

GCSE

Mathematics

Unit 2 43602F

Mark scheme

43602F
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Version 1.0 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.
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 <i>a</i> and <i>b</i> inclusive.
3.14 ...	Accept 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)	(7, 5)	B1	
	Additional Guidance		
	(7x, 5y)	B0	
1(b)	(7, 1)	B1	
	Additional Guidance		
	(7x, 1y)	B0	
1(c)	(4, 3)	B1	
	Additional Guidance		
	(4x, 3y)	B0	
2(a)	42 and 56	B2	Either order B1 1 correct or 1 correct and 1 incorrect
	Additional Guidance		
	42 alone or 56 alone	B1	
	eg 42 and 49	B1	
	eg 35 and 49	B0	
eg 35, 42, 49, 56	B0		
2(b)	8	B1	

Q	Answer	Mark	Comments
3	50(p), 5(p), 5(p), 5(p) and 20(p), 20(p), 20(p), 5(p)	B3	Coins in any order Piles in either order B2 1 correct set of coins for their total ÷ 2 or 65(p) or (£)0.65 B1 130(p) or (£)1.30 or two piles with equal amounts using only 50p, 20p and 5p coins
	Additional Guidance		
	Beware of additional coins		
	$1 \times 50 + 3 \times 5$ and $3 \times 20 + 1 \times 5$		B3
	Correct answers listed in working, answer line 65p and 65p		B3
	Allow description in words eg This pile should have the 50p coin and three 5p coins and this pile should have the remaining 20p coins and 5p		B3
4(a)	$\frac{40}{100}$ or $\frac{20}{50}$ or $\frac{10}{25}$ or $\frac{8}{20}$ or $\frac{4}{10}$ or $\frac{2}{5}$	B1	oe fraction
	Additional Guidance		
	Ignore further working from a correct fraction eg $\frac{40}{100} = \frac{1}{4}$		B1
4(b)	0.7 or 0.70	B1	Accept .7 or .70
4(c)	25(%)	B1	
5(a)	23	B1	
5(b)	1.2	B1	Accept $\frac{12}{10}$ or $1\frac{2}{10}$ or $1\frac{1}{5}$
	Additional Guidance		
	Accept 1.20		B1

Q	Answer	Mark	Comments
6	($x =$) 7	B1	
	($y =$) 12	B1ft	ft 26 – 2 × their 7 or their 7 + 5
	($z =$) 15	B1ft	ft 34 – their 7 – their 12 or their 7 + 8
	Additional Guidance		
	Allow embedded answers with correct numbers written by letters in grid		B3
	Answer line 7 (+) 7 (+) 7 (= 21), 7 (+) 7 (+) 12 (= 26), 7 (+) 12 (+) 15 (= 34)		B3
	Ignore attempt to provide totals after $x = 7$, $y = 12$ and $z = 15$ seen in working with 42, 24, 15 on answer line		B3
7(a)	Will	B1	
7(b)	16	B1	Allow –16
7(c)	10	B1	Allow –10
8(a)	expression	B1	
8(b)	equation	B1	
9(a)	0.325, 0.37, 0.4	B1	oe
	Additional Guidance		
	Accept 0.325, 0.370, 0.400		B1
	Accept $\frac{325}{1000}$, $\frac{370}{1000}$, $\frac{400}{1000}$ or other equivalent fractions in correct order		B1
	Accept 32.5%, 37%, 40% in correct order		B1

Q	Answer	Mark	Comments
9(b)	$\frac{3}{5}$ and 60%	B2	B1 one correct or one correct and one incorrect or two correct and one incorrect
10	64 or $\sqrt{64}$ or 2 or 2^3	M1	
	8	A1	
	Additional Guidance		
	Do not accept answer 8^2 for final accuracy mark		
	$\sqrt{64} = 8 \times 8$ and answer 8^2		M1A0
	$4 \times 4 \times 4$		M0
	Beware of correct answer 8 from incorrect working $4 \times 4 \times 4 = 65$ and $\sqrt{65} = 8$		M0A0
	$2 \times 2 \times 2$		M1
11(a)	$6a$	B1	
	Additional Guidance		
	$6A$		B1
	$6 \times a$		B0
	$a6$		B0
11(b)	8.5 or $8\frac{1}{2}$ or $8\frac{5}{10}$ or $\frac{85}{10}$ or $\frac{17}{2}$	B1	oe
	Additional Guidance		
	Ignore further working from a correct fraction		
11(c)	20	B1	

Q	Answer	Mark	Comments
12	Alternative method 1		
	$12 \div 2$ or 6 or 12×5 or 60	M1	
	their $(12 \div 2) \times 5$ or their $(12 \times 5) \div 2$ or 30 or $6 + 6 + 3$	M1	oe 30 seen implies M2
	15	A1	
	Alternative method 2		
	40% (=12)	M1	
	$12 \div 4$ or 3 or 12×2.5 or 30	M1	30 seen implies M2
	15	A1	
	Additional Guidance		
	Accept 6 indicated on a diagram		

Q	Answer	Mark	Comments
13	49 or 0.49	B1	
	3.75 or 375	B1	
	(£)4.24 or 424p	B1ft	ft correct addition of their values with consistent units implied
	Additional Guidance		
	(£)4.24p		B3
	49 (+) 3.75 = 52.75		B1B1B0
	49 (+) 3.25 = 52.25		B1B0B0ft
	48 (+) 3.75 = 51.75		B0B1B0ft
	0.49 (+) 3.75 = 4.25		B1B1B0
	0.48 (+) 3.75 = 4.23		B0B1B1ft
	0.49 (+) 3.25 = 3.74		B1B0B1ft
	85 (+) 3.75 = 4.60		B0B1B1ft
	85 (+) 3.75 = 4.6		B0B1B0ft
	44 (+) 3.50 = 3.94		B0B0B1ft
14	$32 \div 2 - 4$ or 12	M1	
	their $12 \div 2 - 4$ or 2 or their $2 \div 2 - 4$	M1	
	-3	A1	SC2 -5.5 with no working
	Additional Guidance		
	12 2 -3 -5.5		M1M1A0
	12 2 -3 1.5 with 1.5 on answer line		M1M1A0
	Incorrect second or third term followed by correct method or evaluation eg $16 \div 2 - 4$ or $8 \div 2 - 4$ eg (32,) 16, 8, 0 or (32,) 16, 4,		M0M1A0 M0M1A0

Q	Answer	Mark	Comments
15	5×70 or 350 or 3×60 or 180 or $5 \times 0.7(0)$ or 3.5(0) or $3 \times 0.6(0)$ or 1.8(0)	M1	
	their (5×70) + their (3×60) or 530 or their $(5 \times 0.7(0))$ + their $(3 \times 0.6(0))$ or 5.3	M1dep	
	5.30	Q1	Strand (i) correct money notation Do not accept 5.3 or 5.30p SC2 5.10 or 6.50 or 3.90 SC1 510 or 650 or 390
	Additional Guidance		
	530p		M1M1Q0
	5.30p		M1M1Q0
	In second method mark "their (5×70) " means 5×70 or an evaluation of 5×70		
	$5 \times 70 + 3 \times 60$		M1M1Q0
	eg $420 + 180$ after $5 \times 70 (=) 420$ and $3 \times 60 (=) 180$		M1M1Q0
	$5 \times 70 + 4 \times 60$		M1M0Q0
$140 + 180$ after $3 \times 70 (=) 140$ and $3 \times 60 (=) 180$		M1M0Q0	
1.8(0) and 3.5(0) without working or indication of addition with answer 5.40		M1M0Q0	

Q	Answer	Mark	Comments
16	Alternative method 1		
	720 ÷ 20 or 7.2(0) ÷ 0.2(0) or 36	M1	oe
	their 36 ÷ 4 × 3 or 27	M1	oe eg $\frac{3}{4} \times 36$ correct method to find $\frac{3}{4}$ of their 36
	their 27 × 5 or 135 or their 27 × 0.05	M1dep	dep on 2 nd M1 oe
	1.35	A1	
	Alternative method 2		
	7.20 ÷ 4 × 3 or 5.4(0)	M1	oe eg $\frac{3}{4} \times 7.20$
	their 5.4(0) ÷ 20 or 27	M1	
	their 27 × 5 or 135 or their 27 × 0.05	M1dep	dep on 2 nd M1 oe
	1.35	A1	
	Additional Guidance		
	£135	M1M1M1A0	
	£ crossed out and 135p	M1M1M1A1	
	Do not allow further work to add on or subtract from their 27 for third method mark eg 36 ÷ 4 × 3 = 27 followed by 36 + 27 = 63 and 63 × 5	M1M1M0A0	
Allow rounding, truncation or exact decimal for their 27 in third method mark eg 720 ÷ 20 = 35, 35 ÷ 4 × 3 = 26.25, 26 × 5 (= 130)	M1M1M1A0		

Q	Answer	Mark	Comments
17	800 or 1600 or 200 or 60 or 120 or 100	M1	
	800 or 1600 and 200 and 60 or 120 or 100	M1	
	1920 or 1900 or 2000	A1	SC1 1900 without working or 1900 from 1899
18	$4 < n \leq 8$ or 9, 10, 11, 12, 13, 14, 15, 16 or 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8 or 4, 5, 6, 7, 8 or 5, 6, 7 or 10, 12, 14, 16	M1	Accept $4 < n$ and $n \leq 8$ List of numbers in any order
	5, 6, 7, 8	A1	Any order
	Additional Guidance		
	Embedded answer fully correct $2 \times 5 = 10, 2 \times 6 = 12, 2 \times 7 = 14, 2 \times 8 = 16$		M1A0
	Embedded answer fully correct 10, 12, 14, 16		M1A0
	4, 5, 6, 7		M0A0

Q	Answer	Mark	Comments
19	$x = 81$ and $y = 19$	B2	B1 100 – (a square number) correctly evaluated or 100 – (a prime number) correctly evaluated or A list of square numbers up to and including 81 with one error or omission and a list of prime numbers up to and including 19 with one error or omission or A correctly evaluated trial of a square number plus a prime number. eg $49 + 53 = 102$
	Additional Guidance		
	Condone $x = 19$ and $y = 81$	B2	
	$x = 9^2$ and $y = 19$	B2	
	$x = 9$ and $y = 19$ with $9^2 = 81$ or $9^2 + 19$ or $81 + 19$ in working	B2	
	$x = 9$ and $y = 19$ without working	B1	
	49 and 51 implies 100 – (a square number) correctly evaluated	B1	
	91 and 9 implies 100 – (a square number) correctly evaluated	B1	

Q	Answer	Mark	Comments
20	Alternative method 1		
	150 ÷ 3 or 50	M1	oe
	their 50 × 4 or 150 + their 50 or 200	M1dep	oe
	150 ÷ 100 × 20 or 30 or their 50 ÷ 100 × 20 or 10 or their 200 ÷ 100 × 20 or 40 or 1.2 × 200 or 1.2 × 150 or 180 or 1.2 × 50 or 60	M1	oe
	240	A1	
	Alternative method 2		
	150 ÷ 100 × 20 or 30 or 150 + 30 or 180 or 1.2 × 150	M1	oe
	their 180 ÷ 3 or 60 or 150 ÷ 3 + their 30 ÷ 3 or 50 + 10	M1	oe
	their 60 × 4 or 150 + their 50 + their 30 + their 10	M1dep	oe dep on 2 nd M1
	240	A1	
	Additional Guidance		
	150 ÷ 4 = 37.50, 37.50 ÷ 100 × 20 = 7.50		

Q	Answer	Mark	Comments	
21(a)	2 (×) 100 or 5 (×) 40	M1	oe conditional on one prime factor in a correct product equal to 200 or one prime factor shown in a correct section on a factor tree starting from 200 Any order allow on prime factor tree or repeated division using 2 or 5 correctly condone 100 (×) 2 (×) 1 etc for this mark	
	2 (×) 2 (×) 2 (×) 5 (×) 5	A1	Any order allow on prime factor tree or repeated division	
	$2^3 \times 5^2$	Q1ft	Strand (i) correct index notation Any order ft correct product of prime numbers in index form from their working	
	Additional Guidance			
	$2^3 + 5^2$			M1A1Q0
	(200 =) 2 (×) 2 (×) 5 (×) 5 and $2^2 \times 5^2$ is minimum Q1ft			
	$200 \div 2 = 100$			M1
	2 (×) 10 (×) 10 as a product or shown on a correct section of factor tree			M1
	20 (×) 5 (×) 2 as a product or shown on a correct section of factor tree			M1
20 (×) 5 (×) 4 as a product or shown on a correct section of factor tree			M0	
21(b)	4 and 60 and 12 and 20	B2	B1 one correct or one correct and one incorrect or two correct and one incorrect Any indication	

Q	Answer	Mark	Comments
22	Alternative method 1		
	60×40 or 2400	M1	oe
	their 2400 – 2000 or 400 or 2000 – their 2400	M1dep	
	$\frac{\text{their } 400}{2000} (\times 100)$ or 0.2	M1dep	oe
	20(%)	A1	
	Alternative method 2		
	60×40 or 2400	M1	oe
	their 2400 – 2000 or 400 or 2000 – their 2400	M1dep	
	10% = $2000 \div 10$ or 1% = $2000 \div 100$ and correctly finds multiplier using build up or division to find percentage equivalent to total their 400	M1	oe Correct build up to find percentage equivalent to total their (their 2400 – 2000) or their (2000 – their 2400) implies M3
	20(%)	A1	

22 (cont)	Alternative method 3		
	60×40 or 2400	M1	
	$\frac{\text{their } 2400}{2000} (\times 100)$ or 120(%) or 1.2	M1dep	
	their 120 – 100 or their 1.2(0) – 1(.00) or 100 – their 120 or 1(.00) – their 1.2(0) or 0.2	M1dep	oe
	20(%)	A1	
	Additional Guidance		
	20% on answer line and no working		M1M1M1A1
	$480 \times 5 (= 2400)$ from 5 years scores minimum M1		
	$60 \times 40 = 1800$ and 200 scores minimum M1M1		
	$60 \times 40 = 1800$ and 200 and $\frac{200}{2000}$		M1M1M1A0
$60 \times 40 = 1800$ and $\frac{200}{2000}$		M1M1M1A0	
$\frac{2000}{\text{their } 2400} (= 1.2)$ does not score second method mark on ALT3			