

GCSE

MATHEMATICS

Unit 2 43602F

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.

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.
- M dep** A method mark dependent on a previous method mark being awarded.
- 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.
- B dep** A mark that can only be awarded if a previous independent mark has been awarded.
- ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- 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.

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)	1600 ÷ 300 or 5.(...) or 300 × 5 or 1500 or 300, 600, 900, 1200, 1500 or 1600, 1300, 1000, 700, 400, 100	M1	oe oe mixed number oe allow one error in adding or subtracting 300
	5	A1	
1(b)	100	B1ft	ft only for answer in part (a) not 5 and correct evaluation of 1600 – their 1500 from part (a) if $1300 < \text{their } 1500 \leq 1600$
2(a)	30 016	B1	condone 30,016 or 30'016
2(b)	zero point four three or nought point four three or point four three or forty three hundredths	B1	
2(c)	(nine) hundred(s) or 900 or 100(s)	B1	

Q	Answer	Mark	Comments
3	3×80 or 240 or $3 \times 0.8(0)$ or $2.4(0)$	M1	oe
	10×50 or 500 or $10 \times 0.5(0)$ or $5(.00)$	M1	oe
	7.40	Q1ft	Strand (i) correct money notation ft only if M1M0 or M0M1 awarded and a correct total of two amounts given in money notation as a multiple of 10p
4(a)	120, 150 and 180 with none incorrect	B2	any order B1 Two correct multiples in range with at most one incorrect or all three correct with any other multiples of 30 or another group of exactly three multiples of 30
4(b)	8	B1	
5(a)	35 and 65	B1	
5(b)	34 and 76	B1	
5(c)	76	B1	
5(d)	21	B1	

Q	Answer	Mark	Comments
6(a)	$8 \times 5 - 2 \times 4^2 (=) 8$	B2	B1 $8 \times 5 - 2 \times 4^2$ or 8
6(b)	19	B1	
6(c)	$2n^2 + 2n - 2n^2$ or $2n(n + 1 - n)$	B1	

Q	Answer	Mark	Comments
7	Alternative method 1		
	25 × 4 or 100 or 25 × 12 or 300	M1	oe
	their 100 × 12 or their 300 × 4 or 1200	M1	oe
	2600 ÷ 2 or 1300	M1	oe
	1200 and 1300	A1	
	No and 1200 and 1300	Q1ft	Strand (iii) at least M2 scored and correct decision for their values
	Alternative method 2		
	2600 ÷ 2 or 1300 or 2600 ÷ 4 or 650	M1	oe
	their 1300 ÷ 4 or their 650 ÷ 2 or 325	M1	oe
	25 × 12 or 300	M1	oe
	300 and 325	A1	
	No and 300 and 325	Q1ft	Strand (iii) at least M2 scored and correct decision for their values
	Alternative method 3 and 4 (next page)		

Q	Answer	Mark	Comments
Q7 continued	Alternative method 3		
	2600 ÷ 2 or 1300 or 2600 ÷ 4 or 650	M1	oe
	their 1300 ÷ 4 or their 650 ÷ 2 or 325	M1	oe
	their 325 ÷ 12	M1	oe
	27.(...)	A1	
	No and 27.(...)	Q1ft	Strand (iii) at least M2 scored and correct decision for their 27.(...)
	Alternative method 4		
	2 × 25 or 50 or 4 × 25 or 100	M1	oe
	their 50 × 4 or their 100 × 2 or 200	M1	oe
	their 200 × 12 or 8 × 25 × 12	M1	oe
	2400	A1	
	No and 2400	Q1ft	Strand (iii) at least M2 scored and correct decision for their 2400

Q	Answer	Mark	Comments
8	Correct order and all four correct values seen in same format 3, 3.15, 3.25, 3.5(0) or $3, 3\frac{15}{100}, 3\frac{25}{100}, 3\frac{50}{100}$ or $3, 3\frac{3}{20}, 3\frac{1}{4}, 3\frac{1}{2}$ or 300(%), 315(%), 325(%), 350(%) or $\sqrt{9}, 3.15, \frac{13}{4}, 3\frac{1}{2}$ after values seen in same format	B3	oe B2 all four correct values in same format or three correct values in same format and correct order for their values B1 three correct values in same format SC1 $\sqrt{9}, 3.15, \frac{13}{4}, 3\frac{1}{2}$ with no working
9(a)	90	B1	
9(b)	240	B1	

Q	Answer	Mark	Comments
9(c)	Alternative method 1		
	410	B1	
	150 + 6 × 50 or 450	M1	oe 450 – 410 is B1M1
	A and 40	A1ft	ft their 410 (value indicated for law firm A) A and 40 is B1M1A1
	Alternative method 2		
	410	B1	
	Line from (90, 150) to (270, 450)	M1	
	A and 40	A1ft	ft their 410 (value indicated for law firm A) A and 40 is B1M1A1
10	3 × coin value or 3(p) or 6(p) or 15(p) or 30(p) or 60(p) or 150(p) or (£)1.50	M1	coin value = 1p, 2p, 5p, 10p, 20p, 50p
	(£) 2.(00) – their 3 × coin value or 197(p) or 194(p) or 185(p) or 170(p) or 140(p) or 50(p)	M1	oe in pounds
	their (200 – their 3 × coin value) ÷ 4	M1 dep	dependent on second M1
	35 or 49.25 or 48.5 or 46.25 or 42.5 or 12.5	A1	ignore truncation or rounding after correct value seen SC1 any correct trial: chooses cost of one orange and works out change for four oranges
11	$\frac{1}{2} \times \frac{1}{3}$	M1	oe
	$\frac{1}{6}$	A1	oe

Q	Answer	Mark	Comments
12	Alternative method 1		
	$(8x =) 30 + 10$ or $(8x =) 40$	M1	
	5	A1	SC1 2.5 or $\frac{20}{8}$ oe
	Alternative method 2		
	$x - \frac{10}{8} = \frac{30}{8}$ or $x = \frac{30}{8} + \frac{10}{8}$ or their $(30 + 10) \div 8$	M1	
5	A1	SC1 2.5 or $\frac{20}{8}$ oe	
13	=	B1	
	>	B1	
	>	B1	
14(a)	$x = 2$	B1	
14(b)	Correct straight line drawn	B1	at least 3 diagonal squares long
14(c)	2, 2	B1ft	ft their intersection with line A only if B0 in part (b)

Q	Answer	Mark	Comments
15	Alternative method 1		
	2476 \div (3 + 1) or 619	M1	oe
	their 619 \times (3 – 1) or their 619 \times 2 or 2476 \div (3 – 1) or 2476 \div 2 or their 619 \times 3 – their 619 or (2476 – their 619) – their 619 or 1857 – 619	M1	oe
	1238	A1	
	Alternative method 2		
	(3 + 1) \div (3 – 1) or 4 \div 2 or (3 – 1) \div (3 + 1) or 2 \div 4	M1	oe
	2476 \div their 2 or 2476 \times their $\frac{1}{2}$	M1	oe
	1238	A1	

Q	Answer	Mark	Comments
16	$\frac{170}{100} \times 20$ or $\frac{170}{10} \times 2$ or 17×2 or 34 or $\frac{170}{100} \times 80$ or $\frac{170}{10} \times 8$	M1	oe (Tablet World)
	136	A1	
	$180 \div 4$ or 45 or $180 \times \frac{3}{4}$	M1	oe (IT Supplies)
	135	A1	
	138	B1	(PC Heaven)
	IT Supplies	Q1ft	Strand (iii) ft for correct decision based on their values, must have both method marks and a total for PC Heaven
17(a)	$a - 6b$ or $-6b + a$	B2	B1 (1)a or $-6b$
17(b)	$m(m - 2)$ or $m \times (m - 2)$ or $(m - 2)m$ or $(m - 2) \times m$	B1	
17(c)	$5x^2 - 15x$ or $-15x + 5x^2$	B2	B1 $5x^2$ or $-15x$

Q	Answer	Mark	Comments
18	23, 25 and 29	B2	any order B1 three correct and one incorrect or two correct and none or one incorrect SC1 any three or all four of 21, 22, 26 and 27 with no other number
19	A correct pair of fractions meeting all conditions eg $\frac{1}{9}$ and $\frac{2}{9}$ or $\frac{1}{12}$ and $\frac{1}{4}$	B3	B2 a pair of fractions which add to $\frac{1}{3}$ but which do not satisfy all conditions eg, $\frac{1}{6}$ and $\frac{1}{6}$ or $\frac{2}{3}$ and $-\frac{1}{3}$ or $\frac{1}{3}$ – any fraction less than $\frac{1}{3}$ correctly changed to common denominator with at least one numerator correct B1 $\frac{1}{3}$ changed to any equivalent fraction $\frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \dots$ or $\frac{1}{3}$ – any fraction less than $\frac{1}{3}$