AQA Qualifications

GCSE

Mathematics

43603F Unit 3: Foundation

Mark scheme

4360
November 2016

Version/Stage: 1.0 Final

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.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded 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. e.g. accept 0.5 as well as $\frac{1}{2}$
[*a*, *b*]	Accept values between *a* and *b* inclusive.
[a, b)	Accept values a ≤ value < b
3.14 …	Accept answers which begin 3.14 e.g. 3.14, 3.142, 3.1416
Q	Marks awarded for quality of written communication
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.

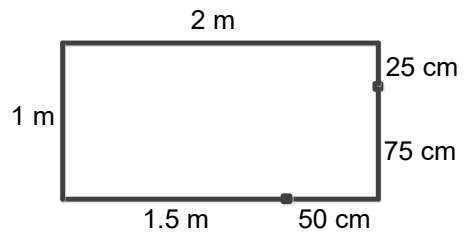
Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the candidate intended it to be a decimal point.

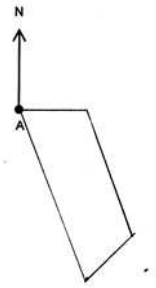
Q	Answer	Mark	Comments
1(a)	C	B1	
1(b)	E	B1	
1(c)	A	B1	
2(a)	Rhombus	B1	
2(b)	Trapezium	B1	
2(c)	Kite and Rhombus	B2	B1 for 2 correct and 1 incorrect or 1 correct and 1 incorrect or 1 correct
3	26	B1	
	their 26 × 13.6(0) or 353.6	M1	
	353.60	Q1ft	ft their answer Strand (i) Correct money notation.
	Additional Guidance		
	£353.60p		B1M1Q0
	26 m^2 × 13.6(0) = 9193.6(0)		B1M1Q0
	26^2 × 13.6(0)		B1M0Q0
4(a)	[4.4, 4.6]	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
4(b)	(2, 4)	B1	
	Additional Guidance		
4(c)	(5, 0) (5, 4)	B2	B1 for 2 correct and 1 incorrect or 1 correct and 1 incorrect or 1 correct
4(d)	(5, 2) (7, 4)	B2	B1 for 2 correct and 1 incorrect or 1 correct and 1 incorrect or 1 correct
5(a)	170	B1	
	Additional Guidance		
5(b)	1.8	B1	oe
	Additional Guidance		
6(a)	[33, 37]	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
6(b)	Reflex	B1	
7	Arc of radius 7 cm centre *A* or Arc of radius 9 cm centre *C*	M1	
	Fully correct construction with arcs shown	A1	SC1 Fully correct within tolerance, no arcs
	Additional Guidance		
	Fully correct construction with arcs shown but *AB* = 9 cm and *BC* = 7 cm		M1A0
8	**Alternative method 1**		
	1.12 ÷ 4 or 0.28 and 1.75 ÷ 6 or 0.29(…)	M1	oe 4 ÷ 1.12 or 3.5(…) and 6 ÷ 1.75 or 3.4
	0.28 and 0.29(…) and 4 pack	A1	3.5(…) and 3.4 and 4 packs
	Alternative method 2		
	$1.12 \times \frac{6}{4}$ or 1.68	M1	$1.75 \times \frac{4}{6}$ or 1.16(…) or 1.17
	1.68 and 4 pack	A1	1.16(…) or 1.17 and 4 pack
	Alternative method 3		
	1.12 × 3 or 3.36 and 1.75 × 2 or 3.5(0)	M1	oe
	3.36 and 3.5(0) and 4 pack	A1	
	Additional Guidance		
	First box or smaller box or 1.12 or 4 all imply the 4 pack		
	Ignore units		

Q	Answer	Mark	Comments
9		B2	Rectangle does not need to be drawn if intention is clear oe B1 for two equal lengths, eg 1.5 m and 1 m + 50 cm or stating sides could be 200 × 100 or 2 × 1
	Additional Guidance		
	Measurements need not reflect length of sticks in their drawing. 		B1
10	**Alternative method 1**		
	0.3 or 0.6 seen	M1	270 or 240 seen
	2.7 ÷ 0.3 or 9 or 2.4 ÷ 0.6 or 4	M1dep	270 ÷ 30 or 9 or 240 ÷ 60 or 4
	36	A1	Accept 33
	Alternative method 2		
	2.7 × 2.4 or 6.48 or 0.3 × 0.6 or 0.18	M1	270 × 240 or 64800 or 30 × 60 or 1800
	their 6.48 ÷ their 0.18	M1 dep	their 64800 ÷ their 1800 Units do not need to be consistent
	36	A1	Accept 33
	Additional Guidance		
	9 × 4 = 36		M1M1A1

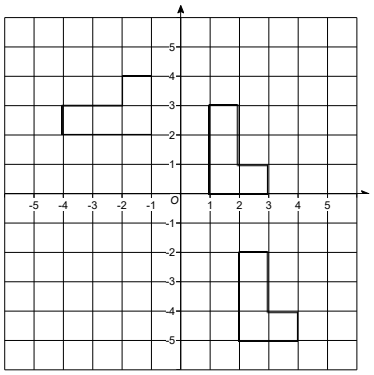
Q	Answer	Mark	Comments
11(a)	90 + 90 + 130 or 310 or 360 – 310 or 180 – 130	M1	oe x + 130 + 90 + 90 = 360
	50	A1	
	Additional Guidance		
11(b)	43 + 80 + 135 or 258	M1	
	360 – (43 + 80 + 135) or 102 or 360 – their 258	M1dep	oe
	78	A1	
	Additional Guidance		
	102 seen on diagram or in working		M1M1
12	$2x$ + 15 + 35 + 90 = 180 or $2x$ + 140 = 180	M1	oe 180 – 90 – 35 – 15 = 40
	$2x$ = 180 – 90 – 35 – 15 or $2x$ = 40	M1dep	their 40 ÷ 2
	20	A1	
	Additional Guidance		
	x = 20 seen with 55 on answer line is further working		M1M1A1
	2 × 20 + 15 = 55 on answer line is an embedded answer		M1M1A0
13(a)	Fully correct net	B2	B1 for 4 or 5 or 7 correct faces including the given face in the correct positions
	Additional Guidance		
	Outline of correct net (without internal lines)		B2

Q	Answer	Mark	Comments
13(b)	20 and 12 and 8	B1	Any order
	Additional Guidance		
13(c)	1920	B1ft	ft their (b)
	Additional Guidance		
14(a)	Fully correct drawing with all lines within tolerance	B4	 B3 for any two correct lines from A to B, their B to their C or their C to their D B2 for any one correct line from A to B, their B to their C or their C to their D B1 for any one correct distance or direction for their points
	Additional Guidance		
	All lines starting at A is a maximum of B2		
	Allow missing line from D back to A		
14(b)	[2.7, 2.9] miles	B1ft	ft their drawing
	Additional Guidance		
	If all lines start at A do not allow ft		
	Correct answer seen followed by rounding eg 2.8 → 3		B1

Q	Answer	Mark	Comments
15(a)	$P = 2(l + w)$	B1	
15(b)	$A = d^2$	B1	
15(c)	$S = 2(xy + xz + yz)$	B1	
15(d)	150 ÷ 6 or 25	M1	
	$\sqrt{\text{their } 25}$ or 5	M1dep	
	their 5^3	M1dep	oe
	125	A1	
	Additional Guidance		

Q	Answer	Mark	Comments
16	19.9(0) × 1.5 ÷ 2 or 14.92(5) or 14.93 or 19.9(0) × 1.5 or 29.85	M1	
	$\frac{15}{100}$ × 18 or 2.7(0) or $\frac{15}{100}$ × 18 × 2 or 5.4(0)	M1	0.85 seen
	18 – their 2.7(0) or 0.85 × 18 or 15.3(0) or 36 – their 5.4(0) or 0.85 × 18 × 2 or 30.6(0)	M1dep	dependent on 2nd M1 oe or 0.85 × 36
	15.3(0) and 14.93 or 30.6(0) and 29.85	A1	
	A and 14.92(5) or 14.93 and 15.3(0) or A and 29.85 and 30.6(0)	Q1ft	Strand (iii) Correct comparison made for the same number of shirts with M3 scored
	Additional Guidance		
	A and 29.85 and 33.3(0) – discount of 15% on one shirt only		M1M1M1A0Q1ft

Q	Answer	Mark	Comments
17	Attempt at distance ÷ time	M1	eg 240 ÷ 2.5 240 ÷ 2.3(0) 240 ÷ 2 hours 30 minutes 240 ÷ 150
	96 or 1.6	A1	
	96 km/h or 96 km h^{-1} or 1.6 km/min	A1	Accept kmph or km per hour or km per min
	Additional Guidance		
	1.6 km/h		M1A1A0
18(a)	$\pi \times 2.5^2$	M1	oe
	19.6(…)	A1	
	20	B1ft	ft their 2 sf or more answer
	Additional Guidance		
	20.0		B0
18(b)	$\pi \times 16$ or 50.(…)	M1	oe
	$\pi \times \frac{16}{2}$ or $\pi \times 8$ or 25.(…)	M1dep	oe
	41.(…)	A1	Accept $16 + 8\pi$ Accept 40 if working shown
	Additional Guidance		

Q	Answer	Mark	Comments
19(a)	Rotation	B1	
	90° clockwise or 270° anti-clockwise	B1	
	(–1, 0)	B1	
	Additional Guidance		
	More than one transformation		B0
	Accept ¼ turn clockwise for 90° clockwise		
19(b)		B2	B1 for translation 1 unit right or for translation 5 units down SC1 for *P* translated $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$
	Additional Guidance		

Q	Answer	Mark	Comments
20	Correctly evaluated trial less than 4	M1	eg 2 → –12
	Obtains $3 \leq x \leq 4$ or better	M1dep	3 → –3 3.1 → –1.209 3.2 → 0.768 3.3 → 2.937 3.4 → 5.304 3.5 → 7.875 3.6 → 10.656 3.7 → 13.653 3.8 → 16.872 3.9 → 20.319
	Obtains $3.4 \leq x \leq 3.5$ or two correct trials [3.35, 3.45] which bracket 6	A1	3.35 → 4.095375 3.45 → 6.563625 3.44 → 6.307584 3.43 → 6.053607 3.42 → 5.801688
	Tests 3.45 and concludes 3.4 or two correct trials [3.35, 3.45] which bracket 6 and 3.4 for final answer	Q1	Strand (ii) Using 2 dp to ensure 1 dp
	Additional Guidance		
	3.4 without working shown		M0M0A0Q0
	3.4 without final trial		M1M1A1Q0
	Allow rounded or truncated values		

21	**Alternative method 1**		
	4.5 litres = 1 gallon seen or implied	B1	
	27 ÷ their 4.5 or 6	M1	
	their 6 × 36 or 216	M1dep	
	216 and yes	A1	
	Alternative method 2		
	4.5 litres = 1 gallon seen or implied	B1	
	36 ÷ their 4.5 or 8 or 210 ÷ 27 or 7.7(…)	M1	
	their 8 × 27 or 216 or 36 ÷ their 4.5 or 8 and 210 ÷ 27 or 7.7(…)	M1dep	
	216 and yes or 7.7(…) and 8 and yes	A1	
	Alternative method 3		
	4.5 litres = 1 gallon seen or implied	B1	
	210 ÷ 36 or $5.8\dot{3}$	M1	
	their $5.8\dot{3}$ × their 4.5 or 26.25	M1dep	
	26.25 and yes	A1	
	Alternative method 4		
	4.5 litres = 1 gallon seen or implied	B1	
	27 ÷ their 4.5 or 6 or 210 ÷ 36 or $5.8\dot{3}$	M1	
	27 ÷ their 4.5 or 6 and 210 ÷ 36 or $5.8\dot{3}$	M1dep	
	6 and $5.8\dot{3}$ and yes	A1	
	Additional Guidance		
	Must clearly state their conversion		