Pearson

Mark Scheme

Mock Set 3

Pearson Edexcel GCSE Mathematics (1MA1)
Higher Tier (Non-Calculator)
Paper 1H

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Publications Code

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 answer is given on the answer line using both incorrect and correct notation, award the 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.

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
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

Higher tier Paper 1H (Non-calculator): Mock (Set 3) Mark Scheme

Question	Working	Answer	Mark	Notes
1 (a)		3^7	M1	for a first step using a rule of indices, eg $3^5 \times 3^4 = 3^{5+4}$ (= 3^9) or $3^5 \div 3^2 = 3^{5-2}$ (= 3^3) or $3^4 \div 3^2 = 3^{4-2}$ (= 3^2)
			A1	cao
(b)		1	B1	cao
(c)		$\frac{1}{9}$	B1	for $\frac{1}{9}$ (or 0.11…)
2		20	P1	for process to find the height of the surface of water, eg $32 \times \frac{3}{4}$ (= 24) or to find the volume of the tank, eg $50 \times 32 \times 20$ (= 32 000)
			P1	for process to find volume of water and sand, eg $50 \times$ "24" $\times 20$ (= 24 000) or "32 000" $\times \frac{3}{4}$ (= 24 000) or for process to divide their height in the ratio 5 : 1 eg "24" $\div (5 + 1) \times 5$ (= $4 \times 5 = 20$)
			P1	(dep P1) for process to divide volume in ratio 5:1, eg "24 000" $\div (5 + 1) \times 5$ (= $4000 \times 5 = 20\,000$) or process to find volume of water, eg "20" $\times 50 \times 20$ (= 20 000)
			P1	for process to convert to litres, eg "20 000" $\div$ 1000
			A1	cao
3		Explanation (supported)	C1	for scale factors of 0.5 for decrease and 1.5 for increase seen; this could be shown in an example, eg £10 reduced by £5 then £5 increased by £2.50
			C1	for justifying the statement, eg $0.5 \times 1.5 = 0.75$ or £5 + £2.50 = £7.50

Question	Working	Answer	Mark	Notes
4		50	P1 P1 P1 A1	for equating opposite angles to give an equation in x, eg $3x + 10 = 5(x – 10)$ for expanding the bracket and rearranging terms in x and number terms on opposite sides of the equation, eg $5x – 3x = 10 + 50$ $(x = 30)$ (dep on 1st P1) for substituting their value of x (= 30) into one of the angles, eg $3 \times 30 + 10$ or $5(30 – 10)$ (= 100) cao
5	$6x – 4y = –10$ $2x – 4y = 2$ $4x = –12$ OR $6x – 4y = –10$ $6x – 12y = 6$ $8y = –16$	$x = –3$, $y = –2$	M1 M1 A1	for a method to eliminate either x or y (condone one arithmetic error) (dep on previous M1) for correct substitution of their value of x or y or for a method to eliminate the other unknown cao
6		Correct conclusion from correct working	M1 A1 M1 C1	for a method to find the interior angle, eg $(8 – 2) \times 180 \div 8$ (= 135) or exterior angle, eg $360 \div 8$ (= 45) of a regular octagon for interior angle = 135 or exterior angle = 45 for method to find size of angle CDA, eg $(360 - 135 \times 2)/2$ (= 45) or for stating and using BC parallel to AD for method to complete the solution with angle CDJ = 135 eg 180 − "45" (= 135) or angle BCD and angle CDJ are alternate angles
7 (a)		5.49×10^{-3}	B1	cao
(b)		6.4×10^{7}	M1 A1	for method to square each element, eg 64 and $10^{3\times2}$ or method to convert to ordinary numbers and square, eg 8000×8000 cao
(c)		8.47×10^{5}	M1 A1	for method to convert to ordinary numbers eg $760\,000 + 87\,000$ or $7.6 \times 10^5 + 0.87 \times 10^5$ cao

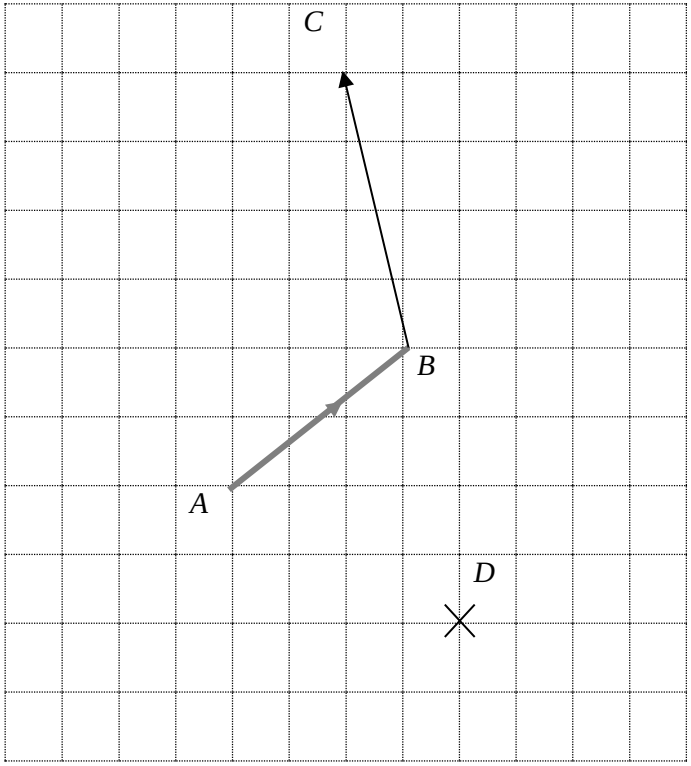
Question	Working	Answer	Mark	Notes
8 (a)		10	P1	for process to find total scores of either women, 15.6 × 10 (= 156) or children 9.2 × 10 (= 92) or all 11.2 × 40 (= 448)
			P1	for complete process to find average score of men, eg ("448" – "156" – "92") ÷ 20
			A1	cao
(b)		Mean is reduced	C1	The mean is reduced (since the total is reduced)
9 (a)i		Box plot drawn	B1	for a box drawn with at least two correct values from: LQ = 23, Median = 28, UQ = 32.5
			B1	for lowest value = 17 and highest value = 41 clearly shown on the grid
			B1	for a fully correct diagram
ii		$\frac{10}{25}$	M1	for $\frac{a}{25}$ where $a < 25$ or $\frac{10}{b}$ where $10 < b \leq 25$
			A1	for $\frac{10}{25}$ oe
(b)		Incorrect classes	C1	for identifying that the class intervals are incorrect eg should be $0 < a \leq 30, 40, 50$
10 (a)		Vector drawn	B1	for correct vector
(b)		× marked	M1	for method to find the vector $\overrightarrow{AD} = \begin{pmatrix} 3--1 \\ 2-4 \end{pmatrix} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$ or for $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$ drawn on the grid
			A1	for ft for correct position (×) D on their diagram

Question	Working	Answer	Mark	Notes
11		$6\frac{1}{4}$	M1 M1 A1	for interpretation of statement, eg $P \propto \frac{1}{\sqrt{m}}$ or $P = \frac{k}{\sqrt{m}}$ for method to find the constant of proportionality oe, eg $10 = \frac{k}{\sqrt{0.25}}$ ($k = 5$) for $6\frac{1}{4}$ oe
12		9	P1 P1 P1 P1 A1	for process to find the area of a circle in algebraic form, eg $\pi(2n + 6)^2$ or $\pi(n – 1)^2$ or $\pi(n + 13)^2$ Condone omission of π or numerical value given throughout for process to set up an inequality in n, eg $\pi(2n + 6)^2 – \pi(n – 1)^2 > \pi(n + 13)^2$ for process to remove all brackets, eg $4n^2 + 24n + 36 – n^2 + 2n – 1 > n^2 + 26n + 169$ oe for isolating the n^2 term eg reduction to $n^2 > 67$ cao
13 (a)		–3	M1 A1	for drawing a tangent at the point where t = 5 and applying a method to find the gradient for answer in the range –3.5 to –2.5
(b)		Rate of change	C1	for explanation relating to the 'rate of change of the temperature' of the coffee, eg rate of change of temperature or cools at a rate of 3 degrees/minute or rate of change at 5 minutes
14		320	P1 P1 P1 A1	for factorising to get $5(16t – t^2)$ or $5t(16 – t)$ or for a sketch of the graph of $s = 80t – 5t^2$ for $–5[(t – 8)^2 – 64]$ oe or identify turning point at $t = 8$ from their graph (dep P1) for substitution of $t = 8$ into $s = 80t – 5t^2$ cao
15		Conclusion from accurate algebra	C1	for method to find probability of two red, eg $\frac{n}{2n+1} \times \frac{n-1}{2n}$ or two blue, eg $\frac{n+1}{2n+1} \times \frac{n}{2n}$ or different colours, eg $\frac{n+1}{2n+1} \times \frac{n}{2n}$ or $\frac{n}{2n+1} \times \frac{n+1}{2n}$

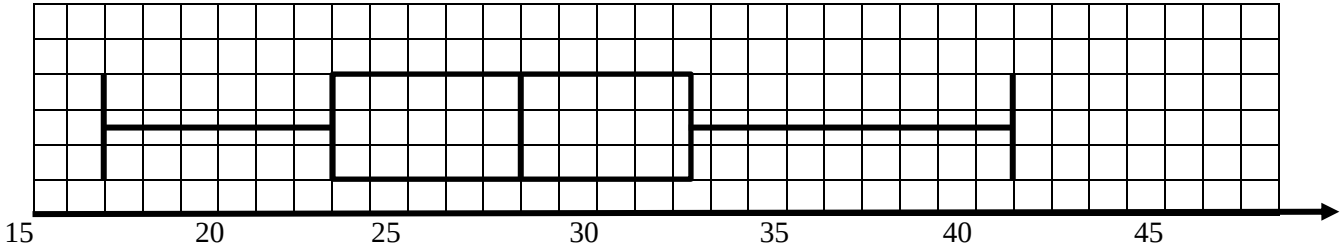
Question	Working	Answer	Mark	Notes
			C1	for probability of two of the same colour, eg $\frac{n}{2n+1}\times\frac{n-1}{2n}+\frac{n+1}{2n+1}\times\frac{n}{2n}$ or $1-\left[\frac{n+1}{2n+1}\times\frac{n}{2n}+\frac{n}{2n+1}\times\frac{n+1}{2n}\right]$
			C1	for method to reduce to a single fraction
			C1	for showing that the probability is $\frac{n}{2n+1}$
16	$\frac{4}{3}\pi\times 2^3\times 19$ $=\frac{4}{3}\pi\times 152$ $\frac{4}{3}\pi\times 3^3\times 10$ $=\frac{4}{3}\pi\times 270$	Silver plus supporting evidence	P1	for process to find the volume of a sphere, eg $V_g=\frac{4}{3}\pi\times 2^3$ or $V_s=\frac{4}{3}\pi\times 3^3$ or ratio of volumes, eg $2^3:3^3$
			P1	for process to convert density to g/cm^3, eg $19000\times\frac{1000}{1000000}$ (= 19) or for process to convert volume into m^3, eg $\frac{4}{3}\pi\times 2^3\div 1000$
			P1	(dep P1) for process to find the mass of a sphere, eg $\frac{4}{3}\pi\times 2^3\times$ "19" or $2^3\times$ "19" (= 152) or $\frac{4}{3}\pi\times 3^3\times$ "10" or $3^3\times$ "10" (= 270)
			C1	for correct comparison from two correct values that can be used to compare mass, eg 270 > 152
17 (a)		3 : 1	M1	for $(x\pm 3y)(x\pm 3y)$ or $\frac{x^2}{y^2}=9$
			A1	for $x=3y$ or $\frac{x}{y}=3$
			A1	for 3 : 1 oe
(b)		$\frac{3+2x}{3-x}$	M1	for $(3+2x)(1-2x)$ oe
			M1	for $(2x-1)(x-3)$ oe
			A1	for cancelling correctly to leave $\frac{3+2x}{3-x}$ oe

Question	Working	Answer	Mark	Notes
18 (a)		Translation	B1	for graph translated 1 unit in the positive x-direction
(b)		(1, 3)	B1	cao
19		$a = \frac{23}{49}$ $b = \frac{17}{49}$	M1 M1 M1 A1 A1	for method to expand $(3 - \sqrt{2})^2$ $(= 11 - 6\sqrt{2})$ for method to rationalise the denominator, eg multiplying by $\frac{11+6\sqrt{2}}{11+6\sqrt{2}}$ (dep M1) for method to expand correctly either the numerator or the denominator, eg $23 + 17\sqrt{2}$ or $121 - 72$ $(= 49)$ for $a = \frac{23}{49}$ for $b = \frac{17}{49}$
20		Proof	B1 M1 A1 A1	for using any correct trig value for 30°, eg sin 30 = 0.5, cos 30 = $\frac{\sqrt{3}}{2}$ or tan 30 = $\frac{1}{\sqrt{3}}$ for hypotenuse of small triangle = $2y$ or hypotenuse of large triangle = $2n$ for method to find the hypotenuse of middle triangle, eg $\sqrt{(2n)^2 - n^2}$ $(= \sqrt{3}n)$ for a correct equation linking y and n and correct working leading to the given result

Question 10



Question 19



Question 18(a)