AQA Qualifications

GCSE

Mathematics

Paper 2 43652F

Mark scheme

43652F

November 2013

Final version 1.0

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.
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.
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.
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 $a \leq$ value $< b$
25.3 …	Allow answers which begin 25.3 e.g. 25.3, 25.31, 25.378.
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.

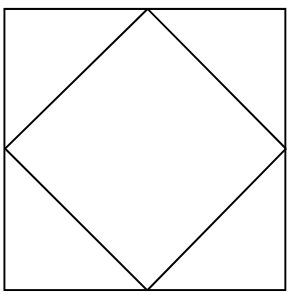
Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

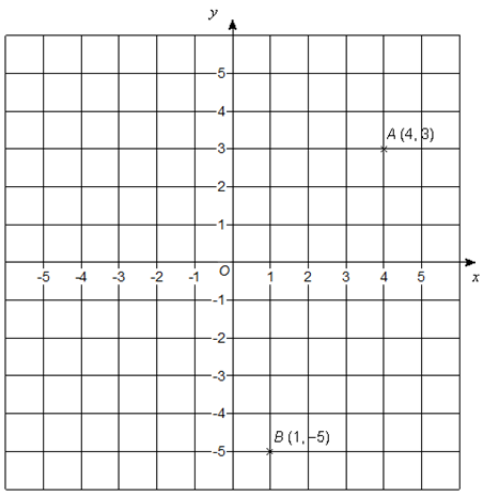
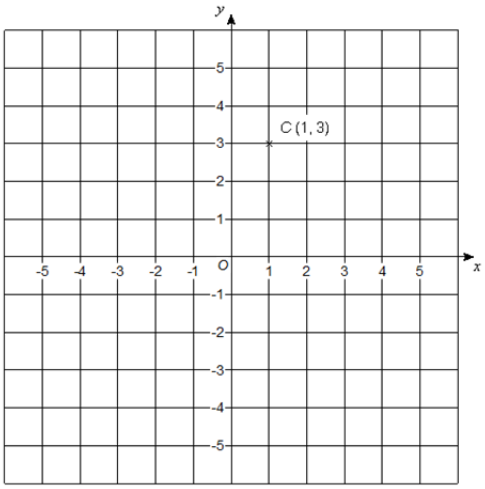
Premature approximation

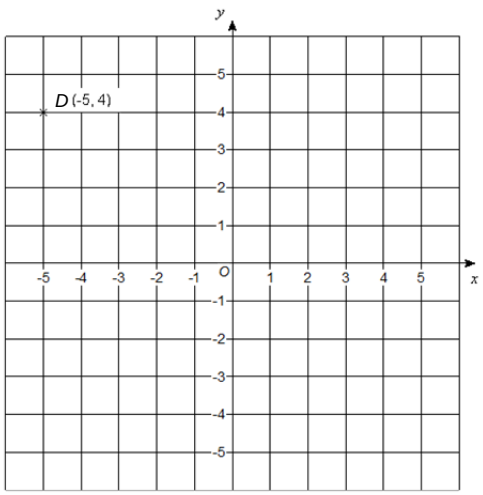
Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Paper 2 Foundation Tier

Q	Answer	Mark	Comments
1(a)	2678	B1	
1(b)	63	B1	
1(c)	279	B1	
2	(Vertical scale) does not start at 0 or incorrect height bars or vertical scale is incorrect	B1	Any order
	Gaps (between bars not equal)	B1	
	No label(s) (on vertical scale) (frequency)	B1	
3(a)	Less than $\frac{1}{2}$	B1	
3(b)	More than $\frac{1}{2}$	B1	
4(a)	Isosceles	B1	
4(b)	1	B1	
4(c)	Correct sketch	B1	Angles do not need to be labelled
4(d)	Correct sketch	B1	Angles do not need to be labelled Allow 

Q	Answer	Mark	Comments
5(a)	7 × 8 seen or 56	M1	
	5625	A1	SC1 for 5625 without 7 × 8 or 56
5(b)	6 × 7 seen	M1	65^2
	65	A1	SC1 for 65 without 6 × 7
6(a)	25 × 3451 or 25 × 34.51	M1	Digits 86 275 seen
	862.75	A1	
6(b)	5000 ÷ 415 or 12.04(...) or 12.05 or 5000 ÷ 4.15	M1	oe
	1204.8(...) or 1205	A1	
	1204	Q1ft	Strand (i) Rounding down their answer
7(a)	Northern (Italy)	B1	
7(b)	At least two of 9, 8 and 6	M1	
	9, 8 and 6 and Southern (Italy)	A1	SC1 for 6 and Southern with no other working
7(c)	(10 + 5 + 11 + 7 + 12) ÷ 5 or 45 ÷ 5	M1	Condone missing brackets 5 × 9 = 45 (embedded answer)
	9	A1	SC1 for 35.4
7(d)	Central (Italy) and valid reason	Q1ft	Strand (ii) e.g. mean between 5 and 13 all temperatures are between 5 and 13 only one that has 9 in it above 5 and below 10

Q	Answer	Mark	Comments
8(a)			
	A plotted correctly	B1	Need not be labelled
	B plotted correctly	B1	Need not be labelled
8(b)			
	C plotted at (1, 3)	B1	Need not be labelled

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="2">8(c)</td><td> 
</td><td></td><td></td></tr>
<tr><td>D plotted at (–5, 4)</td><td>B2</td><td>B1 for one coordinate correct
Need not be labelled</td></tr>
<tr><td>9(a)</td><td>3</td><td>B1</td><td></td></tr>
<tr><td>9(b)</td><td><table>
<tr><th></th><th>Tennis</th><th>Basketball</th><th>Football</th><th>Total</th></tr>
<tr><td>Boys</td><td>3</td><td>3</td><td>5</td><td>11</td></tr>
<tr><td>Girls</td><td>5</td><td>2</td><td>2</td><td>9</td></tr>
<tr><td>Total</td><td>8</td><td>5</td><td>7</td><td>20</td></tr>
</table></td><td>B4</td><td>Accept tallies for inner 6 boxes

B3 for 2 rows with totals
B3 for 2 columns with totals
B3 1 row and 1 column with totals

B2 for 2 rows without totals
B2 for 2 columns without totals
B2 1 row and 1 column without totals
B2 for all totals

B1 for 1 row without total
B1 for 1 column without total
B1 for totals for rows
B1 for totals for columns</td></tr>
</table>

Q	Answer	Mark	Comments
10(a)	(Match) 4 or 43685	B1	
10(b)	128 or 417 seen	M1	Allow – 128 or – 417 seen
	(Match) 2 or 19872	A1	All working must be correct SC1 for 20417 or (Match) 3
10(c)	32473 – 3584	M1	
	28889	A1	
	29000	B1ft	Rounding to nearest thousand SC1 32000 and 4000 SC1 28000
11(a)	180 – 156	M1	
	24	A1	
11(b)	360 – 90 – 149	M1	oe
	121	A1	
12(a)	62	B1	
12(b)	8	B1	
12(c)	50	B1	

Q	Answer	Mark	Comments
13	15 **and** 9 seen or implied	B1	Ratio of 5 : 3 seen or implied
	75 ÷ 15 or 5 or 75 ÷ their 15 or 75 × 9 or 675 or 75 × their 9	M1	for their 15, allow [14, 16] for their 9, allow [8, 10] 75 ÷ 5 or 75 × 3
	75 ÷ 15 × 9 or 5 × 9 or 75 ÷ their 15 × their 9	M1dep	75 ÷ 5 × 3 oe
	45	A1ft	
14(a)	4.8 × 1.2 × 2.8	M1	oe
	16.128 or 16.13 or 16.1 or 16	A1	
	m^3	B1	
14(b) Alt 1	their 16.128 × 1000 or their 16.128 × 3 or their 16.128 ÷ 4	M1	16 128 48.384 4.032
	their 16.128 × 1000 × 3 or their 16.128 × 1000 ÷ 4 or their 16.128 × 3 ÷ 4	M1dep	48 384 4032 12.096
	[12 000, 12 100]	A1ft	ft from their (a)
14(b) Alt 2	2.8 ÷ 4 × 3 or 2.1	M1	oe $2.8 - \frac{2.8}{4}$ or 2.1
	4.8 × 1.2 × their 2.1 or their 2.1 × 1000	M1dep	12.096 2100
	[12 000, 12 100]	A1	

Q	Answer	Mark	Comments
15	2120	B1	
	their 2120 ÷ 5	M1	oe
	424	A1ft	
	2544	B1ft	ft their 2120 + their 424 Correct money notation SC2 for 2162.40 or SC1 for 2162.4
16(a)	$5x - 3y$	B2	B1 for $5x$ or $-3y$ Do not ignore fw
16(b)	3 × 6 – 2 × 4 or 18 – 8 or 10 or 3 × 7 – 2 × 4 or 21 – 8 or 13 or 3 × 6 – 2 × 5 or 18 – 10 or 8 or 3 × 7 – 2 × 5 or 21 – 10 or 11	M1	
	Two correctly evaluated	A1	10 13 8 11
	(Largest) 13 and (Smallest) 8	Q2	Strand (iii) Fully correct Q1 for their largest and smallest stated with largest 13 or smallest 8 with the four calculations seen Note 7 and 4 give the answer 13 6 and 5 give the answer 8 SC2 for largest 13 or smallest 8 SC3 for three correct calculations with one incorrect calculation and their largest and smallest correct

Q	Answer	Mark	Comments
17(a)	16.9	B1	
17(b)	their 16.9 × 2	M1	oe [(2.5 + 15) + (1.7 + 15) +…] × 2 ÷ 5
	33.8	A1ft	SC1 for 3.8
18(a)	–3, –1, 3	B2	B1 for 1 or 2 correct
18(b)	At least 2 of their 5 points plotted correctly	M1	May be implied from straight line ± ½ square
	Fully correct straight ruled line from – 2 to 2	A1	± ½ square
19(a)	495 ÷ 55 or 9 or 80 ÷ 55 or 1.45… or 80 × 495 or 39600	M1	55 ÷ 495 or $\frac{1}{9}$ or 55 ÷ 80 or 0.68… or 0.69
	495 ÷ 55 × 80 or 80 × their 9 or 495 × their 1.45… or 80 × 495 ÷ 55 or 495 + (80 – 55) × their 9	M1dep	oe 80 ÷ their $\frac{1}{9}$ or 495 ÷ their 0.68…
	720	A1	

Q	Answer	Mark	Comments
19(b) Alt 1	55 ÷ 495 or $\frac{1}{9}$ or 495 ÷ 55 or 9 or 160 ÷ 495 or 0.32… or 160 × 55 or 8800	M1	495 ÷ 160 or 3.09...
	55 ÷ 495 × 160 or 160 ÷ their 9 or 160 × their $\frac{1}{9}$ or 55 × their 0.32… or 160 × 55 ÷ 495	M1dep	oe 55 ÷ their 3.09375
	17.7… or 17.8	A1	
	18	B1ft	Rounding to nearest whole number
19(b) Alt 2	80 ÷ their 720 or $\frac{1}{9}$ or their 720 ÷ 80 or 9 or 160 ÷ their 720 or 0.22… or 160 × 80 or 8800	M1	their 720 ÷ 160 or 4.5
	80 ÷ their 720 × 160 or 160 ÷ their 9 or 160 × their $\frac{1}{9}$ or 80 × their 0.22... or 160 × 80 ÷ their 720	M1dep	oe 80 ÷ their 4.5
	17.7… or 17.8	A1	
	18	B1ft	Rounding to nearest whole number

Q	Answer	Mark	Comments
20(a)	Continuous	B1	
20(b)	Discrete	B1	
20(c)	Continuous	B1	
20(d)	Discrete	B1	
21	Height of triangle = 4 seen or implied	B1	Identifies height of trapezium as 9
	(Area of rectangle) 234 or 378	B1	(Area of trapezium) $\frac{(13+21)\times 9}{2}$
	$\frac{1}{2}$ × 18 × their 4 or 36 / $\frac{1}{2}$ × 9 × their 4 or 18	M1	17 × 9 or $\frac{34\times 9}{2}$ or $\frac{306}{2}$
	$\frac{1}{2}$ × 18 × their 4 × 2 or 72 / $\frac{1}{2}$ × 9 × their 4 × 4 or 72	M1dep	153
	306	A1	
22(a)	$y - 8 = 3w$	M1	$\frac{y}{3} = w + \frac{8}{3}$
	$\frac{y-8}{3} = w$ or $\frac{y}{3} - \frac{8}{3} = w$	A1	SC1 $\frac{y-8}{3}$ or $\frac{y}{3} - \frac{8}{3}$ Do not ignore further work
22(b)	$5x + 20$	B1	
	$5x - 3x = 23 - 20$ or $2x = 3$	M1	their $5x - 3x$ = 23 – their 20
	1.5	A1ft	oe

Q	Answer	Mark	Comments
23	15.7 × 4 or 62.8	M1	
	their 62.8 = π × diameter	M1dep	oe their 62.8 = 2 × π × radius
	their 62.8 ÷ π	M1dep	their 62.8 ÷ 2π radius = [9.95, 10]
	[19.9, 20]	A1	SC2 for [4.9, 5]
24	Triangle is correct with two equal arcs seen for angle of 60°	B3	B2 Triangle correct but no arcs B2 Fully correct constructions (3rd side missing) B1 for either *AB* = [7.4, 7.6] or *AC* = [6.2, 6.4] or 60°