Pearson

Mark Scheme

Mock Set 3

Pearson Edexcel GCSE Mathematics (1MA1)
Higher Tier (Calculator)
Paper 3H

edexcel

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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 (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.

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 3H (Calculator): Mock (Set 3) Mark Scheme

Question	Working	Answer	Mark	Notes
1 (a)		$2^3 \times 3 \times 7$	M1 M1 A1	for continual prime factorisation (at least two consecutive steps correct) **or** for at least two stages of a factor tree correct for a fully correct factor tree **or** list of 2, 2, 2, 3, 7 for $2 \times 2 \times 2 \times 3 \times 7$ **or** $2^3 \times 3 \times 7$
(b)		12	M1 A1	for attempt to list factors of 168 **and** 180 with at least 4 of each correct and none incorrect **or** correct prime factorisation of 180, e.g. $2 \times 2 \times 3 \times 3 \times 5$ or $2^2 \times 3^2 \times 5$ cao
2	$36.4 \div \frac{48}{60} = 45.5$ $65.2 \div \frac{85}{60} =$ 46.0(2352941…)	Geraldine with correct figures	P1 P1 C1	for a process using speed, e.g. distance/time $36.4 \div 48$ **or** $65.2 \div 85$ **or** $36.4 \div (48 \div 60)$ **or** $65.2 \div (85 \div 60)$ for process to find one correct speed, e.g. $36.4 \div (48 \div 60)$ **or** $65.2 \div (85 \div 60)$ for Geraldine with correct figures, e.g. 45.5 **and** 46.0(…)

Question	Working	Answer	Mark	Notes
3		Correct region	B1 B1 B1 C1	for an arc of radius 4.5 cm centred on *C* for a correct angle bisector drawn at angle *ABC* for a line drawn 2 cm from *AB* for the correct region shaded; accept any consistent shading
4 (a)		$\frac{1}{11}, \frac{3}{11}, \frac{7}{11}$	M1 A1	for a denominator of 11 or for one correct probability oe
(b)		249 or 250	P1 A1	for $68 \div$ "$\frac{3}{11}$" oe, ft from part (a), accept rounded integer answers for 249 or 250, ft from part (a), accept rounded integer answers
5 (a)		Evaluation	C1	for error correctly identified, can be in the working, e.g. circling
(b)		Assessment	C1	for statement that Josh should be looking for two values that add to −6 (not 6)
(c)		Evaluation	C1	for indication that the *y* intercept should be negative not positive

Question	Working	Answer	Mark	Notes
6		33.7	P1	for starting to use Pythagoras, e.g. $4.5^2 + 7^2$
			P1	for complete process to find *KM*, e.g. $\sqrt{4.5^2 + 7^2}$ (= 8.321658489)
			P1	(dep P1) for a correct trigonometry statement, e.g. sin *KLM* = "8.32"…÷ 15
			A1	for answer in the range 33.6 to 33.7
7		1.03	P1	for process to find the mass of either **A** or **C**, e.g. 7 × 1.42 (= 9.94) or (7 + 125) × 1.05 (= 138.6)
			P1	(dep) for a complete process to find the density of **B**, e.g. ("138.6" − "9.94") ÷ 125
			A1	for answer in the range 1.029 to 1.03
8		$7.3 \leq x < 7.4$	B2	cao
			(B1)	(for 7.3 and 7.4)

Question		Working	Answer	Mark	Notes
9	(a)		Correct graph	B1 B1	for 5 or 6 points plotted correctly for their points joined by a curve or line segments provided no gradient is negative.
	(b)		43	B1	Answer in the range 41 to 45
	(c)		Yes with justification	M1 M1 C1	for taking readings from graph at 35 **and** 55 years for a correct calculation from their readings eg “44”÷70 (= 63%) or 60% of 70 = 42 for a correct conclusion and calculation from their readings, e.g. “44”÷70 (= 63%) or 60% of 70 = 42% (< “44”)
10			460	P1 P1 A1	for a process to find the cost after the first reduction, e.g. 293.25 ÷ 0.85 (= 345) (dep) for a complete process to find the initial cost, e.g. “345” ÷ 0.75 cao

Question		Working	Answer	Mark	Notes
11			$x^3 + 6x^2 - 24x - 64$	M1	for a method to find the product of any two linear expressions, e.g. 3 correct terms or 4 correct terms ignoring signs, e.g. $(x + 2)(x + 8) = x^2 + 10x + 16$, **or** $(x + 8)(x - 4) = x^2 + 4x - 32$, **or** $(x + 2)(x - 4) = x^2 - 2x - 8$
				M1	for a method of 6 products, 4 of which are correct (ft from their first product) **or** a method of 8 products 6 of which are correct
				A1	cao
12			56	P1	for correct substitution into the formula for the volume of a cylinder, e.g. $\pi \times 5^2 \times h$ (= 1178)
				P1	for correct rearrangement to find the height e.g. $h = 1178 \div (\pi \times 5^2)$ (= 14.99876184)
				P1	(dep on P1) for correct use of tangent ratio, e.g. tan x = "14.99…" ÷ 10
				A1	for answer in the range 56 to 56.31

Question	Working	Answer	Mark	Notes
13		Proof	M1 M1 C1	for 3 consecutive integers written algebraically, e.g. n, $n + 1$, $n + 2$ **or** $n - 1$, n, $n + 1$ for multiplying the smallest and largest, e.g. $n(n + 2) = n^2 + 2n$ **or** $(n - 1)(n + 1) = n^2 - 1$ **or** for squaring the middle number for a correct conclusion from correct expressions
14	$x = 0.4575757\ldots$ $10x = 4.575757\ldots$ $1000x = 457.575757\ldots$ $990x = 453$ **OR** $100x = 45.7575757\ldots$ $99x = 45.3$	$\frac{151}{330}$	M1 M1 A1	for $0.4575757\ldots$ or $0.4 + 0.05757\ldots$ (dep) for two recurring decimals that when subtracted would give an integer or terminating decimal or for $\frac{453}{990}$ conclusion to proof to given fraction
15		Region identified	B1 B1 A1	for $x = 4$ **or** $2x + y = 6$ **or** $y = \frac{1}{3}x$ for $x = 4$ **and** $2x + y = 6$ **and** $y = \frac{1}{3}x$ for lines drawn and correct region identified by either shading in or out; the letter R is not required, but necessary if no shading

Question	Working	Answer	Mark	Notes
16		67	P1 P1 A1	for process to use proportions, e.g. $\frac{10}{n}$ or $\frac{3}{20}$ for process to form equation, e.g. $\frac{10}{n} = \frac{3}{20}$ cao
17		19 or 20	M1 M1 A1	for correct method to find the quantity in 2017, e.g. 0.87 × 30 (= 26.1) (dep) for complete iterative process, e.g. (quantity in 2018 =) 0.87 × "26.1" (= 22.707), (quantity in 2019 =) 0.87 × "22.707" (= 19.75509) for answer of 19.75509 correctly rounded or truncated to the nearest whole number
18		$a = 90$ $b = -1$	B1 B1	for $a = 90$ for $b = -1$

Question	Working	Answer	Mark	Notes
19		proof	B1	for $\overrightarrow{BC} = 2\mathbf{b} - 3\mathbf{a}$ **or** $\overrightarrow{CB} = 3\mathbf{a} - 2\mathbf{b}$ **or** $\overrightarrow{BE} = 6\mathbf{b}$
			M1	for a correct vector expression for $\overrightarrow{AD}$ **or** $\overrightarrow{DE}$ **, or** $\overrightarrow{AE}$ e.g. $\overrightarrow{AD} = \overrightarrow{AB} + \frac{3}{4}\overrightarrow{BC}$ **or** $\overrightarrow{AD} = \overrightarrow{AC} + \frac{1}{4}\overrightarrow{CB}$ **or** $\overrightarrow{DE} = \frac{3}{4}\overrightarrow{CB} + \overrightarrow{BE}$, **or** $\overrightarrow{AE} = \overrightarrow{AB} + 3\overrightarrow{AC}$
			A1	for $\overrightarrow{AD} = \frac{3}{4}(2\mathbf{b} + \mathbf{a})$ **and** $\overrightarrow{DE} = \frac{9}{4}(2\mathbf{b} + \mathbf{a})$ **or** $\overrightarrow{AE} = 3(2\mathbf{b} + \mathbf{a})$ with either $\overrightarrow{AD} = \frac{3}{4}(2\mathbf{b} + \mathbf{a})$ **or** $\overrightarrow{DE} = \frac{9}{4}(2\mathbf{b} + \mathbf{a})$
			C1	for a fully correct proof, eg $\overrightarrow{DE} = 3\overrightarrow{AD}$, so the vectors are parallel and have point *D* in common

Question	Working	Answer	Mark	Notes
20	P(OOO) $\frac{6}{9}\times\frac{5}{8}\times\frac{4}{7}=\frac{120}{504}$ P(OEE) $\frac{6}{9}\times\frac{3}{8}\times\frac{2}{7}=\frac{36}{504}$ P(EOE) $\frac{3}{9}\times\frac{6}{8}\times\frac{2}{7}=\frac{36}{504}$ P(EEO) $\frac{3}{9}\times\frac{2}{8}\times\frac{3}{7}=\frac{36}{504}$ P(odd) $\frac{120}{504}+\frac{36}{504}+\frac{36}{504}+\frac{36}{504}$ P(EEE) $\frac{3}{9}\times\frac{2}{8}\times\frac{1}{7}=\frac{6}{504}$ P(EOO) $\frac{3}{9}\times\frac{6}{8}\times\frac{5}{7}=\frac{90}{504}$ P(OEO) $\frac{6}{9}\times\frac{3}{8}\times\frac{5}{7}=\frac{90}{504}$ P(OOE) $\frac{6}{9}\times\frac{5}{8}\times\frac{3}{7}=\frac{90}{504}$ P(odd) $1-\left(\frac{6}{504}+\frac{90}{504}+\frac{90}{504}+\frac{90}{504}\right)$	$\frac{228}{504}$	P1 P1 P1 P1 A1 **OR** P1 P1 P1 P1 A1	for a “second choice” denominator of 8 for one correct product of 3 probabilities for all four correct products of 3 probabilities for a fully correct process to find the probability of the sum being odd oe for a “second choice” denominator of 8 for one correct product of 3 probabilities (method to use 1 – p(odd)) for all four correct products of 3 probabilities for a fully correct process to find the probability of the sum being odd oe

Question	Working	Answer	Mark	Notes
21 (a)		343	M1 A1	for g(2) = 7 or fg(x) = $(4x - 1)^3$ cao
(b)		$\frac{\sqrt[3]{x}+1}{4}$	M1 M1 A1	for h(x) = $(4x - 1)^3$ for a correct first step to find inverse, e.g. $\sqrt[3]{x} = 4y - 1$ cao
22		$y = 0.4x - 17.4$	P1 P1 P1 P1 A1	for process to find p, e.g. $\sqrt{261-15^2}$ for process to find gradient of OA, e.g. $-15 \div 6$ $(=\frac{-5}{2})$ (dep on previous P1) for process to find the perpendicular gradient using $-\frac{1}{m}$ or states gradient as $\frac{2}{5}$ for process to find the y-intercept of the gradient, e.g. $-15 = \frac{2}{5} \times 6 + c$ oe