AQA Qualifications

GCSE

Mathematics Linear

Paper 1 43651F

Mark scheme

43651F
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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

AQA Qualifications

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.

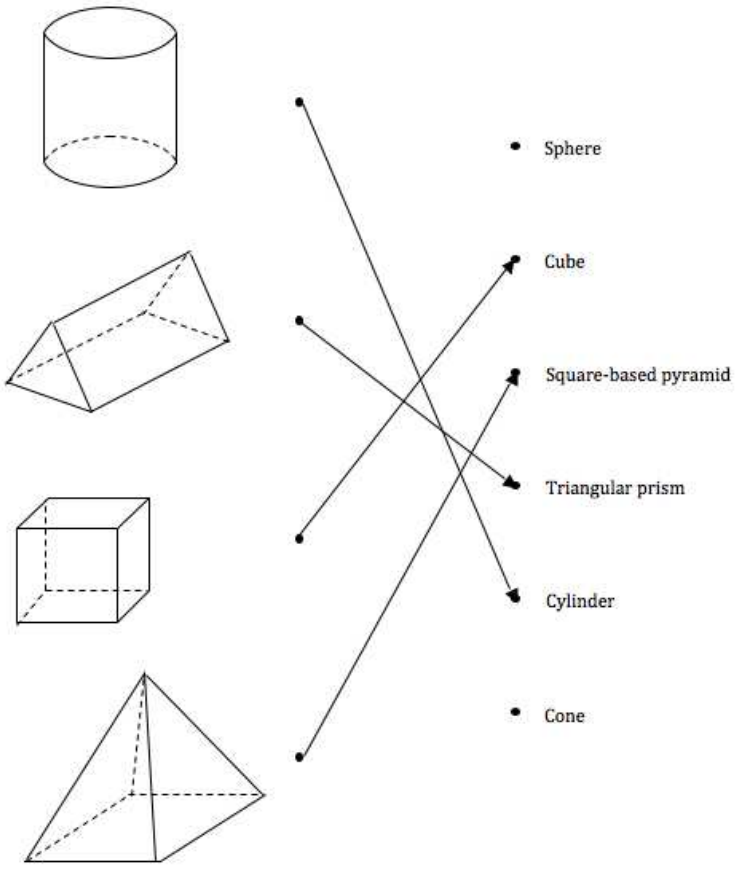
Premature approximation

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

Paper 1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	20	B1	
1(b)	18	B1	
1(c)	16	B1	
1(d)	8	B1	
2(a)	C&O frequency = 5	B1	
	Three tally marks in BBQ	B1	
2(b)	Key 1 circle represents 2 people	B1	oe Half circle represents 1 person One and a half circles represents 3 people
	6 circles in Plain **and** 2.5 circles in C&O	B2ft	B1 6 circles in Plain **or** 2.5 circles in C&O ft their fully completed key Only award B2ft if BBQ row is also correct for their key B1ft one row matching their key
3(a)	(1, 2)	B1	
3(b)	$x = 2$	B1	
3(c)	(3, 2)	B1	
4(a)	[8.9, 9.1]	B1	
4(b)	[53, 57]	B1	

Q	Answer	Mark	Comments
5 Alt 1	2.20 + 0.5 + 0.6 or 3.3	M1	oe Allow mix of units
	their 3.3 – 0.8	M1	oe Allow mix of units
	2.50	A1ft	ft three items added and offer subtracted if M0M1 awarded
5 Alt 2	2.20 – 0.8 or 1.4	M1	oe Allow mix of units
	their 1.4 + 0.5 + 0.6	M1	oe Allow mix of units
	2.50	A1ft	ft offer subtracted and three items added if M1M0 awarded
6	£1, 20p, 10p with 5p change or 50p, 50p, 20p, 10p with 5p change or £1, 20p, 20p with 15p change or 50p, 50p, 20p, 20p with 15p change or £1 and 50p with 25p change	B2	B1 correct combination of coins used (condone no or incorrect change) or B1 correct totals with no indication of individual coins £1.30 and 5p change or £1.40 and 15p change or £1.50 and 25p change or B1 any valid combination of coins with some redundant with correct change eg £1, 20p, 20p, 10p with 25p change
7(a)	–0.3 $\frac{1}{3}$ 3.03 33.3	B2	B1 for $\frac{1}{3}$ = 0.3(…) or B1 for –0.3 first and 33.3 last or B1 for reverse order

Q	Answer	Mark	Comments
*7(b)	No ticked **and** partial explanation eg No, one is positive, one negative No, 33.3 + 0.3	B1	oe Implied if Q1 awarded
	No ticked **and** full explanation eg No, it is 33.6 No, 33.3 + – 0.3 = 33	Q1	Strand (iii) oe
8(a)		B3	B2 two correct B1 one correct

Q	Answer	Mark	Comments
8(b)	(l =) 40	B1	SC2 40, 24, 20 assigned to the wrong dimensions or SC2 length 40, height 24 and width 20 with further work seen on answer line or SC1 two of 40, 24, 20 seen May be on diagram
	(h =) 24	B1	
	(w =) 20	B1	
9(a)	15	B1	If answer line blank accept answer on dotted line in sequence
9(b)	Goes down by 4, –4, 4 less	B1	oe
9(c)	9 or 21 or 33 or 45	B2	B1 next term of both sequences seen ie 18 and 25 or B1 next two terms of either sequence seen ie 18 and 21 or 25 and 21
10(a)	1.5 or 1 and a half	B1	Condone change of units ie accept 1 hour 30 minutes or 90 minutes

Q	Answer	Mark	Comments
10(b)	Any one correct fact seen Cycling is 120° or $\frac{120}{360}$ or 2 hours or $\frac{2}{6}$ or $\frac{1}{3}$ or 33(...)% **or** Swimming or Running is 90° or $\frac{90}{360}$ or $\frac{1}{4}$ or 25% **or** Swimming is 1.5 hours **or** Stretching and Cycling or Swimming and Running is 180° or $\frac{180}{360}$ or 3 hours or $\frac{3}{6}$ or $\frac{1}{2}$ or 50%	M1	May be seen on diagram Must be linked with correct activity Running is 1.5 hours has already been tested in part (a) so M0 if no other fact seen
	Stretching is $\frac{60}{360}$ or 60 or 1 hour	A1	oe May be seen on diagram or implied by final answer
	$\frac{1}{6}$	A1	SC1 any fraction given with its correct simplest form or SC1 Answer $\frac{1}{3}$

Q	Answer	Mark	Comments
11(a)	$4a$	B1	
11(b)	$6b^2$	B1	
11(c)	$6c - 3$	B1	Mark final answer
12	(*BCA* =) 180 – 110 or (*BCA* =) 70	M1	May be seen on diagram
	(180 – their 70) ÷ 2	M1dep	110 ÷ 2 is M2
	55	A1	SC1 Angles such that A = B **and** A + B + ACB = 180
13(a)	130	B1	
13(b)	Vertically opposite	Q1	Strand (i)
14 Alt 1	(Side =) 2	M1	May be seen on diagram
	5 × 2	M1dep	
	10	A1	
14 Alt 2	4 × 5 or 20	M1	May be seen on diagram
	4 × 5 ÷ 2	M1dep	
	10	A1	
14 Alt 3	Splits large square into 25 smaller squares or Area large square = 100	M1	5 × 5
	$\sqrt{(\text{their } 25 \times 4)}$	M1dep	
	10	A1	

Q	Answer	Mark	Comments
15(a)	22	B1	
15(b)	13	B1	
15(c)	Yes ticked **and** lower median or Cannot tell ticked **and** not enough data	B1ft	ft their answer for (b) oe
16	3×10^2 or 100 seen	M1	
	300	A1	SC1 900
17	$0.5 \times 8 \times (10 + 20)$	M1	oe Condone missing brackets
	120	A1	
	cm^2	B1	
18 Alt 1	6.5 or 3.25 seen	M1	
	9.75 or 6.5 + 3.25 or 65 – (6.5 + their 3.25) or 65 – (their 6.5 + 3.25)	M1dep	
	55.25	A1	
18 Alt 2	0.15×65	M1	oe
	9.75 or 65 – their (0.15×65) oe	M1dep	
	55.25	A1	
18 Alt 3	0.85	M1	oe
	0.85×65	M1dep	oe
	55.25	A1	

Q	Answer	Mark	Comments
19 Alt 1	(24 ÷ 3) + 5 or 13 or 24 + 15 or 39	M1	oe May be seen as a numerator/ denominator of incorrect fraction eg $\frac{13}{24}$
	$\frac{13}{39}$ or 13 **and** 39 or 13, 13, 13 or 13 : 26	A1	
	Yes ticked and $\frac{13}{39} = \frac{1}{3}$ or equivalent, eg $3 \times 13 = 39$, or $39 \div 13 = 3$	Q1ft	Strand (ii) ft on wrong calculation for 24 ÷ 3 and No ticked SC1 Yes ticked (incorrect or no working)

19 Alt 2	$\frac{5}{15}$	M1	
	$\frac{5}{15} = \frac{1}{3}$	A1	
	Yes ticked and clear explanation that same proportion of blue added	Q1	Strand (ii) SC1 Yes ticked (incorrect or no working)

This scheme is for a 'written' explanation with no contradictory values calculated

19 Alt 3	Yes ticked	B1	
	Full explanation that the extra added are in the same proportion eg As $\frac{1}{3}$ of the extra are blue	Q2	Strand (ii) Q1 partial explanation eg 5 of each colour

Q	Answer	Mark	Comments

Answer only zero marks

20 Alt 1	Writes, correctly, at least two of given fractions with common denominator eg $\frac{40}{60}, \frac{36}{60}, \frac{42}{60}, \frac{39}{60}, \frac{45}{60}$	M1	**NB** The two fractions must have different denominators to those which they started with Accept decimal numerators
	Writes, correctly, at least three fractions with common denominator eg $\frac{40}{60}, \frac{36}{60}, \frac{42}{60}, \frac{39}{60}, \frac{45}{60}$	M1dep	**NB** The three fractions must have different denominators to those which they started with Accept decimal numerators
	$\frac{7}{10}$ oe **and** all 4 fractions written correctly with common denominator	A1	It is not necessary to write $\frac{3}{4}$ with the same denominator Accept decimal numerators

20 Alt 2	Writes, correctly, at least two of given fractions converted to percentages eg 66..% (67..%), 60%, 70%, 65%, 75%	M1	Condone missing % signs
	Writes, correctly, at least 3 fractions converted to percentages eg 66..% (67..%), 60%, 70%, 65%, 75%	M1dep	Condone missing % signs
	$\frac{7}{10}$ or 70% with all 4 fractions correctly converted to percentages	A1	It is not necessary to write $\frac{3}{4}$ as 75%

20 Alt 3	Writes, correctly, at least two of given fractions converted to decimals eg 0.66 (0.67), 0.6, 0.7, 0.65, 0.75	M1	Any appropriate representation of $\frac{2}{3}$ to at least 2dp, eg 0.6^{r}
	Writes, correctly, at least 3 fractions converted to decimals eg 0.66 (0.67), 0.6, 0.7, 0.65, 0.75	M1dep	
	$\frac{7}{10}$ or 0.7 with all 4 fractions correctly converted to decimals	A1	It is not necessary to write $\frac{3}{4}$ as 0.75

See over for further Alt schemes

Q	Answer	Mark	Comments
20 Alt 4	Draws approximate diagrams of same shape for at least two of the fractions 	M1	
	Draws approximate diagrams for at least three fractions  The shaded areas must be such that $\frac{3}{5} < \frac{13}{20} < \frac{2}{3} < \frac{7}{10} < \frac{3}{4}$	M1dep	
	$\frac{7}{10}$ with all diagrams for all 4 fractions drawn and the shaded areas such that $\frac{3}{5} < \frac{13}{20} < \frac{2}{3} < \frac{7}{10}$	A1	It is not necessary to draw $\frac{3}{4}$
20 Alt 5	Chooses a quantity, say, 60 and calculates, correctly, the appropriate fraction of that quantity for two of the given fractions eg 40, 36, 42, 39, 45	M1	
	Calculates, correctly, at least 3 values eg 40, 36, 42, 39, 45	M1dep	
	$\frac{7}{10}$ with all 4 values correctly calculated	A1	It is not necessary to calculate $\frac{3}{4}$ of the quantity

Q	Answer	Mark	Comments
21(a) Alt 1	4 × 0.5 or 4 × 50 or 200(p) or (£)2	M1	
	6 + 4 × 0.5 or 8 or (£)6 + (£)2 or (£)6 : (£)2	M1dep	
	8 ÷ 5 (= 1.6)	A1	
21(a) Alt 2	Juice = $\frac{1}{5}$ **and** Lemonade = $\frac{4}{5}$	M1	200ml of juice and 800ml of lemonade
	$\frac{1}{5}$ × 6 **and** $\frac{4}{5}$ × 0.5	M1dep	Allow mixture of units
	1.2 + 0.4 (= 1.6) or 120 + 40 (= 160)	A1	Allow mixture of units eg 1.2 + 40 (= 1.60)
21(a) Alt 3	$\frac{1}{5}$ × 6 = 1.2 or $\frac{1}{5}$ × 6(00) = 120 **or** $\frac{4}{5}$ × 0.5 = 0.4 or $\frac{4}{5}$ × 0.5 or 50 = 40	M1	oe Must see calculation Allow mixture of units
	$\frac{1}{5}$ × 6 = 1.2 or $\frac{1}{5}$ × 6(00) = 120 **and** $\frac{4}{5}$ × 0.5 = 0.4 or $\frac{4}{5}$ × 0.5 or 50 = 40	M1dep	oe Must see calculation Allow mixture of units
	1.2 + 0.4 (= 1.6) or 120 + 40 (= 160)	A1	Allow mixture of units eg 1.2 + 40 (= 1.60)
21(b)	40 seen or 2 ÷ 1.6 or 200 ÷ 160	M1	0.4 or 1.25
	25% or 20%	A1	20% is allowed as this is defined a 'profit margin'