



Mark Scheme (Results)

November 2020

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 (eg 3.5 – 4.2) then this is inclusive of the end points (eg 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 eg $2 \times 6 (=12)$ 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 eg “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 eg [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

M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	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)
C	communication mark awarded for a fully correct statement(s) with no contradiction or ambiguity
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	$3n - 2$	B2 (B1	for $3n - 2$ oe for $3n + k$ where $k \neq -2$ or is absent unambiguously shown)	Accept a different variable, eg. $3x - 2$ $n = 3n - 2$ gets B1 only $n + 3$ gets NO marks
2	Shown	M1 M1 C1	for conversion to improper fractions eg. $\frac{7}{3}$ or $\frac{15}{4}$ (dep) for method to multiply fractions, eg. $\frac{7 \times 15}{3 \times 4} (= \frac{105}{12})$ or $\frac{28 \times 45}{12 \times 12} (= \frac{1260}{144})$ oe for complete working showing each stage as far as $\frac{35}{4}$ or $8\frac{9}{12}$	Need not be shown with operators
3	B C D A	B2 (B1	cao for two or three correct)	
4	A & D	B1	cao	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	20 or 24 or 168 Comparison	B1 C2 (C1	for identification of the range of the girls (20) or the range (24) or the median (168) of the boys for a correct comparison of medians and a correct comparison of ranges supported by correct figures eg the median height for girls (165) is less than the median height for boys (168) and the range for girls (20) is less than the range for boys (24) At least one comparison must be in context referring to height or quoting cm. for a correct comparison of medians or a correct comparison of ranges that could fit their incorrect figure(s))	Simply quoting values for median, range is insufficient; they must be compared. Context not necessary for C1
8	450	M1 M1 A1	for $18 \div 3 (=6)$ for substitution eg. $75 = \frac{F}{"6"}$ or $75 \times "6"$ cao	Ignore units
9	0.000 672, 67.2×10^{-4} 6.72×10^5 672×10^4	B2 (B1	cao for correct conversions to same format, condoning one error or for 3 numbers in the correct order (ignoring one) or for all 4 numbers listed in reverse order)	Accept correct numbers in any form

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
10	6 : 15 : 20	<p>P1</p> <p>or</p> <p>P1</p> <p>A1</p>	<p>chooses a multiplier to equate the two fractions in terms of b eg $\frac{2}{5} \times \frac{3}{3} (= \frac{6}{15})$ or $\frac{3}{4} \times \frac{5}{5} (= \frac{15}{20})$ or lists equivalent fractions to $\frac{2}{5}$ up to at least $\frac{6}{15}$, eg. $\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \dots$ or lists equivalent fractions to $\frac{3}{4}$ up to at least $\frac{15}{20}$, eg. $\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \frac{15}{20}, \dots$ or $(a : b =) 2 : 5$ and $(b : c =) 3 : 4$ or for 6 : 15 or 15 : 20 seen</p> <p>puts into related terms ready for ratio eg $\frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$ and $\frac{3}{4} \times \frac{5}{5} = \frac{15}{20}$ or for $(a : b =) 6 : 15$ and $(b : c =) 15 : 20$ or lists equivalent ratios up to a common element for b, eg $a : b = 2 : 5, 4 : 10, 6 : \underline{15}$ and $b : c = 3 : 4, 6 : 8, 9 : 12, 12 : 16, \underline{15} : 20$</p> <p>for 6 : 15 : 20 oe</p>	<p>Need not be written in ratio form</p> <p>Accept equivalent ratios Accept $a = 6, b = 15$ and $c = 20$</p>

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
11 (a)	300	M1	for working out $\sqrt[4]{81}$ as 3 or $\sqrt[4]{10^8}$ as 10^2 or 100	Mark may be awarded if operations are attempted on 8100000000 eg 300000000
		A1	for 300 or 3×10^2 or 3×100	
	$\frac{1}{8}$	M1	for showing a square root of 64 as 8 or recognition of the reciprocal eg $\frac{1}{n}$ or shows expressions that show an understanding of the $\frac{1}{2}$ index and the minus index eg $\frac{1}{\sqrt{64}}$ or other equivalent forms	
		A1	oe	
	3^{2-n}	M1	for $3^{2(n-1)}$ or 3^{2n-2} or $(3^2)^{n-1}$	
		A1	for 3^{2-n} oe eg $3^{n-2(n-1)}$	
(b)				Accept $\pm \frac{1}{8}$ oe
(c)				

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	5,15,35,55,70,80	B1	cao	
(b)	Graph drawn	M1	for 5 or 6 of their points plotted correctly from a cf table	Ignore to the left of the first point and right of the last point If histograms drawn, points must be identified Accept a smooth curve or line segments ft from a cum freq graph
		A1	for a fully correct graph SC B1 if 5 or 6 of their points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	
(c)	Correct decision and correct figures	M1	for $60 \div 100 \times 80 (=48)$ oe reading value from graph at wage = 360 $(=40)$ or for $35 + \frac{1}{5} \times 20 (=39)$	
		M1	reading value from graph at cf = 48 $(=380)$ or for $40 \div 80 \times 100 (=50(\%))$ or for $60 \div 100 \times 80 (=48)$	
		C1	ft for correct decision and correct figures, eg No with 48 and "380" or with "40" and "50"(%) or with "40" and 48	
13	196	P1	for vol A = $1400 \div 70 (=20)$ or for mass B = $280 \times 30 (=8400)$	An answer of 350 from $70 + 280$ gets no marks
		P1	for density C = $\frac{1400 + "8400"}{"20" + 30} (= \frac{9800}{50})$ or answer with digits 196	
		A1	cao	
14	0.42	P1	for appropriate multiplication eg $0.3 \times 0.7 (=0.21)$ or $0.3 \times 0.1 (=0.03)$ or $0.3 \times 0.6 (=0.18)$	Probabilities could also be given in fraction or percentage form
		P1	(dep) for complete process eg $0.3 \times 0.7 + 0.7 \times 0.3$ or $0.3 \times 0.1 + 0.3 \times 0.6 + 0.6 \times 0.3 + 0.1 \times 0.3$	
		A1	oe	Acceptable equivalents are 42% or $\frac{42}{100}$ oe

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
15	$y = -\frac{1}{3}x + 8$	M1 M1 A1	for a method for finding the gradient of L_2 eg use of $-\frac{1}{m}$ or $-\frac{1}{3}$ (dep) for substitution of (9, 5) into $y = -\frac{1}{3}x + c$ for $y = -\frac{1}{3}x + 8$ oe	$y - 5 = -\frac{1}{3}(x - 9)$ gets M2A1
16 (a)	540	P1 P1 A1	for $\frac{120}{20} (=6)$ or $\frac{20}{120} (=0.16\ldots)$ or $\frac{90}{20} (=4.5)$ or $\frac{20}{90} (=0.22\ldots)$ for $\frac{20}{120} = \frac{90}{n}$ or $\frac{20}{90} = \frac{120}{n}$ or $\frac{90 \times 120}{20}$ oe cao	Decimal values truncated or rounded to 2 dp or more
(b)	Explanation	C1	for explanation Acceptable examples If marks fall off Shirley will have over-estimated the number of bees There will be fewer bees Her amount will go down Not acceptable examples My answer will be wrong It will increase the answer	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
17	$f = \frac{4d+3}{d+3}$	M1 M1 M1 A1	for clearing the fraction eg $d(f-4) = 3(1-f)$ or $df-4d = 3-3f$ (dep M1) for isolating f terms in a correct equation eg $df+3f = 3+4d$ (dep on two terms in f) for factorising eg $f(d+3) = 3+4d$ oe	Condone error in expansion of RHS for this mark
18	20	P1 P1 A1	for a statement of proportionality eg $x = k\sqrt{y}$ or 1.44 oe for using $\sqrt{1.44}$ as multiplier eg $(x_2 =) k\sqrt{1.44y}$ or 1.2 oe cao	Must be written in the form of an equation with a constant term, accept $x \propto k\sqrt{y}$

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
19 (a)	33	B1	cao	Accept $\frac{y-3}{6}$
(b)	27	M1	for $f(9) = 12 \div \sqrt{9} (=4)$ and a clear intention to find $g(“4”)$ or for $3 \times (2 \times \frac{12}{\sqrt{9}} + 1)$ or for stating gf eg $3(2 \times \frac{12}{\sqrt{x}} + 1)$ oe	
		A1	cao	
(c)	$\frac{1}{2}$	M1	for g^{-1} as $\frac{x-3}{6}$ oe or for starting to solve $3(2x + 1) = 6$	
		A1	for $\frac{1}{2}$ oe	
20	$1 + \frac{\sqrt{5}}{5}$	P1	for writing $\sqrt{180}$ as $6\sqrt{5}$	This process mark can be awarded whenever this is seen, which might be later in the process. Accept written as $a = 1, b = 5$
		P1	for process to rationalising the denominator eg $\frac{\sqrt{180} - 2\sqrt{5}}{5\sqrt{5} - 5} \times \frac{5\sqrt{5} + 5}{5\sqrt{5} + 5}$ or $\frac{4\sqrt{5}}{5\sqrt{5} - 5} \times \frac{5\sqrt{5} + 5}{5\sqrt{5} + 5}$ oe	
		P1	(dep on previous P1) for expanding terms eg $\frac{5\sqrt{5}\sqrt{180} + 5\sqrt{180} - 50 - 10\sqrt{5}}{125 - 25}$ or $\frac{100 + 20\sqrt{5}}{100}$ oe	
		A1	for $1 + \frac{\sqrt{5}}{5}$	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
21	Proof	M1 M1 B1 C1	for $\overrightarrow{DQ} = \frac{1}{2}(\mathbf{b} - \mathbf{a})$ oe or $\overrightarrow{EQ} = \frac{1}{2}(\mathbf{a} - \mathbf{b})$ oe for $\overrightarrow{PQ} = \frac{1}{2}\mathbf{a} + \overrightarrow{DQ}$ or $\frac{1}{2}\mathbf{a} + \frac{1}{2}(\mathbf{b} - \mathbf{a})$ oe or $\overrightarrow{PQ} = -\frac{1}{2}\mathbf{a} + \mathbf{b} + \overrightarrow{EQ}$ or $-\frac{1}{2}\mathbf{a} + \mathbf{b} + \frac{1}{2}(\mathbf{a} - \mathbf{b})$ oe for $\overrightarrow{PQ} = \frac{1}{2}\mathbf{b}$ for complete proof with statement, eg $FE = 2PQ$ or FE is a multiple of PQ or $\mathbf{b} = 2(\frac{1}{2}\mathbf{b})$	Vectors could be written on the diagram
22	0.5	P1 P1 P1 P1 A1	derive an algebraic expression for the area of A eg $\frac{1}{8}\pi[(5x-1)^2 - (3x-1)^2]$ expand and simplify for either area A or area B eg $\frac{1}{8}\pi(16x^2-4x)$ or $\pi(x^2-2x+1)$ (dep P2) equate and rearrange into a quadratic eqn of the form $ax^2 + bx + c = 0$ eg $2x^2 + 3x - 2 = 0$ (dep P3) factorise eg $(2x-1)(x+2) = 0$ or use of formula eg $\frac{-3 \pm \sqrt{3^2 - 4 \times 2 \times -2}}{2 \times 2}$	Accept only the single value of 0.5 oe but award 0 marks for a correct answer with no supportive working

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
23	$\frac{27}{56}$	P1	<p>for $\frac{3}{8}$ and $\frac{7}{9}$</p> <p>OR</p> <p>uses a total of 72 cards and shows a process to find the number of cards with a black shape or the number of cards with a triangle,</p> <p>eg $72 \div 8 \times 3 (=27)$ or $72 \div 9 \times 7 (=56)$</p>	72 or any multiple of 72
		P1	<p>for process shown to divide fractions $\frac{3}{8} \div \frac{7}{9}$ or $\frac{3}{8} \times \frac{9}{7}$</p> <p>OR for $\frac{3}{8} \times \frac{9}{9} (= \frac{27}{72})$ and $\frac{7}{9} \times \frac{8}{8} (= \frac{56}{72})$</p> <p>OR</p> <p>uses a total of 72 cards and shows a process to find the number of cards with a black shape and the number of cards with a triangle,</p> <p>eg $72 \div 8 \times 3 (=27)$ and $72 \div 9 \times 7 (=56)$</p>	<p>Could be seen in a ratio, eg 27 : 45 or 16 : 56</p> <p>Accept the division shown as $\frac{\frac{3}{8}}{\frac{7}{9}}$</p>
		A1	<p>for $\frac{27}{56}$ or any other equivalent fraction</p>	<p>Could be seen in ratios, eg 27 : 45 and 16 : 56</p> <p>Answer of 27 : 56 gets P2A0</p>

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 1H

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: ± 5 mm

PAPER: 1MA1/1H		
Question	Modification	Mark scheme notes
3	Wording added “Look at the diagram for Question 3 in the Diagram Book.” The wording “The diagram shows four graphs” removed and replaced by “It shows four graphs labelled graph A, graph B, graph C and graph D.” Diagrams enlarged. Graph lines made thicker. Open headed arrows. Headings moved above the graph.	Standard mark scheme
4	Wording added “Look at the diagram for Question 4 in the Diagram Book.” The wording “The diagram shows four triangles” removed and replaced by “It shows four triangles.” Diagram enlarged. Headings moved above the diagrams. Angles moved outside of the angle arcs and the angle arcs made smaller. Triangles straightened up so a 10 cm side lies horizontally. Braille only: Description added of the triangles.	Standard mark scheme
6	The wording “ADC is a triangle” removed. Diagram enlarged. Wording added “Look at the diagram for Question 6 in the Diagram Book. It shows the triangle ADC.” Angles moved outside of the angles arcs and the angle arcs made smaller.	Standard mark scheme

PAPER: 1MA1/1H			
Question		Modification	Mark scheme notes
7		<p>Wording added “Look at the table and the diagram for Question 7 in the Diagram Book.”</p> <p>Wording “This stem and leaf diagram shows...” removed and replaced with “The stem and leaf diagram shows...”</p> <p>The wording “...of a group of Year 9 girls” removed and replaced by “...of a group of girls in Year 9”.</p> <p>The wording “...of a group of 15 Year 9 boys” removed and replaced by “...of a group of 15 boys in Year 9”.</p> <p>Table enlarged and kept on the same page as the stem and leaf diagram.</p> <p>Diagram enlarged and a tracking line added. Key moved above the diagram.</p>	Standard mark scheme
8		<p>Model provided for all candidates with a base added to represent the horizontal floor.</p> <p>Wording added “Look at the diagram for Question 8 in the Diagram Book. You may be provided with a model.”</p> <p>The wording “The diagram shows a prism...” removed and replaced by “The diagram and the model show a prism...”.</p> <p>Diagram enlarged. Dashed lines to be made thicker and longer.</p> <p>The pressure formula to be kept in the Question Paper and moved to the left of the diagram in the Diagram Book.</p>	Standard mark scheme
9		<p>The wording “Write these numbers in order of size” removed and replaced by “Write these four numbers in order of size.”</p>	Standard mark scheme
10		<p>The letter a changed to w. The letter b changed to x. The letter c changed to y.</p>	Standard mark scheme except for the letter changes indicated.

PAPER: 1MA1/1H				
Question		Modification	Mark scheme notes	
12	(a)	The value of the 350-400 interval changed from '20' to '25'. The value of the 450-500 interval changed from '10' to '5'. Wording added "Look at the table for Question 12(a) in the Diagram Book." Table enlarged. The wording "The table gives information..." removed and replaced by "It gives information..."	Standard mark scheme	
	(b)	Wording added "Look at the diagram for Question 12(b) in the Diagram Book." The wording "On the grid opposite..." removed and replaced by "On the grid..." Diagram enlarged. Right axis labelled. Small squares removed. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis.	Standard mark scheme	
	(c)	The wording "60% of this group of people have a weekly wage of £360 or less" removed and replaced by "75% of this group of people have a weekly wage of £375 or less" to make the question accessible.	M1 for $75 \div 100 \times 80 (=60)$ oe	M1 reading value from graph at wage = 375 (=48)
			M1 reading value from graph at cf = 60 (=400)	M1 for "48" $\div 80 \times 100 (=60(\%))$ or for $75 \div 100 \times 80 (=60)$
			Standard mark scheme (NO) with 60 and "400" or with "48" and 60(%) or with "48" and 60	
17		The letter <i>f</i> changed to <i>p</i> , <i>d</i> changed to <i>m</i> .	Standard mark scheme but note the changes to the letters.	
21		The wording "DEF is a triangle" replaced by "Look at the diagram for Question 21 in the Diagram Book. It shows the triangle DEF." Diagram enlarged.	Standard mark scheme	

PAPER: 1MA1/1H			
Question		Modification	Mark scheme notes
22		<p>Wording added “Look at the diagram for Question 22 in the Diagram Book.”</p> <p>The wording “The diagram shows...” removed and replaced by “It shows...”</p> <p>Diagram enlarged. Open headed arrows. Shading changed to dotty shading.</p> <p>Angle moved outside of the angle arc the angle arc made smaller.</p> <p>The shapes labelled ‘shape A’ and ‘shape B.’</p> <p>The labels “(3<i>x</i>-1) cm” and “2<i>x</i> cm” added to the bottom of the diagram.</p> <p>The label “(5<i>x</i>-1) cm” added to the top of the diagram.</p>	Standard mark scheme
23		<p>Wording added: “Look at the information for Question 23 in the Diagram Book.</p> <p>It shows the four types of cards in a game.”</p> <p>Diagram enlarged. Black cards changed to dotty shading.</p> <p>All reference of ‘black’ changed to ‘shaded’.</p> <p>Headings added above the cards e.g. “shaded circle”.</p>	Standard mark scheme

