

# GCSE

# Mathematics

Unit 3 43603F

Mark scheme

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43603F  
June 2015

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Version 1.0 Final Mark Scheme

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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](http://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.

<b>M</b>	Method marks are awarded for a correct method which could lead to a correct answer.
<b>A</b>	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>B</b>	Marks awarded independent of method.
<b>Q</b>	Marks awarded for Quality of Written Communication
<b>ft</b>	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
<b>SC</b>	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
<b>M dep</b>	A method mark dependent on a previous method mark being awarded.
<b>B dep</b>	A mark that can only be awarded if a previous independent mark has been awarded.
<b>oe</b>	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$
<b>[a, b]</b>	Accept values between $a$ and $b$ inclusive.
<b>3.14 ...</b>	Accept answers which begin 3.14 eg 3.14, 3.142, 3.149.
<b>Use of brackets</b>	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**

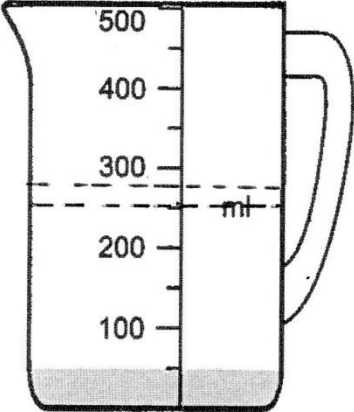
Erased or crossed out work that has been replaced is not awarded marks.

### **Premature approximation**

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

Q	Answer	Mark	Comments
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1(a)	50	B1	
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1(b)	Mark above 250 and below 275 in area indicated	B1		
	<b>Additional Guidance</b>			
	Any clear indication			B1
	Calculation shown and answer is not 260			B0

1(c)	Any equivalent percentage or $\frac{80}{100} \times 500$ or $0.8 \times 500$	M1	eg 1% is 5 (ml) 10% is 50 (ml) 20% is 100 (ml) 50% is 250 (ml) oe eg $5 \times 80$
	400	A1	

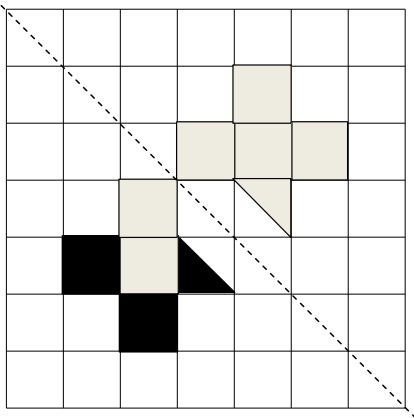
Q	Answer	Mark	Comments
2(a)	4.5 or $4\frac{1}{2}$	B1	oe
	<b>Additional Guidance</b>		
	Ignore additional units on the answer line		

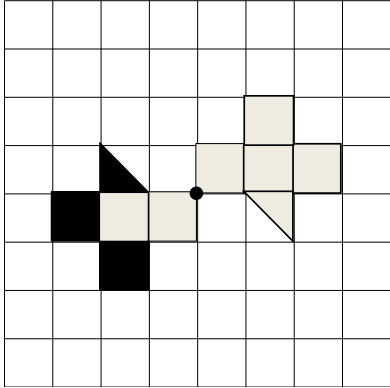
2(b)	<b>Alternative method 1</b>		
	Works out any area	M1	eg 4 × their 4.5 7 × 7 7 ( × 1) 9 × 9 5 × 3
	4 × their 4.5 + 7 + 6 or 7 × 7 – 4 × their 4.5	M1dep	oe
	31	A1ft	ft their 4.5 SC2 for 30 or 32 as final answer
	<b>Alternative method 2</b>		
	Attempt to count squares	M1	eg Vertical or horizontal rectangle = 7 or realise there are four triangles (4 × their 4.5) or 18 or numbering seen or 6 or 25
	25 + 6	M1dep	oe
	31	A1ft	ft their 4.5 SC2 for 30 or 32 as final answer

Q	Answer	Mark	Comments	
3(a)	125 118 130 115	B3	B2 for 2 or 3 correct B1 for 1 correct  123 115 SC2 for all correct 128 SC1 for 2 or 3 correct 114	
	<b>Additional Guidance</b>			
	3 correct and 1 incorrect		B2	
	2 correct and 2 incorrect		B2	

3(b)	Dan	B1ft	ft their fastest time (lowest value)
	<b>Additional Guidance</b>		
	Dan or fastest time (lowest value)	B1ft	

Q	Answer	Mark	Comments
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4(a)	<p>Fully correct</p> 	B2	B1 for 1 or 2 shapes in correct position
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4(b)	<p>Fully correct</p> 	B2	B1 for 1 or 2 shapes in correct position
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Q	Answer	Mark	Comments
5(a)	3 kg	B1	
5(b)	12 kg	B1	
6(a)	(Faces) 5	B1	
	(Edges) 9	B1	
	(Vertices) 6	B1	

Q	Answer	Mark	Comments
<b>6(b)</b>	Cannot tell and valid explanation	B2	eg Don't know if length too much B1 for cannot tell or for any valid statement
	<b>Additional Guidance</b>		
	<b>All comments below are for "Cannot tell", Deduct 1 mark for "Yes" or "No" Assume referring to prism unless clearly otherwise</b>		
	<b>Reference to measurements of prism only</b>		B2
	<b>Reference to not knowing measurements of cube</b>		B1
	The prism may be very wide or very tall and cannot fit inside the cube.		B2
	We need to know the size/dimensions of the prism.		B2
	They are not the same shape so might have different height.		B2
	Cross section of cube = $\sqrt[3]{125} = 5$ . Cross section of prism = $\sqrt[3]{45} = 3.4$ . The length of the prism is unknown.		B2
	Height of prism is not given.		B2
	No specific measurements, width could be larger than length or other way round.		B2
	You don't know the area of the end of the prism, so you don't know if the prism will fit in.		B2
	You don't know the area of the end of the cube, so you don't know if the prism will fit in.		B1
	They are not the same shape or similar so you do not know.		B1
	No measurements are given for either shape.		B1
	Cube may not be long in depth as the cube and from the volume we do not know the depth.		B1
	The volume is how much inside, you do not know whether it will fit or not.		B1
	There is no cube to judge it by.		B1
Calculations involving $\pi$ , giving radius (cube)=6.3 and r(prism) = 3.5 but then, don't know size or measurements of cube or prism.		B1	
Don't know the dimensions of the cube and if it is long enough for the prism to fit in.		B1	

Q	Answer	Mark	Comments
7	$B(12, 5)$	B1	
	$C(6, -5)$	B1	
	$D(12, -5)$	B1ft	ft their 12 from $B$ and their $-5$ from $C$
8(a)	$3 \times 15$ or 45	M1	
	135	A1	
8(b)	$180 - 84 - 49$	M1	oe eg $96 - 49$ or $131 - 84$
	47	A1	
	<b>Additional Guidance</b>		
	133		MOA0

Q	Answer	Mark	Comments
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8(c)	<b>Alternative method 1</b>		
	26 + 15 + 190 or 231	M1	360 – 190 – 26 – 15
	129	A1	
	<b>Alternative method 2</b>		
	180 – 10 – 15 or 155 or 25	M1	180 – 26 – 25 or 155 – 26
	129	A1	
	<b>Alternative method 3</b>		
	180 – 26 – 15 or 139 and 10 seen	M1	180 – 41 – 10 or 139 – 10
	129	A1	

9(a)		B2	B1 for one correct dot or for one correct dot and one incorrect dot
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9(b)	7 × 4 or 28 seen	M1	oe
	14 × 4 or 7 × 8	M1	oe
	56	A1	SC1 63

Q	Answer	Mark	Comments
<b>10(a)</b>	4 or 5 points plotted correctly	M1	$\pm \frac{1}{2}$ square
	5 points plotted correctly and points joined with a smooth curve from 20 to 60	A1	$\pm \frac{1}{2}$ square SC1 for all coordinates reversed and a smooth curve
	<b>Additional Guidance</b>		
	Curve does not need to extend to zero		
<b>10(b)</b>	Extends graph to at least [(70, 94), (70, 103)]	B1	
	Correct reading for their graph	B1ft	tolerance $\pm 1$

Q	Answer	Mark	Comments
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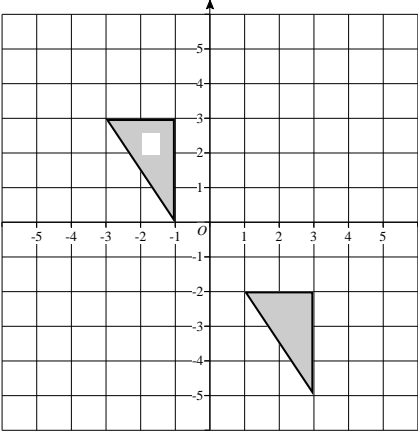
<p><b>11(a)</b></p>		<p>B2</p>	<p>B1 for 1 or 2 correct</p>
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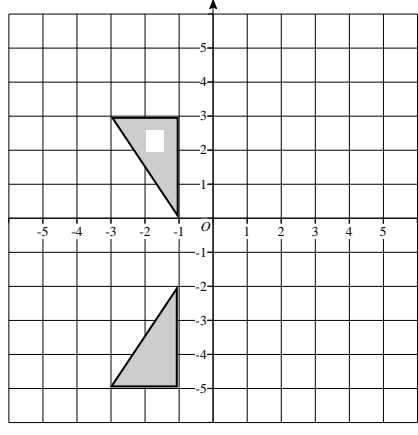
<p><b>11(b)</b></p>		<p>B3</p>	<p>B1 for each</p>
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Q	Answer	Mark	Comments
12	$5x + 5x + 3x + 3x$ or $16x$ or $5 + 5 + 3 + 3$ or 16	M1	oe
	$5 \times 2x$ or $10x$ or $5 \times 2$ or 10	M1	oe
	$16x : 10x$ or $16 : 10$	A1	oe eg $8x : 5x$ $1.6 : 1$
	$8 : 5$	A1ft	Dependent on at least M1 SC3 $5 : 8$ SC2 $5x : 8x$
	<b>Additional Guidance</b>		
	$10 : 16$ oe		M1M1A0A0
	$16x : 12x$ 4 : 3		M1M0A0A1ft

13	$12 \times 4 \times 9$	M1	$0.12 \times 0.04 \times 0.09$ $120 \times 90 \times 40$
	432	A1	0.000 432 432 000
	$\text{cm}^3$	B1	$0.000\ 432\ \text{m}^3$ $432\ 000\ \text{mm}^3$
	<b>Additional Guidance</b>		
	$432^3$ (Assume $^3$ is their units)		M1A1B0
	$12 \times 4 \times 9 = 442\ \text{cm}^3$		M1A0B1
$12 + 4 + 9 = 25\ \text{cm}^3$		M0A0B1	

Q	Answer	Mark	Comments
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<p>14(a)</p>	<p>Correct translation</p> 	<p>B2</p>	<p>B1 for translation 4 right or 5 down or for 3 correct points without the triangle</p>
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<p>14(b)</p>	<p>Correct reflection</p> 	<p>B2</p>	<p>B1 for reflection in <math>y = c</math> or in <math>x = -1</math> or for 3 correct points without the triangle</p>
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Q	Answer	Mark	Comments	
15	$\frac{30}{100} \times 68$ or 20.4 or 20 or $\frac{70}{100} \times 68$ or 47.6 or 48	M1	oe	
	0.75 × 55 or 41(.25) or 41.3	M1	oe	
	15 000 ÷ 47.6 or 315.(...) or 15 000 ÷ 48 or [312, 316]	M1dep	oe Dependent on 1st M1	
	12 000 ÷ 41(.25) or 12 000 ÷ 41.3 or [290, 293]	M1dep	oe Dependent on 2nd M1	
	[312, 316] and [290, 293] and A	Q1		
	<b>Additional Guidance</b>			
	68 – 20.4 = 45.6, 15 000 ÷ 45.6 = 329 and 291 seen			M1M1M1M1 Q0

Q	Answer	Mark	Comments
16(a)	$\pi \times 0.7$ or $2 \times \pi \times 0.35$ or 2.19	M1	
	[2.198, 2.2]	A1	Accept $0.7\pi$

16(b)	Consistent units seen or implied	B1	eg 1600 or [0.002 198, 0.002 2] seen	
	their 1600 $\div$ their [2.198, 2.2]	M1	oe Units need not be consistent	
	727.(...)	A1		
	727	Q1ft	Strand (i) Rounding down their answer	
	<b>Additional Guidance</b>			
	160 $\div$ $0.7\pi = 72.8$ so 72			B0M1A0Q1ft

Q	Answer	Mark	Comments
17(a)	$4x - 5 = 15$	M1	$4 \times 5 - 5 = 15$ or $4 \times 5 = 20$
	$4x = 15 + 5$ or $4x = 20$	M1dep	oe
	5	Q1	Strand (ii) SC2 Answer 5 without algebra shown

17(b)	$5y - 7 = y + 3$	M1	
	$5y - y = 3 + 7$ or $4y = 10$	M1	oe
	$(y =) 2.5$	A1	
	their $2.5 + 3$ or $5 \times \text{their } 2.5 - 7$ or $5.5$ or $5.5 \times 15$	M1	oe ft their y if clearly shown
	82.5	A1	
	<b>Additional Guidance</b>		
	$4 \times 2.5 = 10, 2.5 + 3$ embedded value for y		

Q	Answer	Mark	Comments	
18	$9^2 + 16^2$ or $81 + 256$ or $337$	M1		
	$\sqrt{9^2 + 16^2}$ or $\sqrt{81+256}$ or $\sqrt{337}$	M1dep		
	18.35... or 18.36	A1		
	18.4	B1ft	ft their answer to 2 dp or better	
	<b>Additional Guidance</b>			
	18.4 on its own			M1M1A1B1
	18.40			M1M1A1B0
	18.3			M1M1A0B0