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## **Mark Scheme (Results)**

Summer 2018

Pearson Edexcel GCSE (9 – 1)  
In Mathematics (1MA1)  
Higher (Non-Calculator) Paper 1H

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## General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

- 1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

- 2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no answer) indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

**Questions where working is not required:** In general, the correct answer should be given full marks.

**Questions that specifically require working:** In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

- 3 **Crossed out work**

This should be marked **unless** the candidate has replaced it with an alternative response.

- 4 **Choice of method**

If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

- 5 **Incorrect method**

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.

- 6 **Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

## 7 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (eg. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

## 8 Probability

Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

## 9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

## 10 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and all numbers within the range.

## 11 Number in brackets after a calculation

Where there is a number in brackets after a calculation E.g.  $2 \times 6 (=12)$  then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

## 12 Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas E.g. "12"  $\times$  50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

## 13 Word in square brackets

Where a word is used in square brackets E.g. [area]  $\times$  1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

## 14 Misread

If a candidate misreads a number from the question. Eg. uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

### Guidance on the use of abbreviations within this mark scheme

<b>M</b>	method mark awarded for a correct method or partial method
<b>P</b>	process mark awarded for a correct process as part of a problem solving question
<b>A</b>	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
<b>C</b>	communication mark
<b>B</b>	unconditional accuracy mark (no method needed)
<b>oe</b>	or equivalent
<b>cao</b>	correct answer only
<b>ft</b>	follow through (when appropriate as per mark scheme)
<b>sc</b>	special case
<b>dep</b>	dependent (on a previous mark)
<b>indep</b>	independent
<b>awrt</b>	answer which rounds to
<b>isw</b>	ignore subsequent working

**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	$\frac{95}{28}$	M1	for a method to add using common denominators with at least one fraction correct (matching numerator with common denominator) eg $\frac{60}{28} + \frac{35}{28}$ <b>or</b> $(2)\frac{4}{28} + (1)\frac{7}{28}$	Use of decimals gets no credit unless it leads to a correct fraction
1 (b)	$1\frac{3}{5}$	M1	for $\frac{6}{5} \times \frac{4}{3}$ <b>or</b> $\frac{24}{20} \div \frac{15}{20}$ <b>or</b> $\frac{8}{5}$ oe eg $1\frac{9}{15}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	cao	
2	140	P1	for beginning to solve the problem eg $50 \div 5 \times 8 (= 80)$ <b>or</b> $14 : 8 : 5$ oe <b>or</b> $14 : 8$ and $8 : 5$ oe (linked)	80 may be seen in the ratio 80 : 50
		P1	for a full process to solve the problem eg “80” $\div 4 \times 7$ <b>or</b> $\frac{50}{5} \times “14”$ <b>or</b> $140 : 80 : 50$	
		A1	cao	If 140 clearly identified as houses in working award full marks

**Paper: 1MA1/1H**

<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Mark scheme</b>	<b>Additional guidance</b>
3	30	P1	for full process to find the number of bags sold eg $5 \times 1000 \div 250 (= 20)$	This could be by repeated addition  Calculations can be in £ or pence  [number of bags] can only come from $5 \times 10 \div 250 (= 0.2)$ or $5 \times 100 \div 250 (= 2)$ or $5 \div 250 (= 0.02)$  3/10 or 0.3 is not enough but should be awarded 2 marks  Award P3 for 130(%)
		P1	<b>OR</b> for process to find selling price of 1 kg of sweets eg $0.65 \times 4 (= 2.60)$	
		P1	for [number of bags] $\times 0.65$ <b>or</b> “20” $\times 0.65 (= 13)$ <b>or</b> “2.60” $\times 5 (= 13)$ <b>OR</b> for $10 \div “20”$ oe (= 0.50) <b>OR</b> for $0.65 \times 4 (= 2.60)$ <b>and</b> $10 \div 5 (= 2)$	
		P1	(dep on previous P1) for a process to find the percentage profit eg (“13” $- 10) \div 10 \times 100$ <b>or</b> $(0.65 - “0.50”) \div “0.50” \times 100$ <b>or</b> $(“2.60” - “2”) \div “2” \times 100$ <b>OR</b> “13” $\div 10 \times 100 (= 130)$ oe	
		A1	cao	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
4 (a)	Estimated value	P1	for using a rounded value in a correct process eg $3000 \div 15$ <b>or</b> $15 \times 8$ <b>or</b> $20 \times 8$	Their rounded value must be used in a calculation  Rounding may appear after a correct process eg $15.12 \times 8 = 120.96 \approx 100$ followed by eg $3069.25 \div 100$
		P1	for a full process to find the number of days eg “3000” $\div$ “15” $\div$ “10” (= 20) <b>or</b> “3000” $\div$ “15” $\div$ 8 (= 25)	Accept $3069.25 \div 15.12 \div 8$ oe
(b)	Explanation	A1	for a correct answer following through their rounded values	
		C1	eg less days required <b>or</b> it doesn't affect the answer because I would still round 16.27 down to 15 (or up to 20)	Refers to time taken



**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance
5 (a)	isosceles triangle, base 6 cm, height 4 cm	M1	for drawing an isosceles triangle <b>or</b> for drawing a triangle of base 6cm and height 4cm	Accept a freehand drawing Only a single triangle is acceptable; do <b>not</b> accept any attempted nets or 3-D diagrams
		A1	for a fully correct diagram	Condone a perpendicular drawn from base to vertex
		M1	for a method to find the area of a triangular face eg $\frac{1}{2} \times 6 \times 5 (= 15)$	
		M1	(dep) for finding the total surface area eg $4 \times "15" + 6 \times 6$	
		A1	for a numerical answer of 96  SC B1 for an answer of 84 if M0 scored	Ignore incorrect or absent units for this mark [The SC is from: $4 \times \frac{1}{2} \times 6 \times 4 + 6 \times 6$ ]
(b)	96 cm <sup>2</sup>	B1	cm <sup>2</sup>	Ignore incorrect or absent numerical answer for this mark

**Paper: 1MA1/1H**

<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Mark scheme</b>	<b>Additional guidance</b>
6	(22, 20)	P1  P1  P1  P1  A1	for process to find width or height of diagram eg $38 - 6 (= 32)$ <b>or</b> $36 - 7 (= 29)$  for process to find length of side of square eg " $32$ " $\div 4 (= 8)$  <b>or</b> process to find half width of diagram eg " $32$ " $\div 2 (= 16)$  for process to find $x$ coordinate eg $6 + 2 \times "8" (= 22)$ <b>or</b> $6 + "16" (= 22)$ <b>or</b> $(6 + 38) \div 2 (= 22)$  for process to find $y$ coordinate eg $36 - 2 \times "8" (= 20)$ <b>or</b> $36 - "16" (= 20)$ <b>or</b> $7 + "8" + "29" - 3 \times "8" (= 20)$  cao  SC: award 4 marks for (20, 22)	Figures may be shown on the diagram     If $(6 + 38) \div 2$ leads to an answer other than 22, award P2 only    Award for P3 for (22, $y$ ) or ( $x$ , 20) or $x = 22$ or $y = 20$
7	rotation $180^\circ$ about $(-1, -2)$ <b>or</b> enlargement sf $-1$ centre $(-1, -2)$	B2  (B1)	rotation $180^\circ$ about $(-1, -2)$ <b>or</b> enlargement sf $-1$ centre $(-1, -2)$  rotation $180^\circ$ <b>or</b> rotation about $(-1, -2)$  <b>OR</b> enlargement sf $-1$ <b>or</b> enlargement centre $(-1, -2)$  Award no marks for the description if more than one transformation is given  SC B1 for fully correct diagram if B0 scored	Condone missing brackets but do not accept centre written as a vector  Do not accept 'half turn' for 'rotation $180^\circ$ '  Ignore references to clockwise and anticlockwise  Triangles at $(-3, 1)$ , $(-5, 1)$ , $(-4, 3)$ and $(-3, -5)$ , $(-5, -5)$ , $(-4, -7)$

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
8	216	P1  P1  P1  A1	<p>for process to work with ratio eg <math>72 \div (3 + 4 + 5) (= 6)</math> <b>or</b> <math>72 \div 12 (= 6)</math></p> <p>for process to find length of base or height of triangle eg <math>3 \times "6" (= 18)</math> <b>or</b> <math>4 \times "6" (= 24)</math></p> <p><b>OR</b> process to find area scale factor eg <math>"6" \times "6" (= 36)</math></p> <p>complete process to find the area of the triangle eg <math>\frac{1}{2} \times "18" \times "24"</math> <b>or</b> <math>\frac{1}{2} \times 3 \times 4 \times "6"{}^2</math></p> <p>cao</p>	
9 (a)  (b)  (c)	6  1  $\frac{1}{9}$	B1  B1  M1        A1	<p>cao</p> <p>cao</p> <p>for evidence of working with a cube root eg <math>\sqrt[3]{27}</math> or <math>\sqrt[3]{729}</math></p> <p><b>OR</b> evidence of working with a reciprocal eg <math>\frac{1}{27^{2/3}}</math> or <math>\left(\frac{1}{27}\right)^{\frac{2}{3}}</math></p> <p>cao</p>	Accept $\pm 6$

**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance
10 (a)	Box plot drawn	B3	for a fully correct box plot	Condone the lack of a vertical marker at the end of the tails  Note that a box must be present, as must "tails"
		(B2)	for at least 3 correctly plotted values including box and whiskers/tails )	
		(B1)	for at least 2 correctly plotted values including box or whiskers/tails or 5 correct values plotted or clearly identified and no box or whiskers/tails )	
(b)	60	M1	for a method to find $\frac{3}{4}$ of 80 eg $20 + 20 + 20$ or $\frac{3}{4} \times 80$	
		A1	cao	
11	$90 - 2x$	M1	for identifying an unknown angle eg $BAO = x$ , $AOB = 180 - 2x$ , $OBC = 90$ , $ABC = 90 + x$	Could be shown on the diagram alone  Needs to be an algebraic method Accept $x + x + 90 + y = 180$ for M2  Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked do not credit.  Apply the above criteria
		M1	full method to find the required angle eg a method leading to $180 - x - x - 90$	
		A1	for $90 - 2x$	
		C2	(dep M2) full reasons for their method, from base angles in an <u>isosceles triangle</u> are equal <u>angles</u> in a <u>triangle</u> add up to $180^\circ$ a <u>tangent</u> to a circle is perpendicular to the <u>radius (diameter)</u> <u>angles</u> on a straight <u>line</u> equal $180^\circ$ the <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u>	
		(C1)	(dep M1) for a <u>tangent</u> to a circle is perpendicular to the <u>radius (diameter)</u> )	

**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance
12	Statement supported by algebra	B1 M1 A1 C1	writing a general expression for an odd number eg $2n+1$ (dep) for expanding (“odd number”)² with at least 3 out of 4 correct terms for correct simplified expansion, eg $4n^2 + 4n + 1$ (dep A1) for a concluding statement eg $4(n^2 + n) + 1$ (is one more than a multiple of 4)	Could be $2n - 1, 2n + 3$ , etc Note that $4n^2 + 4n + 2$ or $2n^2 + 4n + 1$ in expansion of $(2n + 1)^2$ is to be regarded as 3 correct terms
13	5	M1 M1 A1	for $\sqrt{40}$ <b>or</b> $\sqrt{90}$ <b>OR</b> $2\sqrt{2}$ <b>or</b> $3\sqrt{2}$ for $2\sqrt{10}$ <b>or</b> $3\sqrt{10}$ <b>or</b> $\sqrt{4} \times \sqrt{10}$ <b>or</b> $\sqrt{9} \times \sqrt{10}$ <b>or</b> $\sqrt{4 \times 10}$ <b>or</b> $\sqrt{9 \times 10}$ <b>OR</b> $2\sqrt{2} + 3\sqrt{2}$ cao	Answer of $5\sqrt{10}$ from correct working gets M2 A0

**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance
14	$y = \frac{100}{9x^4}$	P1  P1  P1  P1  A1	for setting up a correct proportional relationship, eg $d \propto x^2$ <b>or</b> $d = kx^2$  for setting up a second proportional relationship, eg $y \propto \frac{1}{d^2}$ <b>or</b> $y = \frac{K}{d^2}$  (dep P1) for a process to find one of the constants of proportionality eg $24 = k \times 2^2$ ( $k = 6$ ) <b>or</b> $4 = K \div 100$ ( $K = 400$ )  full process to find $y$ in terms of $x$ eg $y = \frac{"400"}{("6"x^2)^2}$ oe  $y = \frac{100}{9x^4}$ oe	Condone the use of 'α' instead of '=' for the four P marks          Both constants must come from a correct process    Expression must have been simplified, but could be given other equivalent ways eg $y = 11.111\dots x^{-4}$

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	$(a - b)(a + b)$	B1	cao	Accept reversed brackets
(b)	$12(x^2 + 1)$	M1	for using ' $a$ ' = $x^2 + 4$ and ' $b$ ' = $x^2 - 2$  <b>OR</b> multiplying out both brackets, at least one fully correct	Correct 4 terms if not simplified or 3 terms if simplified
		M1	(dep) for a correct expression for (' $a$ ' + ' $b$ ')('' $a$ ' - ' $b$ '') with no additional brackets, simplified or unsimplified eg $(x^2 + 4 + x^2 - 2)(x^2 + 4 - x^2 + 2)$ <b>or</b> $(2x^2 + 2) \times 6$  <b>OR</b> ft for a correct expression without brackets, simplified or unsimplified eg $x^4 + 8x^2 + 16 - x^4 + 4x^2 - 4$	
		A1	for $12(x^2 + 1)$ <b>or</b> $12x^2 + 12$ oe	

**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance
16	0.12	P1          P1  A1	for process to start eg $(1 - 0.2) \div (3 + 17)$ (= 0.04)  <b>or</b> $(3 + 17) \div (1 - 0.2)$ oe (= 25)  <b>or</b> $(100 - 20) \div (3 + 17)$ (= 4)  <b>or</b> $3 \times 4$ (= 12) and $17 \times 4$ (= 68)  full process to find the required probability eg $3 \times \text{“0.04”}$ <b>or</b> $\frac{3}{20} \times (1 - 0.2)$ oe <b>or</b> $3 \div \text{“25”}$ or $3 \times \text{“4”} \div 100$  oe	Just $1 - 0.2 = 0.8$ is <b>not</b> sufficient for P1          May be seen in a ratio          0.12 using incorrect probability notation gets P2
17	$\frac{3x + 1}{2x}$	M1  A1  A1	for $(3x + 1)(x - 3)$ <b>or</b> $2x(x - 3)$  for $(3x + 1)(x - 3)$ <b>and</b> $2x(x - 3)$  $\frac{3x + 1}{2x}$ oe	Accept $(2x + 0)$ for the first two marks but not for the final answer
18	Graph drawn	C2  (C1)	for graph translated by $-2$ in the $y$ direction  for a graph translated in the $y$ direction  <b>OR</b> for a correct graph through four of the five key points)	Key points: $(-180, -2)$ , $(-90, -3)$ , $(0, -2)$ , $(90, -1)$ , $(180, -2)$

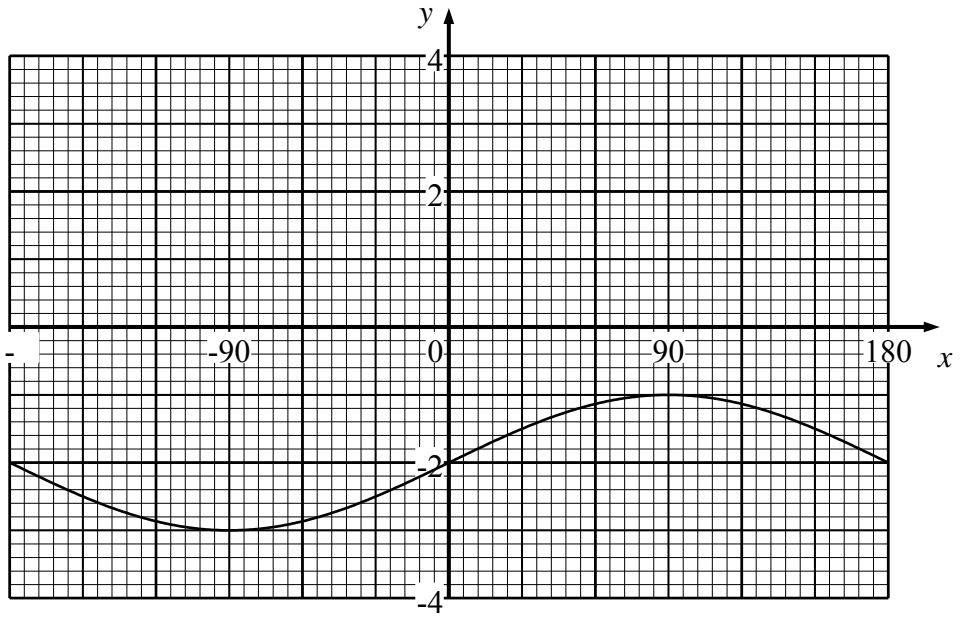


Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
19	$b = \frac{2}{3}a + 2$	P1	for process to rearrange the equation to give $y$ in terms of $x$ eg $y = \frac{7-3x}{2}$ <b>or</b> $y = -\frac{3}{2}x + \left(\frac{7}{2}\right)$ <b>or</b> $m = -\frac{3}{2}$	
		P1	for using their gradient in $mn = -1$	
		P1	for showing a process to find the gradient of $PQ$ eg $\frac{b-4}{a-3}$ <b>OR</b> for substituting $x = 3$ and $y = 4$ in $y = \frac{2}{3}x + c$	
		P1	(dep P3) for forming an equation in $a$ and $b$ eg $\frac{b-4}{a-3} = \frac{2}{3}$ <b>or</b> $b = \frac{2}{3}a + 2$ <b>OR</b> correct equation in terms of $x$ and $y$ eg $y = \frac{2}{3}x + 2$	$y - 4 = \frac{2}{3}(x - 3)$ gets P4
		A1	for $b = \frac{2}{3}a + 2$ oe	Accept 0.66 or 0.67 oe for $2/3$

**Paper: 1MA1/1H**

Question	Answer	Mark	Mark scheme	Additional guidance	
20	2, 3, 4	M1	for method to solve $3n + 2 \leq 14$ eg $n \leq (14 - 2) \div 3$ oe	This could be shown within an equation rather than an inequality at this stage	
		M1	for complete method to rearrange $\frac{6n}{n^2 + 5} > 1$ to the form $an^2 + bn + c (< 0)$	For the 2rd and 3rd M marks condone no '< 0' and condone use of incorrect inequality signs or '='	
		M1	for method to begin to solve $n^2 - 6n + 5 (< 0)$ eg $(n \pm 5)(n \pm 1) (< 0)$	Accept $\frac{- -6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 5}}{2 \times 1}$ (condone one sign error)	
		M1	(dep on previous M2) for $n > 1$ and $n \leq 4$ <b>or</b> $1 < n < 5$	Must come from correct working Could be shown on a number line	
		A1	(dep M4) cao		
		<b>Alternative method</b>			
		M1	for method to solve $3n + 2 \leq 14$ eg $n \leq (14 - 2) \div 3$ oe  <b>OR</b> for $3 \times 4 + 2 = 14$	This could be shown within an equation rather than an inequality at this stage	
		M3	for trials with 1, 2, 3 and 4 in the quadratic inequality, correctly evaluated	The values from the trials may be given as improper fractions eg $\frac{24}{21}, \frac{18}{14}, \frac{12}{9}, \frac{6}{6}$	
		(M2)	for trials with three of 1, 2, 3 and 4, correctly evaluated)		
		(M1)	for trials with two of 1, 2, 3 and 4, correctly evaluated)		
A1	(dep M4) cao				

Q18



## Modifications to the mark scheme for Modified Large Print (MLP) papers.

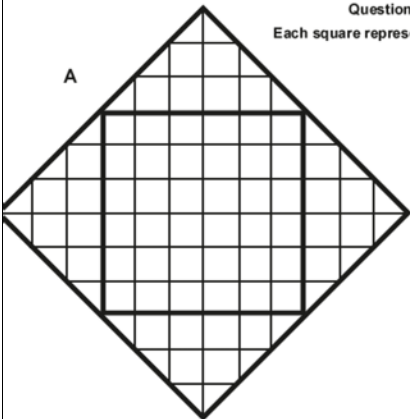
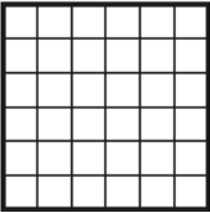

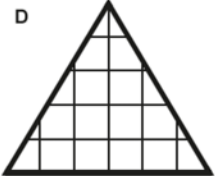
Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles:  $\pm 5^\circ$

Measurements of length:  $\pm 5$  mm

Paper: 1MA1/1H		
Question	Modification	Mark scheme notes
5	(a)	
	<p>Model and a diagram provided. Diagram enlarged. Dashed lines made longer and thicker.            Dotted lines made more obvious.            Question reversed: Four different options of the front view of the pyramid have been provided.            The pyramid has been put on page one for question 23(a) and the four shapes labelled A to D have been put on page two for question 23(a).            Question changed to 'Look at the model or at the diagrams for Question 23(a) in the Diagram Book. They are shown on two pages in the Diagram Book.            Page one shows a solid square-based pyramid, VABCD.            The base of the pyramid is a square of side 6 cm. The height of the pyramid is 4 cm.            M is the midpoint of BC and <math>VM = 5</math> cm.            Page two for Question 23 shows four shapes, labelled A, B, C and D. Each square represents a one centimetre square.            Which shape shows the accurate front elevation of the pyramid from the direction of the arrow?'            [See below for diagram]</p>	<p>Award 1 mark for an answer of D            Award 2 marks for an answer of C            NB: Accept any other unambiguous indication of the answer such the diagram indicated by circling etc.</p>

Question	Modification	Mark scheme notes
5	<p data-bbox="613 357 958 400">Question 5 – Page two Each square represents a one centimetre square.</p>  <p data-bbox="405 424 421 443">A</p>  <p data-bbox="757 424 772 443">B</p>  <p data-bbox="405 783 421 802">C</p>  <p data-bbox="757 783 772 802">D</p>	See above for question 5 mark scheme.

**Paper: 1MA1/1H**

<b>Question</b>		<b>Modification</b>	<b>Mark scheme notes</b>
6		Diagram enlarged. Crosses changed to solid dots. Wording changed to 'It shows a pattern made from four identical squares.'	Standard mark scheme
7		Question reversed. Diagram enlarged. Shading changed to dotted shading. Shapes R and S also drawn on the grid. Shapes labelled, shape R, shape S and shape T. Axis extended to go from minus 8 to 5. One unlabelled shape is provided. Wording added 'A cut out shape is available if you wish to use it.' New question wording 'Look at the diagram for Question 7 in the Diagram Book. It shows shape T, shape R and shape S on a grid. A cut out shape is available if you wish to use it. (a) Describe the single transformation that maps shape T to shape R. [1 mark] (b) Describe the single transformation that maps shape T to shape S. [1 mark].	(a) B1 for "a reflection in the line $x = -1$ " (b) B1 for "rotation $180^\circ$ about $(-1, -2)$ " or "enlargement sf $-1$ centre $(-1, -2)$ " Note: award either 0, 1 or 2 for Q7; do not award separate marks for (a) and (b) on MLP scripts.
10		Values in the table changed: Least height changed from 133 cm to 135 cm. Upper quartile changed from 157 cm to 160 cm. Median changed from 151 cm to 150 cm.	
10	(a)	Diagram enlarged. Wording added 'It shows a grid.' The axis label to the left of the horiz.axis.	Standard mark scheme
10	(b)	Question wording changed to, 'Work out an estimate for the number of these girls with a height between 135 cm and 160 cm'.	Standard mark scheme

**Paper: 1MA1/1H**

<b>Question</b>		<b>Modification</b>	<b>Mark scheme notes</b>
11		Diagram enlarged. Dot at O made bigger. Dashed line added from OB and an angle arc has been marked labelled $x^\circ$ .	Standard mark scheme
15	(a)	Braille only: $a$ changed to $q$ and $b$ changed to $r$ .	Standard mark scheme with $a$ changed to $q$ and $b$ changed to $r$ for Braille.
15	(b)	$x$ changed to $y$ – MLP only.	Standard mark scheme with $x$ changed to $y$ – MLP only.
18		Diagram enlarged. Wording changed to 'It shows'.	Standard mark scheme, but apply normal tolerance for MLP papers in taking readings.



**Pearson**  
**Edexcel**

# **Mark Scheme (Results)**

**Summer 2018**

**Pearson Edexcel GCSE (9 – 1)**  
**In Mathematics (1MA1)**  
**Higher (Calculator) Paper 2H**



**Paper: 1MA1/2H**

Question		Answer	Mark	Mark scheme	Additional guidance
1	(a)	$m^7$	B1	cao	
	(b)	$125n^3p^9$	B2	cao	Allow multiplication signs
			(B1	for 2 of 3 terms correct in a single product)	$125n^3p^x$ or $125n^x p^9$ where $x \neq 0$ or $an^3p^9$ where $a$ is a number
(c)	$8q^6r^3$	B2	cao	Allow multiplication signs	
	(B1			for 2 of 3 terms correct in a single product)	$8q^6r^x$ or $8q^x r^3$ where $x \neq 0$ or $aq^6r^3$ where $a$ is a number
2	(a)	280	M1	for listing at least 3 multiples of both 40 and 56 <b>OR</b> finds the prime factors of both 40 and 56	40, 80, 120, ... 56, 112, 168, ... <b>OR</b> 2,2,2,5 and 2,2,2,7
			A1	cao	
	(b)	60	B1	60 <b>or</b> $2^2 \times 3 \times 5$ oe	$2^2, 3, 5$ not enough ie must be a product
3		$y = 3x - 6$	M1	for a correct method to find the gradient of the line, or $m = 3$ <b>OR</b> identifies $-6$ as the intercept in words or in a partial equation <b>OR</b> $y - b = m(x - a)$ where $m \neq 3$ and $(a, b)$ is a correct coordinate	Just ringing $-6$ is insufficient
			M1	for $y = 3x + c$ <b>or</b> (L=) $3x - 6$ <b>or</b> $y = "3"x - 6$ <b>OR</b> $y - y_1 = 3(x - x_1)$ <b>or</b> $y - b = "3"(x - a)$ where $(a, b)$ is a correct coordinate	Award of this mark implies the first M1 $c$ must be seen either as a letter or a number
			A1	accept $y = 3x + -6$ oe	

**Paper: 1MA1/2H**

Question	Answer	Mark	Mark scheme	Additional guidance
4	3 : 5	P1  P1  P1  P1  A1	for process to find 20% <b>or</b> 120% of the cost, eg $8500 \times 0.2$ (= 1700) <b>oe or</b> $8500 \times 1.2$ (= 10 200) <b>oe</b>  for process to find total cost of payments, eg $12 \times 531.25$ (= 6375)  for complete process to find value of deposit, eg “10 200” – “6375” (= 3825) <b>or</b> $8500 - “6375”$ (=2125) <b>and</b> “2125” + “1700” (=3825) <b>OR</b> the deposit as a proportion of the total cost, eg $1 - \frac{“6375”}{“10200”}$ ( $=\frac{3}{8}$ )  for finding a correct un-simplified ratio, eg “3825” : “6375” <b>oe or</b> 5:3 <b>or</b> $1.6 : 1$ <b>or</b> $\frac{5}{3} : 1$  Accept $1 : 1.6$ , $1 : \frac{5}{3}$	When partitioning all figures quoted must be correct or a full method shown eg $10\% = 8500 \div 10$ (=850) and $20\% = “850” + “850”$ (=1700)  May be seen as a fraction of the total eg $\frac{3825}{10200}$ ( $=\frac{3}{8}$ )  Figures at this stage must be expressed as part of a ratio eg 51:85, $\frac{3}{8} : \frac{5}{8}$ Ignore consistent units
5	(a) 0, -4, -6, -4, 0  (b) Graph  (c) 2.6 and -1.6	B2 (B1)  M1 A1  M1  A1	fully correct figures at least 2 correct figures)  (dep B1) for at least 5 points correctly plotted ft from (a) fully correct graph  for $y = -2$ drawn <b>or</b> intersections with $y = -2$ <b>or</b> $y = x^2 - x - 4$ drawn <b>or</b> 1 correct value  ft a quadratic graph <b>or</b> for answers in the range 2.5 to 2.7 <b>and</b> -1.5 to -1.7	Must be a curve  If answers stated as coordinates, award M1 for both coordinates and M0 for one coordinate

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
6	No (supported)	P1  P1  A1	For a process to calculate the initial or new pressure, eg $(70 + 10) \div (20 + 10)$ (=2.6 to 2.7) <b>or</b> $80 \div 30$ (=2.6 to 2.7) <b>or</b> $70 \div 20$ (=3.5)  For a complete process to make a comparison eg $0.8 \times "3.5"$ (=2.8) <b>OR</b> $\frac{("3.5" - "2.6")}{"3.5"} \times 100$ (=22 to 26) <b>OR</b> $"3.5" \times 0.2$ (=0.7) <b>and</b> $80 \div 30$ (=2.6 to 2.7) <b>OR</b> $\frac{"2.6"}{"3.5"} (\times 100)$ (=0.74 to 0.78 <b>or</b> 74 to 78)  for a correct conclusion supported by accurate figures eg 2.8 <b>and</b> 2.6(6...) <b>OR</b> decrease is 24% (or 22% to 26%) <b>OR</b> 0.7 <b>and</b> 2.6 to 2.7 <b>and</b> 3.5 <b>OR</b> 0.7 <b>and</b> 0.9 <b>OR</b> 0.76 (or 0.74 to 0.78) <b>OR</b> 76% (or 74% to 78%)	Accept any value in the range 2.6 to 2.7 if unsupported by working             Allow truncation or rounding of figures
7	Enlargement	B2  (B1	for correct enlargement at (1,2) (2,3) (2,4) (1,4)  for correct size <b>and</b> orientation in the wrong position <b>OR</b> 3 of 4 vertices correct and joined <b>OR</b> 4 correct vertices not joined	

**Paper: 1MA1/2H**

Question	Answer	Mark	Mark scheme	Additional guidance																				
8	$\frac{3}{22}$	P1  P1  P1  A1	for a process to find a first value eg male/Britain = $32 - 11$ (=21) <b>or</b> Italy/total = $60 - (32+12)$ (=16) <b>or</b> female/total = $60 - 38$ (=22)	<table border="1"> <thead> <tr> <th></th> <th>Br</th> <th>Sp</th> <th>It</th> <th>Tot</th> </tr> </thead> <tbody> <tr> <td>M</td> <td><b>21</b></td> <td><b>9</b></td> <td>8</td> <td>38</td> </tr> <tr> <td>F</td> <td>11</td> <td><b>3</b></td> <td><b>8</b></td> <td><b>22</b></td> </tr> <tr> <td>Tot</td> <td>32</td> <td>12</td> <td><b>16</b></td> <td>60</td> </tr> </tbody> </table> <p>May be seen in a frequency tree                      Values attributed to a category or from method seen</p>		Br	Sp	It	Tot	M	<b>21</b>	<b>9</b>	8	38	F	11	<b>3</b>	<b>8</b>	<b>22</b>	Tot	32	12	<b>16</b>	60
	Br	Sp	It	Tot																				
M	<b>21</b>	<b>9</b>	8	38																				
F	11	<b>3</b>	<b>8</b>	<b>22</b>																				
Tot	32	12	<b>16</b>	60																				
9	12 508.7(0)	P1  P1  P1  A1	for start of process to find interest rate for year 1 eg $12336 \div 12000$ (=1.028) <b>or</b> $(12336 - 12000) \div 12000$ (=0.028) <b>OR</b> forms a suitable equation, eg $12000 \times (1 + \frac{x}{100}) = 12336$	Rate of interest = 2.8, or $x = 2.8$ implies P2																				
			for complete process to find the interest rate for year 1 eg $(“1.028” - 1) \times 100$ (=2.8) <b>or</b> $“0.028” \times 100$ (=2.8) <b>OR</b> correct process to solve correct equation eg $(12336 - 12000) \div 120$ (=2.8)																					
			for complete process to find the value at the end of 2 years eg $(“2.8” \div 2 + 100) \div 100 \times 12336$																					
			accept 12508.7 to 12508.71 <b>or</b> 12509	12509 must come from correct working																				

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
10 (a)	Diagram	B1	for correct vector drawn including arrow	May be drawn anywhere on the grid. Condone missing label Accept consistent incorrect notation for M1
(b)	$\begin{pmatrix} 3 \\ -4 \end{pmatrix}$	M1	for $\mathbf{a} + 2\mathbf{b}$ drawn with resultant vector <b>or</b> for writing $\mathbf{a}$ and $\mathbf{b}$ as column vectors <b>and</b> attempt to add $\mathbf{a} + 2\mathbf{b}$ , eg $\begin{pmatrix} 1 \\ 2 \end{pmatrix} + 2 \times \begin{pmatrix} 1 \\ -3 \end{pmatrix}$ <b>or</b> $\begin{pmatrix} 1+2 \\ c \end{pmatrix}$ <b>or</b> $\begin{pmatrix} d \\ 2+-6 \end{pmatrix}$ <b>or</b> $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$	
		A1	cao	
11 (a)	$\frac{2}{25}$	B1	accept 0.08	All powers and products must be evaluated
(b)	$\frac{1}{8}$	M1	$fg(x) = \frac{2}{(4x^3)^2}$ oe <b>or</b> $g(1) = 4$ <b>or</b> $\frac{2}{(4 \times 1^3)^2}$ oe	
		A1	oe	
12	BDAC	B2	all correct	
		(B1	for at least 2 correct)	

**Paper: 1MA1/2H**

Question	Answer	Mark	Mark scheme	Additional guidance
13 (a)	Shown	M1	for finding one missing angle eg $BDE = y$ or $ODE = 90$ or $ODF = 90$ or $DBO = x$ or $BCD = 180 - y$ or (reflex) $BOD = 2y$	Could be shown on the diagram or in working
		A1	for a complete correct method leading to $y - x = 90$	
		C1	(dep on A1) for all correct circle theorems given appropriate for their working eg The <u>tangent</u> to a circle is perpendicular ( $90^\circ$ ) to the <u>radius</u> ( <u>diameter</u> ) <u>Alternate segment</u> theorem <b>OR</b> <u>Angle</u> at the <u>centre</u> is <u>twice the angle</u> at the <u>circumference</u> Opposite angles in a <u>cyclic quadrilateral</u> sum to $180^\circ$	
		C1	for explanation eg No as $y$ must be less than $180$ as it is an angle in a triangle	
14	11 – 19	P1	for drawing a tangent to the curve at time = 5	Using their drawn tangent, eg change in $y \div$ change in $x$  Must come from gradient of a tangent.
		P1	for process to find the gradient, eg $70 \div 5$	
		A1	(dep on 1 <sup>st</sup> P1) for answer in the range 11 - 19 m/s	

Paper: 1MA1/2H					
Question	Answer	Mark	Mark scheme	Additional guidance	
15	(a)	B1	for 0.55 in correct position	Can be seen as fractions or percentages  Follow through acceptable for method marks from their tree in part (a) providing probabilities are less than 1. Accept fractional equivalents	
		B1	for the branches for the second game correct		
	(b)	0.341	M1		for one correct product, eg $0.45 \times "0.33"$ (=0.1485) <b>or</b> $"0.55" \times "0.35"$ (=0.1925) <b>or</b> $0.45 \times "0.67"$ (=0.3015) <b>or</b> $"0.55" \times "0.65"$ (=0.3575)
	M1	for correct method eg $(0.45 \times "0.33") + ("0.55" \times "0.35")$ <b>or</b> $1 - (0.45 \times "0.67") - ("0.55" \times "0.65")$			
A1	answer in range 0.34 – 0.341 oe				
16	(a)	B2	for a circle radius 3.5, centre (0, 0)	Circle could be drawn freehand as long as it approximates to a circle  $2x + y = 1$ does not have to be shown Use professional judgment  Accept values given as coordinates. Check graph for answers	
		(B1	for a circle centre (0, 0) of a different radius, <b>or</b> for a circle drawn of radius 3.5 centre not (0, 0) <b>or</b> incomplete correct circle)		
	(b)	$x = 2.0, y = -2.9$ $x = -1.2, y = 3.3$	M1		for $2x + y = 1$ drawn, <b>or</b> for correctly eliminating one variable, eg $x^2 + 1 - 4x + 4x^2 = 12.25$ or $x^2 + (1 - 2x)^2 = 12.25$
	A1	for the pair of $x$ values, <b>or</b> the correct pair of $y$ values, <b>or</b> one correct pair of $x/y$ values ft from (a) (dep on B1)			
A1	for both correct pair of $x/y$ values, unambiguously matched ft from (a) (dep on B1)				

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	4, 6, 5, 4	M1	for a correct method to find at least 2 frequencies from bars of different widths, eg $10 \times 0.4 (=4)$ , $10 \times 0.6 (=6)$ , $5 \times 1 (=5)$ , $20 \times 0.2 (=4)$	Be aware of 10 coming from incorrect working ft does not apply to the A1
(b)	10	A1	cao	
		M1	for $\frac{23+1}{4} (=6)$ <b>or</b> $\frac{23}{4} (=5.75)$ could fit from their table in (a)	
		A1	for 10 or 9.375	
18	39.5	P1	for a start to a process eg, for a correct trigonometric statement, eg $\sin 48 = \frac{7.3}{AC}$ <b>or</b> $\cos 42 = \frac{7.3}{AC}$ <b>or</b> $\frac{AC}{\sin 90} = \frac{7.3}{\sin 48}$ <b>OR</b> angle <i>CAH</i> unambiguously identified on a diagram	Must include correct values  If an answer is given in the range but then incorrectly rounded award full marks.
		P1	for a complete correct process to find <i>AC</i> , eg $(AC =) \frac{7.3}{\sin(48)}$ (=9.8..) <b>or</b> $(AC =) \frac{7.3}{\cos(42)}$ (=9.8..) <b>or</b> $(AC =) \sin 90 \times \frac{7.3}{\sin 48}$ (=9.8..)	
		P1	for a correct statement using angle <i>CAH</i> , eg $\tan(CAH) = \frac{8.1}{\text{"9.8.."}}$ <b>OR</b> $\sqrt{8.1^2 + \text{"9.8"}^2} (=12.7\dots)$ <b>and</b> $\frac{\sin CAH}{8.1} = \frac{\sin 90}{\text{"12.7"}}$	
		A1	for answer in the range 39.5 – 39.51	



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
19	905	P1	for correct use of formula for the volume of a sphere eg $\frac{1}{4} \times \frac{4}{3} \times \pi \times r^3$ (= 576 $\pi$ or 1809...) <b>OR</b> 576 $\pi \times 4$ <b>or</b> 2304 $\pi$ <b>or</b> 7238...( $=\frac{4}{3} \times \pi \times r^3$ )	We do not need to see what is in the brackets to award this mark. The contents of the bracket alone would score P0
		P1	for a complete correct process to find $r$ , eg $r = \sqrt[3]{\frac{576 \times 4 \times 3}{4}}$ <b>or</b> $r = 12$	Could be shown in several stages $\sqrt[3]{\frac{576 \times 4 \times 3}{4}} = \sqrt[3]{1728}$
		P1	for a process to find the curved surface area eg $\frac{4 \times \pi \times [\text{radius}]^2}{4}$ (=144 $\pi$ or 452...) <b>OR</b> the surface area of both flat surfaces eg $(2 \times \frac{\pi \times [\text{radius}]^2}{2})$ <b>OR</b> complete expression for the total surface area eg $\frac{4\pi r^2}{4} + \frac{\pi r^2}{2} \times 2$ oe	Radius used must be clearly identified as their radius of the solid
		P1	for process to find the complete surface area eg $\frac{4 \times \pi \times [\text{radius}]^2}{4} + (2 \times \frac{\pi \times [\text{radius}]^2}{2})$	
		A1	answer in the range 904.7 – 905 or 288 $\pi$  (SCB2 for an answer in the range 358.1 – 359.2)	If an answer is given in the range but then incorrectly rounded, award full marks.
20	(a)	C1	for a correct explanation, eg $\sqrt{3} \times -\sqrt{3} = -3$ , not 3	
	(b)	C1	for correct explanation, eg $\sqrt{12} = 2\sqrt{3}$ , not $3\sqrt{2}$	

**Paper: 1MA1/2H**

Question	Answer	Mark	Mark scheme	Additional guidance
21	0.43	B1	for one correct bound for mass or length eg 1967.5 <b>or</b> 1972.5 <b>or</b> 13.15 <b>or</b> 15.95 <b>or</b> 21.65 <b>or</b> 13.25 <b>or</b> 16.05 <b>or</b> 21.75	Can work in any units
		P1	for a correct process to find a bound for the volume, eg $13.15 \times 15.95 \times 21.65 (=454(0.925125))$ <b>or</b> $13.25 \times 16.05 \times 21.75 (=462(5.409375))$	Accept volumes truncated or rounded to at least 3 sig fig
		P1	for a correct process to find a bound for density, eg [mass LB] $\div$ "462(5.409375)" (=0.425(367755)) where $1965 \leq \text{mass LB} < 1970$ <b>or</b> [mass UB] $\div$ "454(0.925125)" (=0.434(3828506)) where $1970 < \text{mass UB} \leq 1975$	Accept densities truncated or rounded to at least 3 sig fig
		A1	for both correct bounds, 0.425(367755) <b>and</b> 0.434(3828506)	Accept bounds truncated or rounded to at least 3 sig fig At this point correct units must be used
		C1	(dep on A1) for a correct statement on degree of accuracy e.g. UB and LB both round to 0.43 to 2 decimal places or 2 significant figures	Must be 0.43 not 0.4

## Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

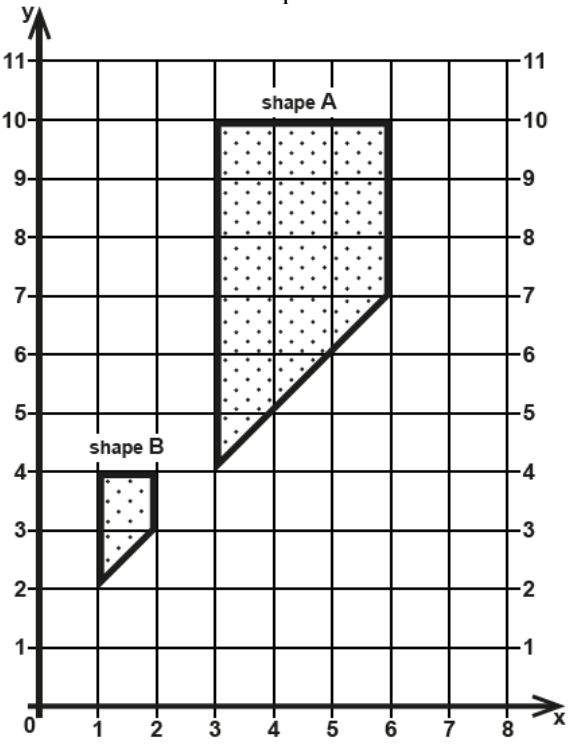
The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles:  $\pm 5^\circ$

Measurements of length:  $\pm 5$  mm

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Paper: 1MA1/2H		
Question	Modification	Mark scheme notes
3	Diagram enlarged	Standard mark scheme
5	(a) Table has been turned to vertical format and left aligned. Wording added 'There are five spaces to fill.' Braille will label answer spaces (i) to (v) from left to right.	Standard mark scheme
5	(b) Diagram enlarged	Standard mark scheme

Question	Modification	Mark scheme notes
7	<p>Shape B has been drawn on the grid and the question has been changed to: 'It shows shape A and shape B given on a grid. Describe fully the single transformation that maps shape A onto shape B.' 3 answer lines have been provided. The cross has been removed from the y axis.</p> 	<p>B2 for all three aspects: enlargement scale factor <math>\frac{1}{3}</math> centre (0,1) (B1 for just two of these aspects)</p>

Paper: 1MA1/2H		
Question	Modification	Mark scheme notes
10	Diagram enlarged. Right axis has been labelled. Arrows have been made longer. Intermediate labels have been added to the axes.	Standard mark scheme
12	Diagrams enlarged. Wording added 'There are four spaces to fill.' Braille will label answer spaces (i) to (iv) from top to bottom.	Standard mark scheme
13	Diagram enlarged. Angles moved outside of the angle arcs and the arcs have been made smaller. Wording added 'Angle BAD = $y^\circ$ Angle BDO = $x^\circ$ '	Standard mark scheme
14	Diagram enlarged. Axes labels have been moved to the left of the horizontal axis and above the vertical axis. Right axis has been labelled. Graph line moved to go through (5, 40).	Standard mark scheme applied to the given graph, which will likely result in figures such as $40/2 = 20$ ; apply normal MLP tolerances, likely to result in an answer in the range 16 - 24 m/s
15	Wording added 'It shows a probability tree diagram.' Diagram enlarged. Wording added in (a): 'There are five spaces to fill.' Braille will label answers as shown below. (ii) 0.45 (iii) (iv) (i) (v)	Standard mark scheme
16	Diagram enlarged.	Standard mark scheme, but apply usual MLP tolerances to reading off the answers.
17	Diagram enlarged. Axes labels have been moved to the left of the horizontal axis and above the vertical axis. Right axis has been labelled. Shading has been changed to dotted shading. In part (a) wording added 'There are four spaces to fill.' Braille will label answer spaces (i) to (iv) from top to bottom.	Standard mark scheme

<b>Paper: 1MA1/2H</b>		
<b>Question</b>	<b>Modification</b>	<b>Mark scheme notes</b>
18	Model provided for all candidates. Diagram enlarged and also provided for MLP. Wording added 'marked x on the model.'	Standard mark scheme
19	2 Models provided for all candidates. Diagrams enlarged and also provided for MLP. No diagram given for the formulae for braille candidates. Shape label has been moved above the diagram. Wording added 'Model 1 is a solid sphere. Model 2, shape S is one quarter of a solid sphere, centre O.'	Standard mark scheme



**Pearson**  
**Edexcel**

# **Mark Scheme (Results)**

**Summer 2018**

**Pearson Edexcel GCSE (9 – 1)**  
**In Mathematics (1MA1)**  
**Higher (Calculator) Paper 3H**

**Paper: 1MA1/3H**

Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	negative	B1	cao	Ignore any description of a relationship and any reference to strength of correlation
1 (b)	Explanation	C1	for a correct explanation, eg “not in line with the trend of the other points” “does not fit in with the correlation” “is far away from the other points or line of best fit”	
1 (c)	Comment	C1	for an explanation eg “point would be outside of the range of the scatter diagram”	
2	$9p + 13$	M1  A1	for method to expand one bracket, eg $5 \times p + 5 \times 3 (= 5p + 15)$ or $2 \times 1 - 2 \times 2p (= 2 - 4p)$ or $-2 \times 1 - 2 \times -2p (= -2 + 4p)$  cao	If an attempt is made to multiply by $-2$ in the second brackets then it must be done consistently.
3	Triangle of area 18	M1  A1	for a complete method to find area of trapezium eg $\frac{1}{2}(2 + 7) \times 4 (= 18)$ <b>OR</b> for a triangle drawn of area 36 <b>OR</b> for a triangle that would give an area ft their area of trapezium  for a triangle drawn of area 18 eg base = 6, height = 6 or base = 9, height = 4	The value for the area of the trapezium must be clear for the ft to be checked.  Accept use of dimensions that are not whole numbers as long as the intention is clear



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
4	Probabilities should sum to 1	C1	for stating that the probabilities should total 1 eg 0.25 should be 0.35	Can be shown on the diagram
	0.35 and 0.65 reversed	C1	for recognising that the 0.35 and 0.65 in the first branches for the 2nd throw should be reversed eg, “for the second throw, the probability it lands on 4 should be 0.65”	
5	(a)	50.5	M1  A1	Must be a complete statement for cos, sin or tan with all three elements present.  If an answer is in the range 50.4 to 50.51 is given in the working space then incorrectly rounded, award full marks.
		Increase (supported)	C1	
	(b)		States increase with supporting reason eg “ $\frac{7}{10}$ is greater than $\frac{7}{11}$ ” “0.636 is less than 0.7” ...“cos increases as angle decreases” “decreasing the denominator increases the value of the fraction” “angle is now 45.6” (accept 45.5 – 45.6)	If figures are given they must be correct (truncated or rounded).

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
6 (a)	8	P1	<p>for process to find sum of unknown probabilities, eg <math>1 - 0.45 - 0.25 (= 0.3)</math></p> <p><b>OR</b> to find the total number of counters in the bag, eg <math>\frac{18}{0.45} (= 40)</math></p> <p><b>OR</b> to find the number of yellow counters, eg <math>\frac{0.25}{0.45} \times 18 (= 10)</math></p>	<p>Award mark for any two probabilities given that sum to 0.3 eg given in the table.</p> <p>Award P2 for P(red) or P(white) (could be shown in table)</p> <p>Equations could be given as written statements or working but must be fully equivalent.</p>
		P1	<p>for process to find P(red) = 0.2 oe <b>or</b> P(white) = 0.1 oe</p> <p><b>OR</b> for process to find the total number of red and white counters, eg “40” – 18 – “10” (=12)</p> <p><b>OR</b> for process to derive an equation in <math>x</math>, eg <math>2x + x = 1 - 0.45 - 0.25</math> or <math>2x + x = “0.3”</math> or <math>x = 0.1</math></p>	
		P1	<p>for a complete process to find the number of red counters, eg <math>\frac{2 \times 0.1}{0.45} \times 18</math> or <math>\frac{2}{3} \times “12”</math> or <math>0.2 \times “40”</math> or <math>\frac{0.2}{0.025}</math></p>	
		A1	cao	
(b)	Explanation	C1	<p>for explanation</p> <p>eg 0.5 multiplied by an odd number will never be a whole number, for half of a number to be an integer that number must be even, you can't have half a marble</p>	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	3.8	M1	for a correct first step, eg $5 - x = 2(2x - 7)$ or $5 - x = 4x - 14$ or $\frac{5}{2} - \frac{x}{2} = 2x - 7$	Method must show LHS $\times 2$ and both terms on RHS $\times 2$ or $5 - x$ and both terms on RHS $\times 2$
		M1	(dep) for isolating terms in $x$ eg $4x + x = 14 + 5$ or $-\frac{x}{2} - 2x = -7 - \frac{5}{2}$	eg $-4x$ both sides with $-5$ both sides or $+x$ both sides with $+14$ both sides
		A1	oe	Accept $\frac{19}{5}$ , $3\frac{4}{5}$ oe but not $\frac{-19}{-5}$ oe

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
8	140	P1	for complete process to find sum of the interior angles of a pentagon eg $(5 - 2) \times 180$ or exterior $360 \div 5 = 72$ , interior $180 - 72 = 108$ , $108 \times 5$ <b>OR</b> for complete process to find sum of the exterior angles of the pentagon eg $(180 - x) + (180 - 2x) + (180 - 125) + (180 - 115) + (180 - 90)$	Must be a complete process that could lead to a figure of 540 if that process is evaluated incorrectly
		A1	for sum of interior angles is 540 <b>OR</b> for sum of exterior angles is 360	360 must be identified as the sum of the exterior angles
		P1	for start to process to find angle <i>ABC</i> eg [angles in a pentagon] - 115 - 125 - 90 (= 210) or $115 + 125 + 90 + x + 2x =$ [angles in a pentagon] <b>OR</b> $(180 - x) + (180 - 2x) + (180 - 125) + (180 - 115) + (180 - 90) = 360$	Award provided [angles in a pentagon] is greater than 400 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified
		P1	for process to find angle <i>ABC</i> eg “210” $\div 3$ (= 70), “210” divided in the ratio 2 : 1 <b>or</b> for process to find angle <i>BCD</i> eg $\frac{2}{3} \times$ “210” <b>or</b> for $3x =$ “210” or $-3x =$ -“210”	Award if 70 is given for either <i>ABC</i> or <i>BCD</i> on the diagram
		A1	cao	Award marks for 140 on the diagram with working and not contradicted by the answer line. Award 0 marks for 140 without working.

**Paper: 1MA1/3H**

Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	$4.52 \times 10^3$	M1	for $2.04... \times 10^7$ oe eg $2.04... \times 10^{-5} \div 10^{-12}$ or $20.4... \times 10^6$ or $204(08163.27)$ <b>or</b> for correct value of $T$ , $4517.(53...)$ , not written in standard form, eg 4520	May be given correct to 3 sig figs or more
(b)	Explanation	M1	for answer in the range $4.51 \times 10^3$ to $4.52 \times 10^3$ (SC B1 for $6.32... \times 10^{-1}$ ) for method to find the scale factor or decreased value in $T$ , eg $\sqrt{\frac{1.1}{1.05^3}}$ (= 0.97.....) oe or $\sqrt{\frac{5.6 \times 10^{-5} \times 1.1}{(1.4 \times 10^{-4} \times 1.05)^3}}$ (= $4.40... \times 10^3$ ) oe	Award mark for a correct method to calculate the scale factor or the percentage increases in $w$ and $d^3$ or the decreased value of $T$
		C1	(dep M1) for explanation eg value of scale factor less than 1, so a decrease in $T$ <b>OR</b> compares $4.40... \times 10^3$ with their value of $T$ from (a) provided answer to (a) is greater	This mark may only be awarded if supported by numerical evidence
10	10	P1	for start to a process to find the LCM of 20, 45 and 120 (= 360), eg $45 = 3 \times 3 \times 5$ or $20 = 2 \times 2 \times 5$ or $120 = 2 \times 2 \times 2 \times 3 \times 5$ or writes down at least 3 multiples of 45 and 120	Could be presented as complete prime factor trees for 45 or 120
		P1	(dep) for a process to find number of times/hour using their LCM, eg $3600 \div 360$ or $3600 \div 720$	Must use a common multiple. Working may be in minutes.
		A1	for 10 or 11	

**Paper: 1MA1/3H**

Question	Answer	Mark	Mark scheme	Additional guidance
11	150 000	P1  P1  A1	for process to find cost in 2007, eg $162\ 000 \div 0.9 (= 180\ 000)$ oe  for process to find cost in 2003, eg $[\text{cost in 2007}] \div 1.2 (= 150\ 000)$ oe  cao	Award 2 marks for $162\ 000 \div 1.08$ oe
12 (a)	1.5	M1  A1	for method to find the gradient of the line, eg $\frac{12}{8}$  for 1.5 oe	Must see use of scales.
(b)	Explanation	C1	Explanation relating to rate of change of volume with time, eg rate at which the container fills or change in number of litres per second or number of litres added per second	Ignore any quantities given. Award the mark for an explanation involving rate.
(c)	Explanation	C1	Explanation relating to volume (amount) of liquid in the container at the start eg number of litres in the container when $t = 0$ , amount of liquid in the container to start with	
13	6.50	M1  M1  A1	for method to find ratio or scale factor of lengths or volumes eg $\sqrt{3} : 2$ or $1 : 1.15(47\dots)$ or $0.86(60\dots) : 1$ or $\sqrt{27} : 8$ oe  for complete method to find ratio of volumes and use to find required volume eg $10 \div ("1.15\dots")^3$ or $10 \times ("0.86\dots")^3$  for answer in the range 6.49 to 6.53	Scale factors may just be seen as 1.15..., 0.86...etc  If an answer is given within the range then incorrectly rounded to 3 sig figs, award full marks. Accept 6.5

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
14	240	M1  A1	for start to method to find total number of matches, eg $16 \times 15$ or $16^2 - 16$ or $16 \times 15 \times 2 (= 480)$ or $\frac{16 \times 15}{2} (= 120)$  cao	Credit complete listing strategies
15 (a)	488 to 507	M1  M1  A1	for method to find area of one strip using trapezia, eg $\frac{1}{2} \times 5 \times 22 (= 55)$ or $\frac{1}{2} \times 5 \times (22 + 28) (= 125)$ or $\frac{1}{2} \times 5 \times (28 + 32) (= 150)$ or $\frac{1}{2} \times 5 \times (32 + 35) (= 167.5)$ <b>OR</b> for a method to find an estimate for the area using rectangles eg $5 \times 22$ or $5 \times 28$ or $5 \times 32$ or $5 \times 35$  for complete and correct method to find the area using four strips, eg $\frac{1}{2} \times 5 \times 22 + \frac{1}{2} \times 5 \times (22 + 28) + \frac{1}{2} \times 5 \times (28 + 32)$ $+ \frac{1}{2} \times 5 \times (32 + 35)$ or $5 \times 22 + 5 \times 28 + 5 \times 32 + 5 \times 35$	May use area of triangle + area of rectangle for the second, third and fourth strips – lengths must be correct.  May use triangle for first strip, $\frac{1}{2} \times 5 \times 22$
(b)	Underestimate (supported)	C1	(dep M1) for underestimate since parts not included below the graph <b>OR</b> ft their method	May use triangle for first strip, $\frac{1}{2} \times 5 \times 22$

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	42	P1	for process to find an equation in $a$ and $b$ , eg $a \times 2^2 + b \times 2 = -2$ ( $4a + 2b = -2$ ) or $a \times 4^2 + b \times 4 = 12$ ( $16a + 4b = 12$ )	Allow one arithmetic error in elimination, eg $16a + 8b = -8$ and $16a + 4b = 12$ leading to $4b = 20$ but no subtraction sign seen
		P1	for process to find a pair of simultaneous equations and eliminate one unknown, eg $16a + 8b = -8$ and $16a + 4b = 12$ and subtraction or $16a + 4b = 12$ and $8a + 4b = -4$ and subtraction	
		A1	for $a = 2$ and $b = -5$	
		A1	cao	
(b)	$n^2 - n$	M1	for correct method, eg $n^2$ seen as a term	
		A1	for $n^2 - n$ oe	



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
17	13.1	P1	for start of process to find the length of $BD$ , eg $\frac{BD}{\sin 34^\circ} = \frac{12.5}{\sin 109^\circ}$	Accept 7.4 for the award of the first two P marks     If an answer is given within the range and then incorrectly rounded to 3 sig figs award full marks.
		P1	for complete process to find the length of $BD$ , eg $BD = \frac{12.5}{\sin 109^\circ} \times \sin 34^\circ (= 7.39\dots)$	
		P1	for process to find the length of $AD$ , eg $AD^2 = 11.4^2 + "7.39^2" - 2 \times 11.4 \times "7.39" \times \cos 86^\circ$	
		P1	for process to use correct order of operations, eg $129.96 + 54.6(5\dots) - 11.7(5\dots) (= 172.85\dots)$	
		A1	for answer in the range 13.1 to 13.2	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
18	(a)	Correct statement	C1 for substituting both 1 and 2 into $x^3 + x$ or into $x^3 + x - 7$	All arithmetic shown must be correct. Ignore any additional trials shown.  $x_1 = 1.70997\dots$ $x_2 = 1.74241\dots$ $x_3 = 1.73884\dots$ Accept an accuracy of 2 dp or more rounded or truncated for values of $x_1$ and $x_2$ Award the marks for 1.7 on the answer line provided correct iterations are shown in the working space.
			C1 for values 2 and 10 plus explanation that these are above and below 7, or for values $-5$ and $3$ plus explanation that there is a change of sign, thus implying a solution lies between 1 and 2	
	(b)	Correct rearrangement	C1 for correct algebraic rearrangement	
	(c)	1.74	M1 for substitution of 2 into the formula eg $\sqrt[3]{7-2}$ ( $= 1.70997\dots$ )	
			M1 for a substitution of $x_1$ to give $x_2$ ( $= 1.74241\dots$ )	
			A1 for answer in the range 1.738 to 1.74	

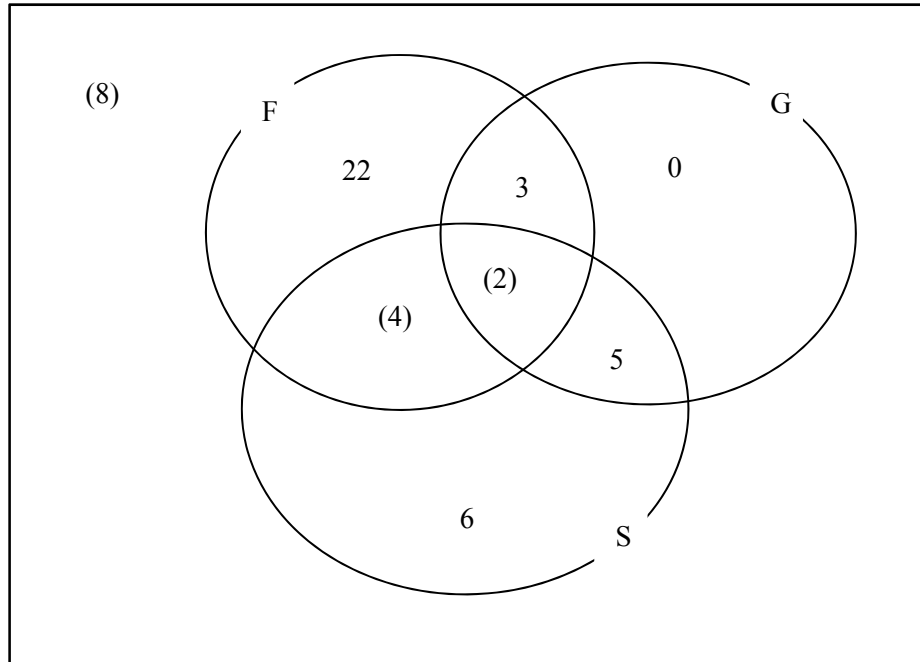
Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
19	$\frac{5}{3}$	P1	for process to derive an equation in $x$ , eg $\frac{x}{4x-1} = \frac{6x+5}{12x+31}$	
		P1	for complete process to remove fractions, eg $x(12x + 31) = (6x + 5)(4x - 1)$	Must be correct use of brackets
		P1	for process to reduce to a quadratic equation, eg $12x^2 - 17x - 5 = 0$	Award for correct LHS only.
		P1	for process to solve the quadratic equation by factorisation or use of quadratic formula, eg $(4x + 1)(3x - 5) = 0$	Award for correct LHS only. Accept substitution into the formula; $\frac{-17 \pm \sqrt{(-17)^2 - 4 \times 12 \times -5}}{2 \times 12}$
		A1	for $\frac{5}{3}$ oe	Accept answers in the range 1.66 to 1.67 as equivalent

**Paper: 1MA1/3H**

Question	Answer	Mark	Mark scheme	Additional guidance
20	$\frac{6}{490}$	<p>P1</p> <p>P1</p> <p>P1</p> <p>P1</p> <p>A1</p>	<p>for start to process information, eg draws Venn diagram and shows at least 1 unknown amount, eg 5 speak German and Spanish but not French</p> <p>for process to find at least 3 unknown amounts from, eg 5 speak German and Spanish but not French 3 speak French and German but not Spanish 22 speak French but not German or Spanish 0 speak German but not French or Spanish</p> <p>for complete process to find number of people who speak only Spanish (= 6)</p> <p>for <math>\frac{[\text{number speaking Spanish only}]}{50} \times \frac{[\text{number speaking Spanish only}] - 1}{49}</math>, eg <math>\frac{6}{50} \times \frac{5}{49}</math></p> <p>for <math>\frac{6}{490}</math> oe</p>	<p>See Venn Diagram at end of mark scheme – rectangle not needed</p> <p>Award first 3 marks to students who show this on the Venn diagram or in a statement.</p> <p>Award this mark for use of their number of students who speak Spanish. Must be a clear link, eg from Venn diagram</p> <p>See note 8 in general marking guidance but 0.01 or 1% must be from seen correct working.</p>

Paper: 1MA1/3H					
Question	Answer	Mark	Mark scheme	Additional guidance	
21	(a)	Proof	C1	for starting the proof, identifying a pair of relevant equal sides or angles with reasons from $AD = BC$ (opposite sides of a parallelogram are equal) angle $PAD =$ angle $QCB$ (opposite angles of a parallelogram are equal) angle $ADP =$ angle $CBQ$ (given or both $90^\circ$ )	Congruency conclusion must include a reference to ASA
			C1	(dep C1) for complete identification of all three equal aspects with reasons	
			C1	(dep C2) for conclusion of congruency proof	
	(b)	Explanation	C1	for identifying a pair of equal sides or angles in $APCQ$ , with reason, eg $AP = QC$ since triangle $ADP$ is congruent to triangle $CBQ$	
C1			(dep C1) for reasoning that $APCQ$ is a parallelogram so opposite sides of a parallelogram are parallel		

Q20



## Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles:  $\pm 5^\circ$

Measurements of length:  $\pm 5$  mm

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Paper: 1MA1/3H		
Question	Modification	Mark scheme notes
1	Diagram enlarged. Axes labels moved to the left of the horizontal axis and above the vertical axis. Crosses changed to solid dots. Right axis has been labelled.	Standard mark scheme

**Paper: 1MA1/3H**

Question	Modification	Mark scheme notes
3	<p>Shape changed but the area is still the same.                      Wording changed to ‘Look at the diagram for Question 21 in the Diagram Book.                      It shows a trapezium drawn on a grid of squares.                      Each square on the grid represents a 1 cm square.                      A triangle is going to be drawn that is equal in area to the trapezium.                      Write down the length of the base and the vertical height of a triangle that is equal in area to the trapezium.’                      Two answer lines have been provided.</p> <p style="text-align: center;"><b>Each square on the grid represents a 1 cm square.</b></p>	<p>M1 for a method to find area of trapezium, eg. <math>\frac{1}{2}(2 + 7) \times 4 (=18)</math> or <math>(2 \times 4) + (0.5 \times 5 \times 4)</math> or <math>8 + 10 (=18)</math> or for two answers that would give a triangle of area ft their area of trapezium (if not 18) or for two answers that would give a triangle of area 36                      A1 for two answers given that would give a triangle of area 18, eg. base = 6, height = 6 or base = 9, height = 4 oe                      NB: answers need not be whole numbers.</p>
4	Diagram enlarged. Wording added ‘It shows a probability tree diagram	Standard mark scheme



**Paper: 1MA1/3H**

Question	Modification	Mark scheme notes
5	Diagram enlarged. Wording added 'AB = 11cm CB = 7cm Angle ACB is a right angle. Angle ABC is marked.'	Standard mark scheme
6	Table has been turned to vertical format. Order of the table changed round so it reads: blue, yellow, red and white.	Standard mark scheme
8	Diagram enlarged. Angles moved outside of the angle arcs, with smaller arcs. Wording added 'Angle EAB = 125° Angle AED = 115° Angle EDC is a right angle.'	Standard mark scheme
10	Pictures removed. Wording changed to 'There are three lamps, lamp A, lamp B and lamp C.'	Standard mark scheme
12	Diagram enlarged. Right axis has been labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme
13	Pictures removed. Wording added 'shape A and shape B.'	Standard mark scheme
15	Diagram enlarged. Right axis has been labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme, but apply MLP tolerances when reading figures from the graph (extra tolerance needed).
17	Diagram enlarged. Angles moved outside of the angle arcs, and the arcs have been made smaller. Wording added 'The diagram shows a shape labelled ABCD. AB = 11.4 cm, CD = 12.5 cm, Angle ABD = 86°, Angle DBC = 109°, Angle BCD = 34°.'	Standard mark scheme

**Paper: 1MA1/3H**

<b>Paper: 1MA1/3H</b>		
<b>Question</b>	<b>Modification</b>	<b>Mark scheme notes</b>
19	Diagrams enlarged. Angles moved outside of the angle arcs, and the arcs have been made smaller. Braille will label the triangles and add information about the measurements of the triangles.	Standard mark scheme
21	Diagram enlarged. Arrows made longer. Wording added 'ABP and QDC are straight lines and parallel.', 'AD is parallel to BC.'	Standard mark scheme

