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General Certificate of Secondary Education
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Mathematics 43603F

Unit 3 Foundation tier

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner 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 examiners 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 examiner understands and applies it in the same correct way. As preparation for standardisation each examiner 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, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

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.

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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.

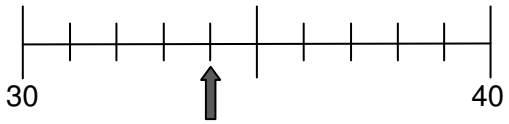
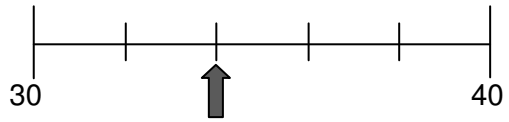
Work replaced

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.

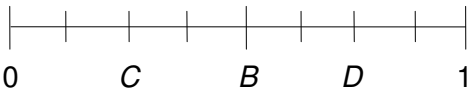
Unit 3 Foundation Tier

Q	Answer	Mark	Comments
1a	(2, 3)	B1	
1b	Point plotted 8 across and 3 up	B1	Mark intent Label *B* can be missing SC1 For reversed coordinates (3, 2) in (a) **and** point plotted 3 across and 8 up
2	34 identified  	B1	[33.5, 34.5] Mark intention, e.g. label 34 or circle at 34 ½ space either side
	34 identified  	B1	[33.5, 34.5] Mark intention, e.g. label 34 or circle at 34 ¼ space either side
3	Attempt to count squares or any area calculation e.g. 4×7	M1	Evidence of counting areas e.g. dots or numbers in shaded squares
	[22, 27]	A2	A1 for [19, 22) or (27, 30]
4a	Parallelogram	B1	Accept Quadrilateral
4b	Cuboid	B1	Accept Rectangular prism
	Cylinder	B1	Accept Circular prism Do not accept Tube

Q	Answer		Mark	Comments	
5	80 + 45 + 70	0.8 + 0.45 + 0.7	M1	200 – (80 + 45 + 70)	2 – (0.8 + 0.45 + 0.7)
	195	1.95	A1	5	0.05
	Yes and 195 (< 200)	Yes and 1.95 (< 2)	Q1 ft	Yes and 5 (left over) or Yes and 0.05 Strand (iii) M1 awarded and correct decision for their total SC1 for any correct conversion eg 2 metres = 200 cm or 80 cm = 0.8 metres or 45 cm = 0.45 metres or 70 cm = 0.7 metres	

Q	Answer	Mark	Comments
6a	5.99 ÷ 8 or 599 ÷ 8	M1	Condone 6 ÷ 8 or 600 ÷ 8
	74.875 (p) or 74 (p) or 75 (p)	A1	Accept £0.74 or £0.75 or £0.74875 Allow any correct rounding or truncation giving an answer to 2 or more s.f.
6b	3.99 ÷ 6 or 399 ÷ 6 or $\frac{6}{8}$ × 5.99 or 6 × their 75 or 6 × their 0.75	M1	oe Scaling method used with £6 eg 8 cost £6, 4 cost £3, 2 cost £1.50 6 cost £4.50 £3.99 + their £1.50 £5.99 – their £1.50
	(£) 0.665 or 66(.5) (p) or 67 (p) or 4.4925 or 450p or £4.50 and better value (Yes)	A1ft	6 pack is better value 7p, 8p or 9p cheaper per battery £5.49 or £4.49 Comparison must be with consistent units ft their (a)
Alt 6b	8 ÷ 5.99 or 8 ÷ 599 and 6 ÷ 3.99 or 6 ÷ 399	M1	May be seen in (a) 6 costs £2 less (so extras are £1 each) Compares cost of 24 batteries £5.99 × 3 and £3.99 × 4
	1.3(3) and 1.5(0) and 6 batteries better value (Yes)	A1ft	£1 compared with 75p £17.97 and £15.96 and 6 batteries better value

7a	South	B1	Accept S
7b	Plymouth	B1	
7c	Alderney	B1	

Q	Answer	Mark	Comments
8a	Yes Yes No Yes	B4	B1 For each correct answer
8b	90 and 60 in either order	B3	Accept [90, 95] or [60, 65] B2 For one correct B1 Any size that will take all 4 parcels (i.e. > 95 and > 65)
9a	$B \rightarrow \frac{1}{2}$	B1	Mark intention e.g. 
	$C \rightarrow \frac{1}{4}$	B1	
	$D \rightarrow \frac{3}{4}$	B1	
9b	$\frac{9}{12}$	M1	Oe
	$\frac{3}{4}$	A1	SC1 for incorrect fraction fully simplified SC1 for $\frac{1}{4}$
10	(2, 1)	B2	Working may be on diagram B1 for $x < 6$ and $y = 1$ B1 for $x = 2$ or B1 for stating that horizontal distance from *A* to *C* is 4 units or B1 for stating that horizontal distance from *B* to *C* is 8 units

Q	Answer	Mark	Comments
11	$9 + 5$ or $2 \times 9 - 4$	M1	$2x - 4 = x + 5$
	14	A1	$2x - 4 = x + 5$ and $x = 9$
	Both 14 and all sides equal Must state both sides are 14 if starting with $x = 9$	Q1	Strand (iii) Must state both sides are 14 if starting with algebra to get to $x = 9$
	Stating that angles are 90° or right angles or equal	Q1	Strand (ii)
12	7.6×2.4	M1	
	18.24 or 18.2	A1	
	18	B1 ft	ft their area provided at least 1 d.p. shown
	$30 + 10 \times$ their 18	M1	Oe
	210	A1 ft	ft their area 212.40 or 212 implies M1A1B0M1A1ft 212.4 implies M1A1B0M1A0
13a	$70 + 120 + 40$ or 230	M1	
	$360 - (70 + 120 + 40)$ or $360 -$ their 230	M1dep	Oe
	130	A1	
13b	*BAC* = 25	M1	oe May be on diagram in correct place
	$180 - 115$ or 65 seen	M1	May be on diagram in correct place
	90 seen	A1	Could be a right angle symbol on diagram at *B* or in working, and must have gained at least M1
	Right-angled (triangle) or Scalene	A1ft	Need to see the interior angles of the triangle and must have gained at least M1
14	Fully correct enlargement by scale factor 2	B2	B1 for enlargement with incorrect scale factor or B1 for two sides correct

Q	Answer	Mark	Comments
15	2.2 pounds = 1000 grams seen or implied	M1	May be implied from working 1 ÷ 2.2 (= 0.45 kg) (= 1 pound)
	(1 pound =) 1000 ÷ 2.2 (= 454 … grams) or 1 ÷ 2.2 × 1000 [454, 455] or 450	M1	(1 gram =) 2.2 ÷ 1000 (= 0.0022 pound) 1 ÷ 2.2 × 0.5 (= 0.227 … grams) [0.227, 0.2275] or 0.225 or 0.230
	($\frac{1}{2}$ pound =) 1000 ÷ 2.2 ÷ 2 (= 227.2 … grams) [227, 227.5] or 225 or 230	M1	100 grams = 2.2 ÷ 1000 × 100 (= 0.22 pounds) or 200 grams = 2.2 ÷ 1000 × 200 (= 0.44 pounds) or 250 grams = 2.2 ÷ 1000 × 250 (= 0.55 pounds) or 500 grams = 2.2 ÷ 1000 × 500 (= 1.1 pounds)
	[227, 227.5] or 225 or 230 and 250 g stated	A1	0.55 (pounds) and 250 g stated 0.44 (pounds) and 250 g stated SC3 for e.g. 0.227 and 250 g stated
Alt 15	2 pounds = 1000 grams seen or implied	M1	May be implied from working 1 ÷ 2 (= 0.5 kg) (= 1 pound)
	(1 pound =) 1000 ÷ 2 (= 500 grams) or 1 ÷ 2 × 1000 (= 500 grams)	M1	(1 gram =) 2 ÷ 1000 (= 0.002 pound) 1 ÷ 2 × 0.5 (= 0.25 grams)
	($\frac{1}{2}$ pound =) 1000 ÷ 2 ÷ 2 (= 250 grams)	M1	100 grams = 2 ÷ 1000 × 100 (= 0.2 pounds) or 200 grams = 2 ÷ 1000 × 200 (= 0.4 pounds) or 250 grams = 2 ÷ 1000 × 250 (= 0.5 pounds) or 500 grams = 2 ÷ 1000 × 500 (= 1 pound)
	250 g stated	A1	SC3 for e.g. 0.25 and 250 g stated

Q	Answer	Mark	Comments
16a	Correct reflection (1, –3), (1, –5), (5, –3)	B2	B1 for triangle reflected in line $x = -1$ B1 for triangle reflected in line $y = c$ B1 for correct points without the triangle drawn
16b	Rotation	B1	
	90(°) clockwise	B1	oe 270(°) anticlockwise Accept $\frac{1}{4}$ turn clockwise
	Origin, *O* or (0, 0)	B1	Oe
17	$\pi \times 3.5 \times 3.5$ or $3.14\ldots \times 3.5 \times 3.5$ or $\pi \times 3.5^2$ or $3.14\ldots \times 3.5^2$	M1	Oe
	38.4(8…) or 38.4(6...)	A1	$\frac{49}{4}\pi$ or 12.25π or 12.3π
	38.5	B1 ft	ft their answer of 2 d.p. or more
18	$x + 2x + 90 + 138$ or states angles in quadrilateral = 360	M1	oe Attempts to subtract from 360
	$x + 2x + 90 + 138 = 360$ or 360 – 90 – 138 or 132 seen	M1dep	Oe
	$x + 2x = 360 - 90 - 138$ or $3x$ = their 132 or their 132 ÷ 3	M1dep	Oe
	44	A1	

Q	Answer	Mark	Comments
19a	2 or 2.0	B1	
19b	Circular arc drawn centre post	M1	
	Fully correct arc radius 5 cm	A1	± 2 mm tolerance
19c	2 cm = 1 metre or 1 cm = 0.5 metre	M1	Any equivalent scale Condone 1 square = 0.5 metre
	1 cm = 50 cm or 2 cm = 100 cm or 2 : 100	M1	Any order Common units
	1 : 50	A1	50 : 1 implies M1M1A0
20a	–2, –3, –2	B2	B1 for 1 or 2 correct
20b	their 5 points plotted	M1	Allow one error $\pm \frac{1}{2}$ square
	Fully correct with a smooth curve	A1	$\pm \frac{1}{2}$ square
20c	Correct reading at $y = 0.5$	B1 ft	ft their curve $\pm \frac{1}{2}$ square
	Second correct reading at $y = 0.5$	B1ft	ft their curve $\pm \frac{1}{2}$ square Award SC1 for [1.8, 1.9] and [–1.9, –1.8] only if graph is missing.