 + 40 or 76	M1	
	36 and 76	A1	

6	**Additional Guidance**	
	32 and 68 without working (from 2 x their 36 + 4)	M1 A0
	36 and 72	M1 A0

7	3 10p coins 2 20p coins 5 50p coins	B3	B2 any 10 coins totalling £3.20 eg 6 × 20p, 4 × 50p eg 4 × 5p, 6 × 50p or any combination of 50p, 20p and 10p coins totalling £3.20 eg 2 × 10p, 5 × 20p, 4 × 50p or 30p, 40p and £2.50 on answer lines without correct number of coins seen B1 any number of coins totalling £3.20 eg 2 × 5p, 1 × 10p, 6 × 50p eg 1 × 10p, 3 × 20p, 5 × 50p or 10 coins using any combination of 50p, 20p and 10p coins totalling £3.00 or £3.10 or £3.30 or £3.40 eg 2 × 10p, 3 × 20p, 5 × 50p

7	**Additional Guidance**					
	10 coins using combination of 10p, 20p and 50p coins totalling £3.00, £3.10, £3.30 or £3.40					
	1 10p 2 20p 5 50p	2 10p 3 20p 5 50p	4 10p 1 20p 5 50p	1 10p 5 20p 4 50p	2 10p 4 20p 4 50p	B1

8(a)	$6f + 3e$ or $3e + 6f$	B1	do not accept further working eg $6f + 3e = 9fe$

8(b)	36	B1	

8(b)	**Additional Guidance**
	Do not allow embedded answer to score any marks without correct answer 36 on answer

9(a)	300 ÷ 4 or 75 or 300 × 1.5 2 cakes = 300 ÷ 2 or 2 cakes = 150 or 12 cakes = 300 × 3 or 12 cakes = 900	M1	oe any correct scaling
	450	A1	

9(b)	**Alternative method 1**		
	(1.5 kg =) 1500 (g) or 300 g = 0.3 kg or 150 g = 0.15 kg	B1	seen or implied
	their 1500 ÷ their 75 or 6 (+) 6 (+) 6 (+) 2 or 5 × 4 or 4 (+) 4 (+) 4 (+) 4 (+) 4	M1	oe
	20	A1	SC2 14 cakes from 1050g
	Alternative method 2		
	(1.5 kg =) 1500 (g) or 300 g = 0.3 kg or 150 g = 0.15 kg	B1	seen or implied
	Build up method to total number of cakes from their 1500 with one error	M1	build up values if correct: 4 cakes = 300(g) 8 cakes = 600(g) 12 cakes = 900(g) 16 cakes = 1200(g)
	20	A1	SC2 14 cakes from 1050g

9(b)	**Additional Guidance**
	1500(g) 4 cakes = 300(g) 8 cakes = 600(g) 16 cakes = 900(g) (one error) 24 cakes = 1500(g) Answer 24 cakes is B1M1A0
	1000(g) uses incorrect total of flour (misread) 4 cakes = 300(g) 8 cakes = 600(g) 12 cakes = 900(g) Answer 12 cakes (one error – should be 13 cakes) is B0M1A0

10	5 × 24 or 120	M1	
	204 – their 120 or 84	M1dep	
	21	A1	

10	**Additional Guidance**
	(204 – 24) and 180 ÷ 4 = 45 is M0

11(a)	1000	B1	

11(b)	0.08	B1	oe

11(b)	**Additional Guidance**
	Accept use of comma eg 0,08
	Accept $\frac{2}{25}$ or $\frac{4}{50}$ or $\frac{8}{100}$ or $\frac{80}{1000}$ or $\frac{800}{10000}$ or 0.080 or 0.0800

12(a)	–4, 2, 8	B2	B1 for two correct

12(b)	Two of their points plotted correctly	M1	ignore incorrect points
	Fully correct straight ruled line from (–2, –4) to (2, 8)	A1	

12(b)	**Additional Guidance**
	Lines must be clearly drawn with a ruled line

12(c)	3	B1	

12(c)	**Additional Guidance**
	$\frac{3}{1}$ on answer line is B1

13	5 × 32 or 160	M1	
	their 160 – 140 or 20	M1dep	oe
	140 × 0.40 or 56 or 140 × 40 or 5600 or 48 + 13.80 or 61.80	M1	oe
	13.80 – (their 56 – 48) or 5.8(0) or 1380 – (their 5600 – 4800) or 580	M1dep	oe dependent on 3rd method mark
	29	A1	

13)	**Additional Guidance**
	Accept £0.29 with £ sign on answer line for B1

14(a)	$x(x + 1)$	B1	

14(a)	**Additional Guidance**
	Accept $(x + 1)\,x$ B1
	$x(x + 1$ condone missing final bracket B1

14(b)	**Alternative method 1**		
	$(-3)^2 + -3$ or 9 seen	M1	oe do not accept if 9 is the final answer
	6	A1	SC1 –12
	Alternative method 2		
	-3×-2	M1	use of factorisation from part (a)
	6	A1	SC1 –12

14(b)	**Additional Guidance**
	Do not accept 6 from 3 + 3 = 6 M0A0

14(c)	**Alternative method 1**		
	$n^2 + n$ is always even	B1	any clear indication
	odd × odd = odd or odd^2 = odd **and** odd + odd = even	Q1	Strand (ii) fully correct reason
	Alternative method 2		
	$n^2 + n$ is always even	B1	any clear indication
	(n is odd, so) $n + 1$ is even **and** odd × even = even	Q1	Strand (ii) fully correct reason use of factorisation from part (a)

14(c)	**Additional Guidance**
	Ignore further working unless a clear contradiction

15	70×40 or 2800	M1	(Nisha)
	their $2800 - \frac{5}{100} \times$ their 2800 or $2800 - 140$ or 2660	M1dep	oe (Nisha)
	$70 \div 5$ or $\frac{1}{5} \times 70$ or 14 or $\frac{4}{5} \times 70$ or 56	M1	oe (Dipen)
	their $14 \times 4 \times 40$ or 56×40 or 70×40 – their 14×40 or their 2800 – their 14×40 or 2240	M1dep	oe dependent on 3rd method mark (Dipen)
	2660 and 2240	A1	
	420 and No	Q1ft	Strand (iii) correct comparison for their values, with at least one correct value

15	**Additional Guidance**
	2800 – 140 implies minimum **first** and **second** Method marks
	2800 – 560 implies minimum **third** and **fourth** Method marks

16(a)	17 and 21	B1	

16(b)	$4n + 1$	B2	oe B1 $4n$ $(\pm k)$

16(b)	**Additional Guidance**
	$4 \times n + 1$ is B2
	$4 \times n$ $(+ k)$ is B1

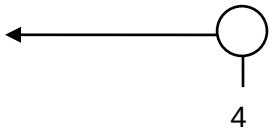
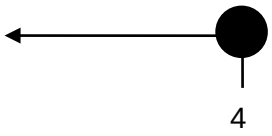
16(c)	**Alternative method 1**		
	$4n + 1 = 53$ or $4n = 52$	M1	
	13	A1	
	Alternative method 2		
	$(53 - 1) \div 4$	M1	oe eg 1+ 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 (= 53)
	13	A1	
	Alternative method 3		
	Counts up in 4s to within 4 of 53	M1	oe allow one error or omission
	13	A1	

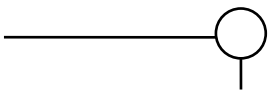
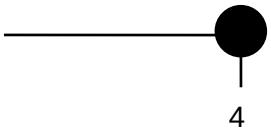
16(c)	**Additional Guidance**
	5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 45, 49 Answer 12 is M1A0
	5, 9, 13, 17, 25, 29, 33, 37, 41, 45, 49 Answer 12 is M1A0
	5, 9, 13, 17, 21, 24, 28, 32, 36, 40, 44, 48 Answer 12 is M1A0

17	$6x + 15 – 2x + 8$	M1	allow one error
	$6x + 15 – 2x + 8$	A1	fully correct
	$4x + 23$	A1ft	do not ignore fw SC2 $4x + 7$

17	**Additional Guidance**
	Do not allow fw eg. $4x + 23 = 27x$ score A0 for final accuracy mark
	Allow fw in trying to solve equation after $4x + 23$ seen to score A1 for final accuracy mark
	$6x + 15 – 2x – 8$ $4x + 7$ is M1 A0 A1ft
	$4x + 7$ alone on answer line is SC2
	Two independent expanded brackets (shown one underneath the other) $6x + 15$ $2x – 8$ with $4x + 23$ on answer line is M1 A1 A1
	Two independent expanded brackets shown remotely (same line) $6x + 15$ $2x – 8$ with $4x + 23$ on answer line is M1 A1 A1
	Two independent expanded brackets shown remotely without correct answer on answer lines scores zero marks $6x + 15$ $2x – 8$ with answer line blank is M0 A0 A0

18(a)	$5x \geq 29 + 11$ or $x - \frac{11}{5} \geq \frac{29}{5}$ or $x \geq \frac{40}{5}$	M1	oe
	$x \geq 8$	A1	SC1 8 SC1 $x \geq 3.6$ or $x \geq 3\frac{3}{5}$

18(b)	 	B2	B1 $x < 4$ or  condone missing arrow for B2 or B1

18(b)	**Additional Guidance**
	Intention must be clear to indicate $x < 4$ with minimum of a line drawn to the left of hollow circle positioned at 4.  Is B2
	 implies is B1