

GCSE

Mathematics

43602F Unit 2: Foundation

Mark scheme

4360

November 2016

Version 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 $a \leq \text{value} < b$
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

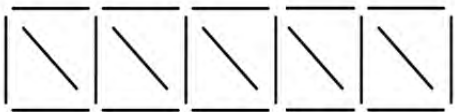
Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the candidate intended it to be a decimal point.

Q	Answer	Mark	Comments
1(a)	8	B1	
1(b)	27	B1	
1(c)	0.05	B1	
1(d)	$\frac{3}{10}$	B1	
1(e)	75(%)	B1	
2	Alternative method 1		
	600 – 240 or 360	M1	6(.00) – 2.4(0) or 3.6(0)
	4	A1	
	Alternative method 2		
	240 + 90 + 90 or 600 – 90 – 90 or 420 or 240 + 90 + 90 + 90 or 510 or 600 – 90 – 90 – 90 or 330 or 240 + 90 + 90 + 90 + 90 or 600 – 90 – 90 – 90 – 90	M1	2.4(0) + 0.9(0) + 0.9(0) or 6(.00) – 0.9(0) – 0.9(0) or 4.2(0) or 2.4(0) + 0.9(0) + 0.9(0) + 0.9(0) or 5.1(0) or 6(.00) – 0.9(0) – 0.9(0) – 0.9(0) or 3.3(0) or 2.4(0) + 0.9(0) + 0.9(0) + 0.9(0) + 0.9(0) or 6(.00) – 0.9(0) – 0.9(0) – 0.9(0) – 0.9(0)
	4	A1	

3	5	B2	B1 three single-digit numbers that total 22 or three different numbers that total 22
	Additional Guidance		
	5 (+) 8 (+) 9		B2
	6 (+) 7 (+) 9		B1
	4 (+) 9 (+) 9		B1
	10 (+) 11 (+) 1		B1
	10 (+) 10 (+) 2		B0
	5 from incorrect working eg $5 (+) 7 (+) 9 = 22$		B0

4(a)	45 and 63	B2	B1 for both correct with 1 incorrect or 1 correct with at most 1 incorrect
	Additional Guidance		
	Accept embedded answer without contradiction eg $5 \times 9 = 45$ and $7 \times 9 = 63$		B2
	45 alone		B1
	45 and 54		B1
	54 and 63		B1
	45, 54 and 63		B1
	36 and 54		B0

4(b)	6	B1	
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5(a)		B1	
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5(b)	41	B1	
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5(c)	is always odd	B1	
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6	Alternative method 1		
	40×60 or 2400	M1	$0.4(0) \times 60$ or $24(.00)$
	their $2400 \div 100 \times 30$ or $40 \div 100 \times 30 \times 60$ or 720	M1	oe their $24(.00) \div 100 \times 30$ or $0.4(0) \div 100 \times 30 \times 60$ or $7.2(0)$ correct method to find 30% of their 2400 $40 \div 100 \times 30 \times 60$ implies M2
	their $2400 - \text{their } 720$ or $40 \div 100 \times 70 \times 60$ or 1680	M1dep	oe $0.4(0) \div 100 \times 70 \times 60$ or $16.8(0)$ dep on 2 nd M1 $40 \div 100 \times 70 \times 60$ implies M3
	16.80	Q1	Strand (i) correct money notation
	Alternative method 2		
	$40 \div 100 \times 30$ or 12	M1	oe correct method to find 30% of 40
	$40 - \text{their } 12$ or $40 \div 100 \times 70$ or 28	M1	oe $40 \div 100 \times 70$ implies M2
	their 28×60	M1dep	oe dep on 2 nd M1
	16.80	Q1	Strand (i) correct money notation
	Additional Guidance		
	1680p with or without £ sign crossed out		Q0
	16.80p		Q0
	16.8		Q0
	$60 \times 0.4 = 16$, $10\% = 1.60$, $3 \times 1.60 = 4.80$, $16 - 4.80 = 11.20$		M1M1M1Q0

7(a)	80	B1	
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7(b)	64 – 30 or 34	M1	
	17	A1	SC1 49

8(a)	Cardiff	B1	
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8(b)	8	B1	condone –8
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8(c)	6	B1	
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9	30 × 5 or 150 or 30 ÷ 2 or 15	M1	
	75	A1	
	Additional Guidance		
	30 ÷ 2 ÷ 5 = 3		M1A0

10	$\frac{5}{7}$	B1	
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11	4 ÷ 2 × 3 or 4 + 2 or 2 × 3 or 6 or 600 ÷ 2 × 3 or 600 + 300 or 300 × 3 or 900 or 450 ÷ 2 × 3 or 450 + 225 or 225 × 3 or 675 or 2 and 300 and 225 seen	M1	oe
	6 and 900 and 675	A1	
	Additional Guidance		
	4 × 1.5 or 600 × 1.5 or 450 × 1.5		M1A0

12(a)	32	B1	
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12(b)	29 + 13 or 42	M1	
	7	A1	SC1 $\frac{16}{6}$ or $\frac{8}{3}$ or $2\frac{2}{3}$ or $2.\dot{6}$
	Additional Guidance		
	Embedded answer without (y =) 7 on answer line		M1A0

13(a)	$y = 4$	B1	
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13(b)	$B(2, 5)$ and $C(0, -1)$	B2	B1 $B(2, 5)$ or $C(0, -1)$ or line drawn from $(-1, 4)$ to $(2, 5)$
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14(a)	$(0).21$ or $\frac{21}{100}$	B1	oe decimal or fraction
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14(b)	4.31	B1	accept $4\frac{31}{100}$
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14(c)	0.65 or 65% or 70% or 0.55 or any two of $\frac{65}{100}$, $\frac{70}{100}$, $\frac{55}{100}$	M1	oe fractions with common denominator
	55% $\frac{13}{20}$ 0.7	A1	oe values
	Additional Guidance		
	Correct order from incorrect evaluation does not score M1A1		
	Condone decimal numerators in fractions with common denominators eg $\frac{6.5}{10}$, $\frac{7}{10}$, $\frac{5.5}{10}$		

15	40 or 300 or 60 or 5 or 12 000	M1	
	200	A1	
	Additional Guidance		
	200 with no working		M1A1
	Attempt at full calculation		MOA0

16(a)	$6x - 21$	B1	
	Additional Guidance		
	Ignore any attempt to solve eg $6x - 21 = 0$		B1
	Do not accept any attempt to simplify further eg $6x - 21 = -15$		B0

16(b)	$x(x + 8)$	B1	
	Additional Guidance		
	$(x + 8)x$		B1
	$x \times (x + 8)$ or $(x + 8) \times x$ or $(x \pm 0)(x + 8)$		B1
	$x(x + 8)$		B1

17	$(2 \times) 5 \times 5$ or $(2 \times) 25$ or 50 or $-3 \times -3 \times -3$ or -27	M1	
	$2 \times$ their 25 + (their -27) or their 50 + (their -27)	M1dep	may be implied by correct evaluation using their values
	23	A1	SC1 73 or 77

18	66 × 15 or 990 or 66 ÷ 3 (× 2) or 22 or 44 or 15 ÷ 3 (× 2) or 5 or 10	M1	oe
	their 990 ÷ 3 (× 2) or their 22 × 15 or 330 or (66 – their 22) × 15 or their 44 × 15 or (15 – their 5) × 66 or their 10 × 66 or 660	M1dep	oe
	75 × 1000 or 75 000 or 75 ÷ 100 × 20 or 15 or 75 ÷ 100 × 80 or 60	M1	oe 0.75 × 1000 or 750 or 0.75 ÷ 100 × 20 or 0.15 or 0.75 ÷ 100 × 80 or 0.6(0)
	their 75 000 × 0.8 ÷ 100 or (75 – their 15) × 1000 ÷ 100 or their 60 × 1000 ÷ 100 or 600	M1dep	oe their 750 × 0.8 or (0.75 – their 0.15) × 1000 or their 0.6(0) × 1000
	660 and 600 and (Company) B	Q1	Strand (iii)

19(a)	$C = 4d + 20$	B1	
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19(b)	Alternative method 1																											
	their $(4d + 20) + 6d + 10 = 90$		M1																									
	$10d = 60$ or their $4d + 6d = 80 -$ their 20 correctly evaluated		M1	correctly collects terms on both sides for their $(4d + 20)$																								
	6		A1																									
	Alternative method 2																											
	Correct value for hire of drill or sander for d days where $d > 1$		M1																									
	Correct total value for hire of drill and sander for d days where $d > 1$		M1																									
	6		A1																									
	Additional Guidance																											
	$20d + 4 + 6d + 10 = 90$ $26d + 14 = 90$ $26d = 76$	$4d + 24 + 6d + 10 = 90$ $10d + 34 = 90$ $10d = 56$	$24d - 4 + 6d + 10 = 90$ $30d + 6 = 90$ $30d = 84$	M1M1A0																								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">number of days</td> <td style="width: 10%;">2</td> <td style="width: 10%;">3</td> <td style="width: 10%;">4</td> <td style="width: 10%;">5</td> <td style="width: 10%;">6</td> </tr> <tr> <td>drill hire (£)</td> <td>28</td> <td>32</td> <td>36</td> <td>40</td> <td>44</td> </tr> <tr> <td>sander hire (£)</td> <td>22</td> <td>28</td> <td>34</td> <td>40</td> <td>46</td> </tr> <tr> <td>total hire (£)</td> <td>50</td> <td>60</td> <td>70</td> <td>80</td> <td>90</td> </tr> </table>			number of days	2	3	4	5	6	drill hire (£)	28	32	36	40	44	sander hire (£)	22	28	34	40	46	total hire (£)	50	60	70	80	90	
	number of days	2	3	4	5	6																						
drill hire (£)	28	32	36	40	44																							
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total hire (£)	50	60	70	80	90																							

20	$4x - 20$	B1	
	their $4x - x$ or $7 +$ their 20 or $3x = 27$	M1	oe collecting terms
	9	A1ft	
	Additional Guidance		
	$4x - 5 = x + 7$ $3x = 12$ $x = 4$		B0 M1 A1ft
	$4x - 5 = x + 7$ $3x = 2$ $x = \frac{2}{3}$		B0 M1 A1ft

21	28 (x) 2 or 8 (x) 7 or 14 (x) 2 (x) 2 or 2 (x) 4 (x) 7 or 2, 2, 2, 7	M1	allow on prime factor tree or repeated division ignore incorrect products if at least one correct product seen
	$2 \times 2 \times 2 \times 7$ or $2^3 \times 7$	A1	
	Additional Guidance		
	Ignore any $\times 1$ for M1 but not A1		

22(a)	Alternative method 1		
	60 + 3 × 40 or 60 + 120 or 180 or 0.6(0) + 3 × 0.4(0) or 0.6(0) + 1.2(0) or 1.8(0)	M1	
	5 × 180 and 900 ÷ 100 = 9 or 5 × 1.8(0) = 9	A1	fully correct method
	Alternative method 2		
	60 × 5 or 300 or 0.6(0) × 5 or 3 or 3 × 40 × 5 or 40 × 15 or 600 or 3 × 0.4(0) × 5 or 0.4(0) × 15 or 6	M1	
	300 + 600 and 900 ÷ 100 = 9 or 3 + 6 = 9	A1	fully correct method
	Additional Guidance		
	5 × 1.8(0)		M1A0
	5 × 180 and 900 ÷ 100		M1A0
	300 + 600 and 900 ÷ 100		M1A0

22(b)	Alternative method 1		
	3 × 9 or 27 or 60 × 80 or 4800 or 60 × 0.8(0) or 48	M1	
	their 48 – their 27	M1	
	21	A1	
	Alternative method 2		
	9 ÷ 20 or 0.45 or 900 ÷ 20 or 45	M1	
	(0.8(0) – their 0.45) × 60 or 0.35 × 60 or (80 – their 45) × 60 ÷ 100 or 35 × 60 ÷ 100	M1	
	21	A1	
	Alternative method 3		
	(0.6(0) + 3 × 0.4(0)) ÷ 4 or 1.8(0) ÷ 4 or 0.45 (60 + 3 × 40) ÷ 4 or 180 ÷ 4 or 45	M1	
	(0.8(0) – their 0.45) × 60 or 0.35 × 60 or (80 – their 45) × 60 ÷ 100 or 35 × 60 ÷ 100	M1	
	21	A1	