Pearson

Mark Scheme

Mock Set 4

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 × 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" × 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

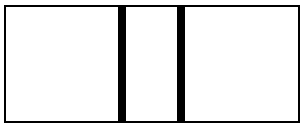
Where a word is used in square brackets E.g. [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

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	$2 \times 2 \times 2 \times 17$	M1	for start of method to identify correct factors, eg 2 correct factors shown in factor tree **or** two prime number divisions into 136	
		M1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error **or** 2, 2, 2, 17	
		A1	for $2\times2\times2\times17$ oe	In any order
2 (a)	0.4	M1	for $1 - (0.2 + 0.25 + 0.15)$	
		A1	oe	Acceptable equivalents are $\frac{4}{10}$ or 40%
(b)	12	M1	for 0.2×60 oe or $\frac{12}{60}$	
		A1	accept "12 out of 60"	Do not accept $\frac{12}{60}$ (award 1 mark)
3	statements	B1	for stating that the graph should be a single straight line or graph should have constant gradient	
		B1	for stating the line should end at (4, 5) (not (5, 4))	Stating the end point is wrong is sufficient.

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4	description	B2 (B1	for four aspects: rotation of 90 anticlockwise about (−2, −1) for two of the above aspects) NB: award 0 marks if there is any mention of a different transformation	Accept 270 clockwise. Accept the point written as −2, −1
5	diagram	B1 B1 B1	for arc, radius 4 cm centre *A* drawn **or** arc, radius 4 cm centre *C* drawn for perpendicular bisector of *AB* drawn for correct region indicated	Accept arcs drawn to within 2 mm; arcs of any length are sufficient to indicate method Need not be a construction but should be within 2mm of the midpoint of *AB* and within 2° of the perpendicular The region need not be labelled, but should be clear. Shaded in or out is acceptable as long as not ambiguous.
6 (a)	1080	P1 A1	for complete process eg $\frac{18}{50} \cdot 3000$ cao	
(b)	assumption and explanation	C1	statement eg sample is representative of the population, so if it is not this could change the number of red notebooks Bill should buy	
7	front elevation drawn	B1 B1	for a rectangle of dimensions 2 × 5 (any orientation) for a rectangle of dimensions 2 × 5 (any orientation) and additional lines as shown	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
8 (a)	100 000 to 200 000	P1	starts process to find the exact or approximate number of seconds in one year, eg 60 ×60 ×24 (=86400)	
		P1	for complete process to find the exact or approximate number of cars made in one year, eg $\frac{60\times60\times24\times365}{209}$ **or** $\frac{60\times60\times20\times400}{200}$	This mark is for the process of calculation and not necessarily estimation; allow any estimation in this mark as long as the association is clear.
		P1	for process of rounding at least two values appropriately, eg 365 and 209	Allow any reasonable estimation eg 365 given as 360, 370 or 400; 209 given as 210, 200, 60 given as 50, etc.
		A1	answer in range 100 000 to 200 000	
(b)	reason	C1	possible reason linked to underestimate or overestimate, ft from part (a) eg do not know because 24 rounded down and 365 rounded up	
9	15	M1	for identifying the position of the quartiles eg 42 and 57	May be indicated on the diagram eg by circling relevant numbers (if no others indicated).
		A1	cao	
10	750	M1	shows complete method, eg 900 ÷ 1.2	Accept alternative complete methods.
		A1	cao	

Paper: 1MA1/1H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
11	(a)	–6, 6	M1	for $x^2 = \frac{108}{3}$ or for $x^2 = 36$ **or** one correct answer given	
			A1	cao	Accept answer written as ±6
	(b)	$(x - 7)(x + 5)$	M1	for factorisation $(x \pm a)(x \pm b)$ where product of a and $b = 35$, eg $(x \pm 7)(x \pm 5)$ **or** difference of a and $b = 2$, eg $(x \pm 9)(x \pm 7)$	
			A1	for $(x - 7)(x + 5)$	
	(c)	$t = \frac{4}{3}(u - 2)$	M1	for subtracting 2 from both sides or multiplying both sides by 4 eg $u - 2 = \frac{3t}{4}$ or $4 \times u = 3t + 2 \times 4$	Multiplication to all three terms must be clear.
			M1	(dep M1) for two steps including removing brackets eg $4(u - 2) = 3t$ oe	Do not award this mark if the first mark has not been awarded.
			A1	for $t = \frac{4}{3}(u - 2)$ oe	Equivalents must be algebraic equivalents to the given answer.
12	(a)	1	B1	cao	
	(b)	$\frac{1}{7}$	M1	for showing a method using either reciprocal or square root eg $\frac{1}{\sqrt{49}}$ or 7 seen	
			A1	cao	Accept ± $\frac{1}{7}$
	(c)	16	M1	for showing $\sqrt[3]{64}$ as 4 or 62^2 as 4096	
			A1	cao	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13	2 : 3	P1	for use of the ratio 1 : 4 eg with own value such as 20 : 80 **or** $\frac{1}{5}$ orange **or** $\frac{4}{5}$ lemonade	Accept as percentages or decimals
		P1	for removal of ¼ of contents shown in working eg $1 \quad \frac{1}{4} : 4 \quad 1 \left(= \frac{3}{4} : 3\right)$ or $4 - 1 : 16 - 4$ or $3 : 12$ **or** after adding on eg $\frac{3}{4} + \frac{5}{4} : 3$ or $\frac{8}{4} : 3$ or $3 + 4 : 12$ or 8 : 12 oe **or** use of $\frac{3}{4}$ left eg $\frac{3}{4} \cdot \frac{1}{5} = \frac{3}{20}$ orange **and** $\frac{3}{4} \cdot \frac{4}{5} = \frac{12}{20}$ lemonade **or** $20 - \frac{1}{4} \times 20$ **and** $80 - \frac{1}{4} \times 80$	In all cases working must be shown for both orange and for lemonade, Award the P marks for processes that are reversed at this stage (ie lemonade : orange).
		A1	cao	
14 (a)	$3\frac{3}{11}$	P1	for working out the time using algebraic expressions, eg $\frac{x}{4} + \frac{2x}{3} \quad \left(= \frac{11x}{12}\right)$	Process marks can be awarded for work in minutes or in hours
		P1	for working out the average speed eg $(x + 2x) \mid \frac{"11x"}{12}$	
		P1	for simplifying eg $\frac{3x \cdot 12}{11x}$	
		A1	cao	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
(b)	1	P1 P1 P1 A1	for forming an expression for a time, eg $\frac{x}{4}+\frac{25}{60}$ oe or $\frac{2x}{3}-\frac{25}{60}$ oe for forming an equation eg $\frac{x}{4}+\frac{25}{60}=\frac{2x}{3}$ starts process to solve the equation eg isolates terms in x, eg $\frac{2x}{3}-\frac{x}{4}=\frac{25}{60}$ **or** deals with fractions eg, multiplies by 60 throughout cao	Units used must be consistent.
15	$8n - 10$ and explanation	P1 P1 P1 C1	for expanding one bracket correctly eg $4n^2 + 4n + 1$ or $4n^2 - 4n + 1$ **or** $[2n + 1 + 2n - 1][2n + 1 - (2n - 1)]$ for a start on simplifying eg $4n^2 + 4n + 1 - 4n^2 + 4n - 1 - 10$ **or** $4n \times 2$ for fully simplifying eg $8n - 10$ for explaining why $8n - 10$ cannot be a multiple of 8	This mark is awarded for showing the simplification of two trinomials. This mark is dependent on full working shown, leading to $8n - 10$
16	4	M1 M1 A1	for forming an equation eg $y=\frac{k}{x^2}$ **or** "if x is divided by 2, y is multiplied by 2^2" oe for substituting values eg $1=\frac{k}{10^2}$ or $k = 100$ or $y=\frac{100}{x^2}$ **or** 1×2^2 oe cao	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
17	proof	P1	starts process by identifying OCT as 90° eg $BCT = x$ so $BCO = 90 - x$ **or** by use of isosceles triangle angle properties eg $OBC = OCB$	Throughout, angles may be represented on the diagram. Drawing in OCT as 90° is sufficient.
		P1	continues process by using another angle property eg if $BAC = y$ then $BOC = 2y$ eg in triangle ABC forms an equation using the angles $2y + 2w + 2(90 - x) = 180$ or $(x + y) + (y + w) + (w + x) = 180$	
		C1	complete process leading to establishment of a link between BAC and BCT eg $BAC(y) = BCT(x)$ or $BAC = y + w = 90 - x = BCT$	
		C1	full proof with full appropriate reasons given for their method of proof eg using The tangent to a circle is perpendicular to the radius (diameter) ; The angle at the centre of a circle is twice the angle at the circumference ; Angles in a triangle add up to 180 ; Base angles of an isosceles triangle are equal.	Do not award this mark if any reasons are given that are not appropriate for the proof presented. Underlined words need to be shown; reasons need to be lined to their method; any reasons not linked do not credit.

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
18 (a)	6.5 to 7.5	M1	for finding the gradient by drawing a tangent at $t = 1.3$	
		M1	for method to calculate the gradient	Drawing a right-angled triangle is insufficient without calculation method; using their drawn tangent eg change in y ÷ change in x
		A1	answer in the range 6.5 – 7.5 from a correct method	Method must be shown; an answer in the range alone is insufficient.
(b)	Interpretation	C1	for acceleration & interpretation eg "acceleration 1.3 hours after leaving port"	
		B1	for units of km/h^2	Accept km/h/h or km/h^{-2}

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	87.5	P1	for a process to find the volume of a shape eg $\frac{1}{8} \times \pi \times 10^2 \times 10 \left(=\frac{1000}{8}\right)$ or $\frac{1}{6} \times \pi \times 10^2 \times 5 \left(=\frac{500}{6}\right)$ oe	The process marks can be awarded if a value for π is used instead of the symbol.
		P1	for process to find the density of a shape eg $40\pi \div \frac{1000}{8}$ or $50\pi \div \frac{500}{6}$ oe	
		P1	for complete process to find the densities, eg $40\pi \times \frac{8}{1000} = \frac{320}{1000}$ (= 0.32) **and** $50\pi \times \frac{6}{500} = \frac{300}{500}$ (= 0.6) oe	Needs to be a complete process associated with the densities of both shapes
		P1	for process to find the percentage eg $\frac{"0.6"-"0.32"}{"0.32"}$ or $\frac{"0.6"}{"0.32"}$ oe	If following-through any of these numbers previous correct method leading to these numbers must be shown.
		A1	cao	
20	$-28 - 20\sqrt{2}$	M1	first step eg multiplies numerator and denominator by $1 + \sqrt{2}$	
		M1	method to simplify $\sqrt{128}$ eg $\sqrt{128} = 8\sqrt{2}$	Steps for the second and third marks may be in reverse order
		M1	method to expand numerator eg $12 + 12\sqrt{2} + \sqrt{128} + \sqrt{2}\sqrt{128}$ or $12 + + 8\sqrt{2} + 12\sqrt{2} + 16$	
		A1	for $-28 - 20\sqrt{2}$	Accept $a = -28$ and $b = -20$

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
21	300	P1	process which recognises $AB = BC$	Could be indicated on the diagram.
		P1	process to find length of tangent by using Pythagoras to find distance AB, eg $x^2 + 10^2 = 18^2 + (x - 6)^2 + 10^2$ oe **or** process to solve equation as far as $12x = 18^2 + 36$ (=360)	
		P1	shows a complete process to find the length of a tangent eg $x = 30$ **or** shows a process to find the area using their length of tangent eg $10 \times x$	
		A1	cao	

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