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# GCSE MATHEMATICS

**NEW PRACTICE PAPER SET 1** Higher Tier Paper 3  
Mark Scheme (Published September 2015)

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8300/3H

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Version 1.0

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Principal Examiners have prepared these mark schemes for specimen papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

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>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 <i>a</i> and <i>b</i> inclusive.
<b>3.14...</b>	Allow answers which begin 3.14 eg 3.14, 3.142, 3.1416
<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 student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

### **Questions which ask students to show working**

Instructions on marking will be given but usually marks are not awarded to students who show no working.

### **Questions which do not ask students to show working**

As a general principle, a correct response is awarded full marks.

### **Misread or miscopy**

Students often copy values from a question incorrectly. If the examiner thinks that the student 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
1	$-7 \leq x < 6$	B1	
2	$\frac{4}{9}$	B1	
3	2.5 cm/s	B1	
4	$x$ is $\frac{2}{3}$ of $y$	B1	
5	$3a(3a - 2)$	B2	B1 $a(9a - 6)$ or $3(3a^2 - 2a)$
6	+ 8, + 12, + 16 seen or implied or $40 + 20$	M1	
	60	A1	
7(a)	Valid reason Any indication that actual outcomes do not always match theoretical probability	B1	eg It's just chance Might get two of one number
7(b)	$7 + 12 + 9$ or $50 - (4 + 5 + 13)$ or 28	M1	oe
	$\frac{28}{50}$ or $\frac{14}{25}$ or 0.56	A1	
8	$3 \times 180$	M1	oe
	540 with correct method shown	A1	SC1 540 without correct method shown

Q	Answer	Mark	Comments
9	<b>Alternative method 1</b>		
	$60 \times 0.5$ or 30	M1	oe
	$(100 - 60) \times 0.2$ or 8	M1	oe
	38	A1	SC2 0.38
	<b>Alternative method 2</b>		
	Implies boys are 40% and works out 50% of their girl total	M1	eg 60 and 40 seen and $\frac{1}{2} \times 60 = 30$ or 120 and 80 seen and $\frac{1}{2} \times 120 = 60$
	Works out 20% of their boy total	M1dep	eg $0.2 \times 40$ or 8 or $0.2 \times 80$ or 16
38	A1	oe	
10(a)	(2, 16)	B1	
10(b)	12	B1	
10(c)	-2 and 6	B1	
11	$9.83 \times 7$ or 68.81	M1	
	their $68.81 - 9.75 - 9.79 - 9.80 - 9.88 - 9.94 - 9.98$ or 9.67	M1dep	oe
	9.67 and Yes	A1	
12	$7x - 3 = 3x + 3$	B1	
	$7x - 3x = 3 + 3$ or $4x = 6$	M1	oe isolating $x$ and number terms
	$x = 1.5$	A1	
	7.5 or $7\frac{1}{2}$	B1ft	ft $7 \times$ their $1.5 - 3$ or $3 \times$ (their $1.5 + 1$ )

Q	Answer	Mark	Comments
13	2	B1	
14	Any two sets of $a = 5, b = 3, c = 13$ $a = 7, b = 11, c = 5$ $a = 5, b = 2, c = 17$	B3	B2 for any one set B1 $a = 5, b = 5, c = 5$ or $b$ and $c$ prime and $a$ non-prime integer and $a = \sqrt{4b + c}$
15	$64x^6y^{10}$	B2	B1 for two terms correct
16	20 – 12 or 8 seen	M1	
	$\sqrt{17^2 - 8^2}$ or 15	M1	oe
	$\frac{1}{2} (12 + 20) \times 15$ or 240	M1dep	oe Dependent on 2nd M1
	their $240 \div 90$ or 2.66... or $2\frac{2}{3}$	M1dep	
	$(3 \times 19.25 =) 57.75$	A1	
17	$6x^2 - 16xy + 15xy - 40y^2$	M1	Allow one error
	$6x^2 - 16xy + 15xy - 40y^2$	A1	Fully correct
	$6x^2 - xy - 40y^2$	A1ft	ft their four terms

Q	Answer	Mark	Comments
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18	<b>Alternative method 1</b>		
	$3x - 6$ and $4x$	M1	
	$\frac{3x - 6}{4x} = \frac{5}{8}$ or $x = 12$	M1	oe
	48	A1	
	<b>Alternative method 2</b>		
	$a : b$ or $\frac{a}{b}$ equivalent to $3 : 4$ with $a$ and $b > 10$ and $a - 6 : b$ or $\frac{a - 6}{b}$ seen	M1	
	$30 : 48$ or $\frac{30}{48}$	A1	
48	A1		

19(a)	Median at 37	B1	tolerance $\pm \frac{1}{2}$ square
	Quartiles at 24 and 56	B1	tolerance $\pm \frac{1}{2}$ square
	Ends at 0 and [107, 108) and correct boxplot presentation	B1	
19(b)	Correct comment about average	B1	eg the median age of the population will go up by 7 years, so average age will rise
	Correct comment about spread	B1	eg the inter-quartile range will have increased by 8 years, so ages are more spread out

Q	Answer	Mark	Comments
20(a)	Valid statement	B1	eg It should be $\frac{11696.67}{1.025}$ He has assumed the interest is the same each year He is using simple interest not compound interest Accept It should be 1.025 The 8 should be a power He should divide not multiply
20(b)	1 + 0.025 or 1.025 or 100 + 2.5 or 102.5	M1	
	$\frac{11696.67}{1.025^8}$ or 9600	M1	oe
	2096.67	A1	
21(a)	511	B1	
	7 × 73 or 7 is a factor or 73 is a factor	B1	
21(b)	Incorrect and $2^5 - 1 : 2^7 - 1 \neq 5 : 7$ or 31 : 127 shown	B1	
22	$\frac{y}{\sin 35} = \frac{15}{\sin 70}$	M1	oe
	[9.15, 9.16] or 9.2	A1	Accept 9 with working



Q	Answer	Mark	Comments
23	<b>Alternative method 1</b>		
	$ax^2 - abx - abx + ab^2 + 3b$	M1	
	$a = 2$ and $b = 5$	A1	
	65	A1	
	<b>Alternative method 2</b>		
	$2[(x - 5)^2 - 50 + c]$	M1	
	$b = 5$	M1	
	65	A1	
24	False – angle in semicircle = $90^\circ$ (not 92)	B1	
	True – opposite angles in cyclic quad total $180^\circ$	B1	
	True – alternate angles $ACD$ and $CAB = 50^\circ$ or $92 + 88 = 180$ (allied)	B1	$50^\circ$ angles may be on diagram - need not say angle sum of a triangle = $180^\circ$
	False – angle $CAD = 42^\circ$ , should be $32^\circ$ if $DE$ is a tangent by alternate segment	B1	
25	Any one of 155, 165, 7.15, 7.25	B1	
	$\frac{155}{7.25}$ or $\frac{165}{7.15}$	M1	
	21.3... or 21.4 or 23.0...or 23.1	A1	
	Upper bound is 23.1 Lower bound is 21.4	A1	

Q	Answer	Mark	Comments
26(a)	$(x - 5)^2 + 1$	M1	
	$x^2 - 5x - 5x + 25 + 1$ $= x^2 - 10x + 26$	A1	
26(b)	$x^2 + 1 - 5$ or $x^2 - 4$	B1	
	$x^2 - 10x + 26 = \text{their } (x^2 - 4)$	M1	
	$-10x = -4 - 26$ or $-10x = -30$ or $10x = 30$	M1	oe
	3	A1	
27	$\frac{1}{3} \times 14 \times 8 \times h = 336$	M1	oe
	$h = \frac{336 \times 3}{14 \times 8}$ or $h = 9$	M1	oe
	$BX^2 = 7^2 + 4^2$ or $BD^2 = 14^2 + 8^2$ or $BX = \sqrt{65}$ or $BD = 2\sqrt{65}$ or $VB = \sqrt{146}$	M1	oe
	Identifies $\hat{V}BX$	M1	oe
	$\tan \hat{V}BX = \frac{\text{their } 9}{\text{their } \sqrt{65}}$	M1	$\cos \hat{V}BX = \frac{\text{their } \sqrt{65}}{\text{their } \sqrt{146}}$ or $\sin \hat{V}BX = \frac{\text{their } 9}{\text{their } \sqrt{146}}$
	48 or 48.1...	A1	