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# GCSE MATHEMATICS (8300/1H)

Paper 1 Higher

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**Mark scheme**

Specimen 2015

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Version 2.0

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.

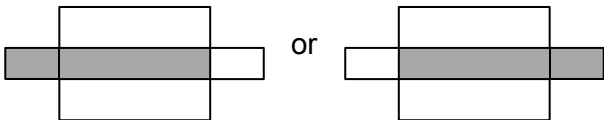
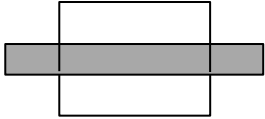
### **Work replaced**

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

### **Premature approximation**

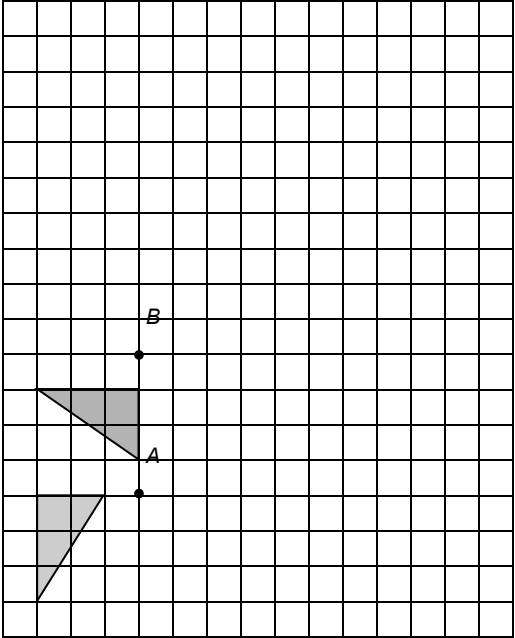
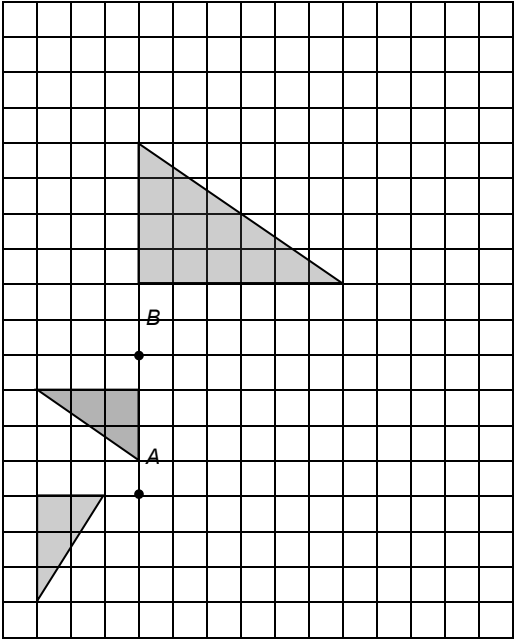
Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Q	Answer	Mark	Comments
1(a)	2.03	B1	
1(b)	$2.\dot{3}$	B1	
2	$45 - 5n$	B1	
3	$9 \times 10^3$	B1	
4	536	B2	B1 for $6432 \div 12$ or digits 536 eg 0.0536 53600
5(a)	strong positive	B1	
5(b)	Straight ruled line of best fit	B1	Through (30, 1) to (35, 1) and (60, 6) to (65, 6)
	4	B1	
5(c)	Refers to danger when extrapolating outside the range of the data given or Refers to difficulty of interpolation at certain points eg 35 lessons suggests 1 or 2 tests	B1	oe eg line of best fit might not continue eg 20 lessons suggests 0 tests

Q	Answer	Mark	Comments
6	<b>Alternative method 1</b>		
	$\frac{16}{40}$ or $\frac{25}{40}$ or $\frac{20}{40}$	M1	
	Valid comparison eg $\frac{16}{40}$ and $\frac{25}{40}$ and $\frac{20}{40}$ or $\frac{4}{40}$ and $\frac{5}{40}$	M1	oe
	$\frac{2}{5}$	A1	Must see working
	<b>Alternative method 2</b>		
	0.4 or 0.625 or 0.5	M1	40(%) or 62.5(%) or 50(%)
	0.4 and 0.625 and 0.5 or 0.1 and 0.125	M1	40(%) and 62.5(%) and 50(%) or 10(%) and 12.5(%)
	$\frac{2}{5}$	A1	Must see working
7(a)	Correct two rectangles shaded 	B1	
7(b)	Correct three rectangles shaded 	B1	
7(c)	$2ab + ad + 2cd$	B1	oe eg unsimplified eg $d(a + 2c) + 2ab$

Q	Answer		Mark	Comments
8	$\frac{\sqrt{3}}{2}$		B1	
9(a)	Ben and valid reason		B1	eg shortest time Took 4.5 minutes
9(b)	Makes 4 correct statements Must refer to all 3 boys		B4	Max B3 for only referring to 2 boys Max B2 for only referring to 1 boy B1 for each valid statement Valid statements could include: Alan started in the lead (Ben 2nd, Carl 3rd) After 2.5 minutes / 500 m Ben slowed down After 3.5 minutes / 600 m Ben increased speed After 4 minutes / 600 m Carl increased speed After 3 minutes / 800 metres Alan stopped (for 0.25 minutes) After 3.25 minutes Alan set off again Alan and Carl both finish in 5 minutes Ben and Carl both finish at the same speed Finishing order: Ben wins, Alan and Carl tie for 2nd
10	$(2x + 3y = 15.5)$	$(2x + 3y = 15.5)$	M1	Equates coefficients
	$2x + 2y = 12$	$3x + 3y = 18$		
	$y = 3.5$ or $x = 2.5$		A1	oe
	$x = 2.5$ and $y = 3.5$		A1	

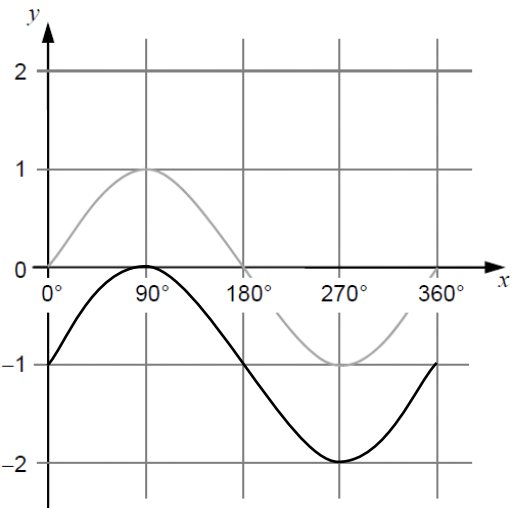
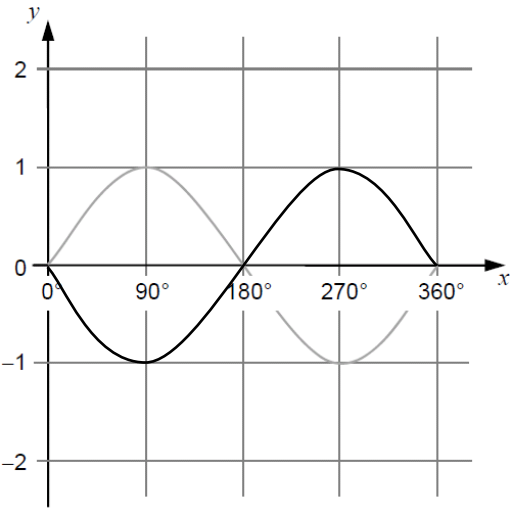
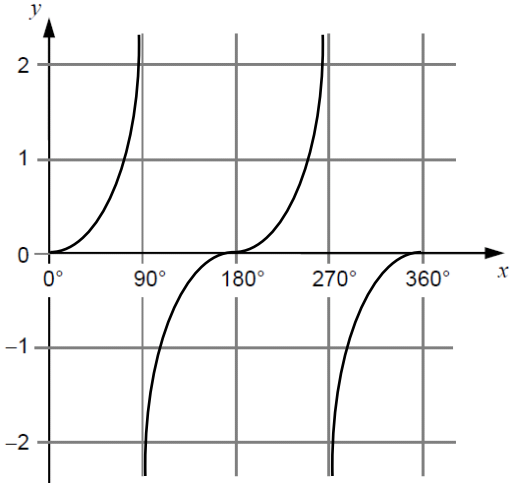
Q	Answer	Mark	Comments
11	15 from 6 6 8 9 21	B3	B2 5 integers with at least two criteria <ul style="list-style-type: none"> <li>mode 6 or</li> <li>median 8 <b>and</b></li> <li>total 50</li> </ul> do not award B2 for mode and median only  B1 5 integers with any one of these criteria <ul style="list-style-type: none"> <li>mode 6</li> <li>median 8</li> <li>total 50</li> </ul>
12	$14x + 8 - 4x - 24 + 1$	M1	Allow one error
	$10x - 15$	A1	
	$5(2x - 3)$	A1	
13(a)	Measure [8, 8.4]	B1	
	their $[8, 8.4] \times 80$	M1	
	their $[8, 8.4] \times 80 \div 100$	M1	
	[6.4, 6.72] or 6 or 7	A1ft	ft their $[8, 8.4] \times 80 \div 100$
13(b)	Estimate is low as road not straight	B1	oe
	Estimate is low if average speed is lower or Estimate is high if average speed is higher	B1	oe
14(a)	Scale factor $\frac{210}{60}$ or $\frac{60}{210}$ or 2.5 seen	M1	oe Accept 210 : 60 or 60 : 210
	3.5	A1	
14(b)	Between 1° and 2° clockwise	B1	

Q	Answer	Mark	Comments
15		B1	May be implied from the correct final shape
		B2ft B1ft	ft their shape one correct coordinate



Q	Answer	Mark	Comments
16	$y(x - 5) = 4 - 3x$	M1	
	$xy - 5y = 4 - 3x$	M1	
	$xy + 3x = 4 + 5y$ or $x(y + 3) = 4 + 5y$	M1	Isolating $x$ terms
	$x = \frac{4 + 5y}{y + 3}$	A1	oe
17	$8^2 + 6^2$ or 100	M1	
	$\sqrt{8^2 + 6^2}$ or 10	M1dep	oe May be on diagram
	$\pi \times \text{their } 10^2 \times \frac{1}{2}$	M1	oe
	$50\pi - 96$	A1	
18	(19, 9)	B1	$\frac{15 + 23}{2} = 19$ or $\frac{6 + 12}{2} = 9$
	$(31 - \text{their } 19) \times \frac{2}{3}$ or 8 or $(\text{their } 9 - 3) \times \frac{2}{3}$ or 4	M1	
	their 19 – 8 or 11 or their 9 + 4 or 13	M1	
	(11, 13)	A1	
19	1.1 or 0.8	M1	May be implied
	$1.1^2 \times 0.8$	M1	oe
	0.968 or 96.8(%) or 0.032 or 3.2%	A1	
	3.2 % decrease	A1ft	ft their 0.968 with both method marks awarded

Q	Answer	Mark	Comments
20	$\frac{1}{3}$	B1	
21	$4x^2 - 10x + 10x - 25$ or $4x^2 - 25$ or $6x^2 + 14x - 15x - 35$ or $6x^2 - x - 35$ or $6x^2 + 14x + 15x + 35$ or $6x^2 + 29x + 35$	M1	Allow one error
	$4x^2 - 10x + 10x - 25$ or $4x^2 - 25$ or $6x^2 + 14x - 15x - 35$ or $6x^2 - x - 35$ or $6x^2 + 14x + 15x + 35$ or $6x^2 + 29x + 35$	A1	Fully correct
	$12x^3 + 28x^2 - 75x - 175$	A1	
22	Use of $\frac{\sqrt{2}}{\sqrt{2}}$ or $\frac{\sqrt{18}}{\sqrt{18}}$ or $\sqrt{50} = \sqrt{25 \times 2}$ or $\sqrt{18} = \sqrt{9 \times 2}$	M1	eg $\frac{26\sqrt{2}}{2}$ or $\frac{12\sqrt{18}}{18}$ or $\frac{12}{3\sqrt{2}}$ or $\frac{4}{\sqrt{2}}$ or $\frac{4\sqrt{2}}{2}$
	One term simplified	A1	ie $13\sqrt{2}$ $2\sqrt{2}$ $10\sqrt{2}$ or $5\sqrt{2}$
	Two terms simplified	A1	ie $13\sqrt{2}$ $2\sqrt{2}$ $10\sqrt{2}$ or $5\sqrt{2}$
	$21\sqrt{2}$ or $a = 21$	A1	

Q	Answer	Mark	Comments
23(a)	Correct graph drawn 	B1	
23(b)	Correct graph drawn 	B1	
23(c)	Correct graph drawn 	B1	

Q	Answer	Mark	Comments
24(a)	$\frac{n-1}{n}$ or $\frac{n-2}{n-1}$	M1	
	$\frac{n-1}{n} \times \frac{n-2}{n-1}$ with cancelling shown	A1	
24(b)	$\frac{n-2}{n} > 0.9$ or $n-2 > 0.9n$	M1	
	$0.1n > 2$ or $n > 20$	M1dep	
	21	A1	SC1 $n = 20$
25(a)	$\vec{BE} = \frac{2}{3}\mathbf{a}$ or $\vec{AE} = \frac{5}{3}\mathbf{a}$	B1	oe
	$-\mathbf{a}$ – their $\vec{BE} + \mathbf{b}$ or $-\mathbf{a}$ – their $\vec{AE} + \mathbf{b}$	M1	
	$-\frac{5}{3}\mathbf{a} + \mathbf{b}$ or $\mathbf{b} - \frac{5}{3}\mathbf{a}$	A1	
25(b)	$\vec{EF} = \frac{2}{5}\vec{ED}$	M1	
	$-\frac{2}{3}\mathbf{a} + \frac{2}{5}\mathbf{b}$	A1ft	oe ft their $\vec{ED}$



