

GCE

Mathematics A

H240/02: Pure Mathematics and Statistics

Advanced GCE

Mark Scheme for Autumn 2021

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Text Instructions

1. Annotations and abbreviations

Annotation in RM assessor	Meaning
✓ and ✖	
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working
M0, M1	Method mark awarded 0, 1
A0, A1	Accuracy mark awarded 0, 1
B0, B1	Independent mark awarded 0, 1
SC	Special case
^	Omission sign
MR	Misread
BP	Blank Page
Seen	
Highlighting	
Other abbreviations in mark scheme	Meaning
dep*	Mark dependent on a previous mark, indicated by *. The * may be omitted if only one previous M mark
cao	Correct answer only
oe	Or equivalent
rot	Rounded or truncated
soi	Seen or implied
www	Without wrong working
AG	Answer given
awrt	Anything which rounds to
BC	By Calculator
DR	This question included the instruction: In this question you must show detailed reasoning.

2. Subject-specific Marking Instructions for A Level Mathematics A

- a Annotations must be used during your marking. For a response awarded zero (or full) marks a single appropriate annotation (cross, tick, M0 or ^) is sufficient, but not required.

For responses that are not awarded either 0 or full marks, you must make it clear how you have arrived at the mark you have awarded and all responses must have enough annotation for a reviewer to decide if the mark awarded is correct without having to mark it independently.

It is vital that you annotate standardisation scripts fully to show how the marks have been awarded.

Award NR (No Response)

- if there is nothing written at all in the answer space and no attempt elsewhere in the script
- OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
- OR if there is a mark (e.g. a dash, a question mark, a picture) which isn't an attempt at the question.

Note: Award 0 marks only for an attempt that earns no credit (including copying out the question).

If a candidate uses the answer space for one question to answer another, for example using the space for 8(b) to answer 8(a), then give benefit of doubt unless it is ambiguous for which part it is intended.

- b An element of professional judgement is required in the marking of any written paper. Remember that the mark scheme is designed to assist in marking incorrect solutions. Correct solutions leading to correct answers are awarded full marks but work must not always be judged on the answer alone, and answers that are given in the question, especially, must be validly obtained; key steps in the working must always be looked at and anything unfamiliar must be investigated thoroughly. Correct but unfamiliar or unexpected methods are often signalled by a correct result following an apparently incorrect method. Such work must be carefully assessed. When a candidate adopts a method which does not correspond to the mark scheme, escalate the question to your Team Leader who will decide on a course of action with the Principal Examiner. If you are in any doubt whatsoever you should contact your Team Leader.

- c The following types of marks are available.

M

A suitable method has been selected and *applied* in a manner which shows that the method is essentially understood. Method marks are not usually lost for numerical errors, algebraic slips or errors in units. However, it is not usually sufficient for a candidate just to indicate an intention of using some method or just to quote a formula; the formula or idea must be applied to the specific problem in hand, e.g. by substituting the relevant quantities into the formula. In some cases the nature of the errors allowed for the award of an M mark may be specified.

A method mark may usually be implied by a correct answer unless the question includes the DR statement, the command words “Determine” or “Show that”, or some other indication that the method must be given explicitly.

A

Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. Accuracy marks cannot be given unless the associated Method mark is earned (or implied). Therefore M0 A1 cannot ever be awarded.

B

Mark for a correct result or statement independent of Method marks.

Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored. Sometimes this is reinforced in the mark scheme by the abbreviation isw. However, this would not apply to a case where a candidate passes through the correct answer as part of a wrong argument.

- d When a part of a question has two or more ‘method’ steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. (The notation ‘dep*’ is used to indicate that a particular mark is dependent on an earlier, asterisked, mark in the scheme.) Of course, in practice it may happen that when a candidate has once gone wrong in a part of a question, the work from there on is worthless so that no more marks can sensibly be given. On the other hand, when two or more steps are successfully run together by the candidate, the earlier marks are implied and full credit must be given.
- e The abbreviation FT implies that the A or B mark indicated is allowed for work correctly following on from previously incorrect results. Otherwise, A and B marks are given for correct work only – differences in notation are of course permitted. A (accuracy) marks are not given for answers obtained from incorrect working. When A or B marks are awarded for work at an intermediate stage of a solution, there may be various alternatives that are equally acceptable. In such cases, what is acceptable will be detailed in the mark scheme. If this is not the case please, escalate the question to your Team Leader who will decide on a course of action with the Principal Examiner.
- Sometimes the answer to one part of a question is used in a later part of the same question. In this case, A marks will often be ‘follow through’. In such cases you must ensure that you refer back to the answer of the previous part question even if this is not shown within the image zone. You may find it easier to mark follow through questions candidate-by-candidate rather than question-by-question.

- f We are usually quite flexible about the accuracy to which the final answer is expressed; over-specification is usually only penalised where the scheme explicitly says so.
- When a value **is given** in the paper only accept an answer correct to at least as many significant figures as the given value.
 - When a value **is not given** in the paper accept any answer that agrees with the correct value to **3 s.f.** unless a different level of accuracy has been asked for in the question, or the mark scheme specifies an acceptable range.
- NB for Specification B (MEI) the rubric is not specific about the level of accuracy required, so this statement reads “2 s.f”.
- Follow through should be used so that only one mark in any question is lost for each distinct accuracy error.
- Candidates using a value of 9.80, 9.81 or 10 for g should usually be penalised for any final accuracy marks which do not agree to the value found with 9.8 which is given in the rubric.
- g Rules for replaced work and multiple attempts:
- If one attempt is clearly indicated as the one to mark, or only one is left uncrossed out, then mark that attempt and ignore the others.
 - If more than one attempt is left not crossed out, then mark the last attempt unless it only repeats part of the first attempt or is substantially less complete.
 - if a candidate crosses out all of their attempts, the assessor should attempt to mark the crossed out answer(s) as above and award marks appropriately.
- h For a genuine misreading (of numbers or symbols) which is such that the object and the difficulty of the question remain unaltered, mark according to the scheme but following through from the candidate’s data. A penalty is then applied; 1 mark is generally appropriate, though this may differ for some units. This is achieved by withholding one A or B mark in the question. Marks designated as cao may be awarded as long as there are no other errors. If a candidate corrects the misread in a later part, do not continue to follow through. Note that a miscopy of the candidate’s own working is not a misread but an accuracy error.
- i If a calculator is used, some answers may be obtained with little or no working visible. Allow full marks for correct answers, provided that there is nothing in the wording of the question specifying that analytical methods are required such as the bold “In this question you must show detailed reasoning”, or the command words “Show” or “Determine”. Where an answer is wrong but there is some evidence of method, allow appropriate method marks. Wrong answers with no supporting method score zero. If in doubt, consult your Team Leader.
- j If in any case the scheme operates with considerable unfairness consult your Team Leader.

Question		Answer	Mark	Guidance
1	(a)	$-4e^{-4x}$ oe	B2 [2]	B1 for e^{-4x} seen as part of answer, not in denominator
1	(b)	By quotient rule $\frac{(x+1) \times 2x - x^2 \times 1}{(x+1)^2}$	B1 B1	B1: correct denominator & 1 correct term in numerator, any form ISW
		Alternative method – chain rule or $-(x+1)^{-2} \times x^2 + (x+1)^{-1} \times 2x$	B1 B1	B1 for either term correct ISW
		(= $\frac{x(x+2)}{(x+1)^2}$ or $\frac{x^2+2x}{x^2+2x+1}$)	[2]	
2		f(x) is positive on both sides of the 1st root oe Curve does not cross the x-axis (near root) Sign does not change (near the root) No negative value (near the root)	B2 [2]	B1 for "The graph touches the x-axis" or "repeated root" or "It is a stationary point" Ignore all else, eg "inflection"
3		$a + 14d = 88$ (i)	M1 A1	M1 for one error, eg $a + 9d = 88$
		$\frac{10}{2}(2a + 9d) = 310$ (ii)	M1 A1	M1 for $\frac{15}{2}(2a + 14d) = 310$ or for one error, eg $5(2a + 18d) = 310$
		Substitute from (i) into (ii) $\frac{10}{2}(2(88 - 14d) + 9d) = 310$ $176 - 19d = 62$ $d = 6, a = 4$	M1 A1 [6]	Attempt substitution, elimination or to verify solutions found BC. Condone one arithmetical error SC for last 2 marks: Correct answers, substitution not seen: B1B0, dep M1M1 cao

Question		Answer	Mark	Guidance
4	(a)	6000	B1 [1]	
4	(b)	2000	B1f [1]	ft their (a) – 4000
4	(c)	Oscillates or Goes up and down. oe Fluctuates. Moves in a cycle	B1 [1]	Ignore all else NOT “Increases for 1 st 6 months then decreases”
4	(d)	$30t = 360$ Time to return to initial size = 12 months	M1 A1 [2]	May be implied by answer Allow $t = 12$, or $t = 12$ months, or just 12
4	(e)	$4500 = 5000 - 1000\cos(30t)^\circ$ $\cos(30t)^\circ = 0.5$ $30t = 60$ or 300 (both) 2nd time $P = 4500$ is when $t = 10$	M1 A1 M1 A1	Substitute $P = 4500$ May be implied by next line Correct rearrangement Attempt $30t = \cos^{-1}(\text{their } 0.5)$, giving α and $360 - \alpha$. Condone $30t = \frac{\pi}{3}, \frac{5\pi}{3}$ or after 10 months. Allow $t = 10$ months, or just 10 SC. (If not gained 1 st M1A1) Correct answer with no or inadequate working and/or T&I: $t = 10$ stated: B2; $t = 10$ embedded: B1B0
		Alternative methods for 2nd M1A1 $30t = 60$ or -60 (both) ($t = 2$ or -2) 2nd time $P = 4500$ is when $t = -2 + 12 = 10$	M1 A1	$30t = 60$ ($t = 2$) (end of 1 st cycle at $t = 12$) 2 nd time $P = 4500$ is when $t = 12 - 2 = 10$
		$30t = 60$ ($t = 2$) $6 - 2 = 4$; $t = 6 + 4 = 10$	M1 A1	
			[4]	
4	(f)	eg $P = 5000 - 1000e^{-t}\cos(30t)^\circ$ $P = 5000 - 1000e^{-kt}\cos(30t)^\circ$ ($k > 0$) Answers in words must be equivalent to one of these	B1 [1]	or other good answers eg $P = 5000 - (1000\cos(30t)^\circ)^{1/t}$ $P = 5000 - \frac{1000}{t}\cos(30t)^\circ$. ($t > 0$)

Question		Answer	Mark	Guidance
5	(a)	Midpoint AB is $(3.5, 5.5)$; Gradient $AB = -\frac{1}{7}$	B1	Both. Allow midpoint = $(\frac{0+7}{2}, \frac{6+5}{2})$ ISW
		Gradient of perpendicular bisector $-1/(-\frac{1}{7})$	M1	(= 7)
		$y - 5.5 = 7(x - 3.5)$ oe ISW	A1	cao. Correct answer, no working or inadequate working: SC B2
		Midpt AB is $(3.5, 5.5)$; Gradient $AB = -\frac{1}{7}$	B1	Both
		$(y = 7x + c) \quad 5.5 = 7 \times 3.5 + c$	M1	ft their midpt and gradient, NOT $-\frac{1}{7}$
		$y = 7x - 19$	A1	cao. Any correct form
		$x^2 + (y - 6)^2 = (x - 7)^2 + (y - 5)^2$	M1	
		$-12y + 36 = -14x - 10y + 49 + 25$ ISW	M1 M1 A1	Attempt expansion cao. Any correct form eg $y = 7x - 19$
			[3]	
5	(b)	Perpendicular bisector of BC is $x + 7y - 17 = 0$ OR of CA is $4y = 3x - 1$	B1	Any correct form for another perp bisector
		Example method, perp bisectors of AB & BC : $x + 7(7x - 19) - 17 = 0 \quad (\Rightarrow x = 3)$	M1	Attempt solve simultaneously equations of two perpendicular bisectors. Can be implied
		Alternative method for 1st two marks Grad BC is 7 so BC & AB perpendicular Hence AC is a diameter	M1 B1	
		Centre is $(3, 2)$ eg Radius ² = $3^2 + (6 - 2)^2 = 25$	B1 M1	cao. NB, if centre = $(3, 2)$ without clear working, B0M0B1 Correct method for r^2 or r using their centre & A or B or C
		Equn of circle is $(x - 3)^2 + (y - 2)^2 = 25$ or $x^2 - 6x + y^2 - 4y = 12$ oe	A1ft	ISW. ft their centre & radius, dep both M1 marks
			[5]	

Question		Answer	Mark	Guidance
			[4]	
8	(a)	$b = -1, c = 1$	B1 [1]	or $(n + 1)(n^2 - n + 1)$
8	(b)	<p>$n + 1$ (or $n^2 - n + 1$) is a factor of K</p> <p>$n > 2$ so $n + 1 > 1$ or $n + 1 > 3$ or $n + 1 \neq 1$ $(n^2 - n + 1$ is a factor of K and $n^2 - n + 1 > 1$ or $\neq 1$) Assume these factors are equal Let $n^2 - n + 1 = n + 1$ $\Rightarrow n^2 - 2n = 0$ $n = 0$ or 2.</p> <p>$n > 2$ so both invalid; hence 2 distinct factors</p> <p>Ignore attempted proofs that either factor $\neq K$</p>	B1 B1 M1 A1 A1 [5]	<p>Stated. Allow x instead of n NOT $n^3 + 1$ can be expressed as $(n + 1)(n^2 - n + 1)$</p> <p>Must see $n > 2$ Allow omission of this step</p> <p>Conclusion stated, from correct working seen. Dep at least B1M1 and correct reasoning given SC: $(n + 1) > 1$ or $n + 1 > 3$ (or $n^2 - n + 1 > 1$) B1 $(n + 1)$ & $(n^2 - n + 1)$ are factors of K B1</p>
9	(a)	<p>Summary method:</p> <p>$\overline{OM} = \frac{1}{2}(\mathbf{b} + \mathbf{c})$ or $\mathbf{b} + \frac{1}{2}(-\mathbf{b} + \mathbf{c})$ oe</p> <p>\overline{AM} or \overline{MA} attempted in terms of \mathbf{a}, \mathbf{b} and \mathbf{c} $(= \pm(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}))$ oe)</p> <p>$\overline{OX} = \mathbf{a} + \frac{2}{3}\overline{AM}$ or $\overline{OM} + \frac{1}{3}\overline{MA}$ oe attempted in terms of \mathbf{a}, \mathbf{b} and \mathbf{c}</p> <p>$\overline{OX} = \frac{1}{3}(\mathbf{a} + \mathbf{b} + \mathbf{c})$</p>	B1 M1 M1 A1	<p>Can be implied</p> <p>May be included in working, eg $\overline{AX} = \frac{2}{3}(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a})$ Not necessarily correct</p> <p>Not necessarily correct or equivalent simplified form</p>

Question		Answer	Mark	Guidance
9	(a) ctd	Examples of methods using the above		Other correct methods may be seen Allow inadequate notation
		$\overline{OM} = \frac{1}{2}(\mathbf{b} + \mathbf{c})$ $\overline{AX} = \frac{2}{3}\overline{AM} = \frac{2}{3}\left(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}\right)$ $\overline{OX} = \mathbf{a} + \frac{2}{3}\overline{AM} = \mathbf{a} + \frac{2}{3}\left(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}\right)$ $= \frac{1}{3}(\mathbf{a} + \mathbf{b} + \mathbf{c})$	B1 M1 M1 A1	for $\overline{AM} = \left(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}\right)$ implied
		$\overline{BM} = \frac{1}{2}(-\mathbf{b} + \mathbf{c})$ $\overline{AM} = \overline{AO} + \overline{OB} + \overline{BM}$ $= -\mathbf{a} + \frac{1}{2}\mathbf{b} + \frac{1}{2}\mathbf{c}$ $\overline{OX} = \mathbf{a} + \frac{2}{3}\left(-\mathbf{a} + \frac{1}{2}\mathbf{b} + \frac{1}{2}\mathbf{c}\right)$ $= \frac{1}{3}(\mathbf{a} + \mathbf{b} + \mathbf{c})$	B1 M1 M1 A1	Implied
$\overline{OM} = \frac{1}{2}(\mathbf{b} + \mathbf{c})$ $\overline{XM} = \frac{1}{3}\overline{AM}$ $= \frac{1}{3}\left(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}\right)$ $\overline{OX} = \overline{OM} - \frac{1}{3}\overline{AM}$ $= \frac{1}{2}(\mathbf{b} + \mathbf{c}) - \frac{1}{3}\left(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}\right)$ $= \frac{1}{3}(\mathbf{a} + \mathbf{b} + \mathbf{c})$	B1 M1 M1 A1	for $\overline{AM} = \left(\frac{1}{2}(\mathbf{b} + \mathbf{c}) - \mathbf{a}\right)$ implied equivalent to $\overline{OM} + \frac{1}{3}\overline{MA}$		

Question		Answer	Mark	Guidance
				eg NOT prob cf z-value or large prob cf small prob or CV cf wrong end of acceptance region
11	(d) ctd	Alternative methods for M1A1A1 or $\frac{a-20}{4.2\div\sqrt{60}} = 1.645$ ($a = 20.9$) CV = 20.9 21 > 20.9 or 21 not in acceptance region	M1 A1 A1	Condone $\frac{4.2^2}{\sqrt{60}}$ or $\frac{4.2^2}{60^2}$ or $\frac{4.2}{60}$
		or $\frac{21-20}{4.2\div\sqrt{60}}$ (= 1.84) $z_{calc} = 1.84$ Compare 1.645	M1 A1 A1	Condone $\frac{4.2^2}{\sqrt{60}}$ or $\frac{4.2^2}{60^2}$ or $\frac{4.2}{60}$
		$\bar{X} \sim N(20, \frac{4.2^2}{60})$ and $\bar{X} = \frac{1260}{60}$ or 21 $P(\bar{X} < 21) = 0.9674$ Compare 0.95	M1 A1 A1	Condone $\frac{4.2^2}{\sqrt{60}}$ or $\frac{4.2^2}{60^2}$ or $\frac{4.2}{60}$ BC
		Reject H_0 Condon Accept H_1 There is evidence that (mean) time spent is > 20 hours or eg there is evidence to support Zac's belief	M1 A1f	Dependent on clearly valid comparison of like with like. Dep 0.0485 or 0.951 or 20.9 or 1.84 or $P(X > 21)$ or $P(X \geq 21)$ soi May be implied by conclusion, eg "There is evidence that mean time is > 20 hours" M1A1 In context, not definite; eg "Mean time is > 20 hours": A0 But "There is evidence to reject H_0 and that mean time is > 20 h"

Question		Answer	Mark	Guidance
				M1A1
			[7]	Allow opposite conclusion, ft their values, if above conditions met and loses 2 nd A1. But potentially can score all the other 6 marks
		NB Use of $4.2^2/60$ as sd gives $p = 0.000335$		
12	(a)	0	B1 [1]	Allow 0%
12	(b)		B1 B1 B1 [3]	Ignore extra branches if no probabilities or $p = 0$ B2: 8 correct branches and probs <u>OR</u> names, no extra branches B2: 7 correct branches, probs and names, no extra branches B1: 8 correct branches without probs & names. No extra branches B1: 6 correct branches, probs and names. Ignore extra branches Ignore products at ends
12	(c)	$0.3 \times 0.3 + 0.7 \times 0.3 \times 0.3 + 0.3 \times 0.7 \times 0.3$ or $0.09 + 0.063 + 0.063$ oe $= \frac{27}{125}$ or 0.216	M1 M1 A1 [3]	All correct M2 ft their diagram Two products correct M1 ft their diagram SC Correct answer with no working: B2
12	(d)	$0.7 \times 0.3 + 0.3 \times 0.7$ or $0.21 + 0.21$ $= \frac{21}{50}$ or 0.42	M1 A1 [2]	or $1 - (0.7^2 + 0.3^2)$ or $1 - (0.49 + 0.09)$ Condone missing brackets or $0.7 \times 0.3 \times 0.7 + 0.7 \times 0.3 \times 0.3 + 0.3 \times 0.7 \times 0.7 + 0.3 \times 0.7 \times 0.3$ oe or $2 \times 0.147 + 2 \times 0.063$ oe Wholly correct method ft their diagram SC Correct answer with no working: B1
12	(e)	P(B wins and 3 points) $= 0.7 \times 0.3 \times 0.3 + 0.3 \times 0.7 \times 0.3$ or 2×0.063 (= 0.126 oe) $\frac{P(\text{B wins \& 3 points})}{P(\text{B wins})} = \frac{0.126}{0.216}$	M2 M1	ft their diagram for M-marks soi M1 for one correct product or 0.063 Must attempt $\frac{P(\text{B wins \& 3 points})}{\text{Their (c) NOT (d) or } 0.3 \times 0.3 + 0.7 \times 0.3 \times 0.3 + 0.3 \times 0.7 \times 0.3}$

Question			Answer	Mark	Guidance
			$= \frac{7}{12}$	A1 [4]	Allow 0.583 (3 sf) SC no working $\frac{7}{12}$ B2 But minimal working is OK, eg $\frac{2 \times 0.063}{0.216} = \frac{7}{12}$ M2M1A1
13	(a)		OR A: High private and low public OR B: Low bicycle and low public OR B: Low bicycle and high private OR C: Low bicycle and high private	B2 [2]	Allow B1 for A or B or C with one correct factor only. Ignore else All answers can be implied Ignore all else
13	(b)		Pie charts allow comparison of proportions Pie charts show proportions oe Ignore all else	B1 [1]	NOT: Bar charts don't show proportions unless also state pies do. Assume "They" means pie charts. NOT: It's easier to compare data Pie charts don't easily show which is greatest Allow percentages instead of proportions
13	(c)	(i)	C and D Larger (or high or most) proportion public transport Can be implied. Ignore all else	B1 B1 [2]	Both, no others Dep applied to at least one of C and D, even if other LA mentioned B-marks are independent
13	(c)	(ii)	LDS says "The method of travel used is for the longest part, by distance, of the usual journey to work" Correct answers therefore should assume users of P&R will report only private, not public		
			Method of travel is the type used for the longest part of the journey Most people using Park-and-Ride would still	B1	"Disagree" may be implied

Question		Answer	Mark	Guidance
		or verification: $\frac{12}{25} + \frac{6}{25} + \frac{4}{25} + \frac{3}{25} = 1$	M1 A1 [2]	
14	(b)	$\frac{1}{25} \quad \frac{2}{25} \quad \frac{3}{25} \quad \frac{4}{25}$	B1 [1]	or equivalent exact values
14	(c)	$(3, 1, 1) \quad (4, 1, 1) \quad (4, 2, 1) \quad (4, 1, 2)$ $\frac{4}{25} \times (\frac{12}{25})^2 + \frac{3}{25} \times (\frac{12}{25})^2 + \frac{3}{25} \times \frac{6}{25} \times \frac{12}{25}$ $+ \frac{3}{25} \times \frac{12}{25} \times \frac{6}{25}$ oe $= \frac{288}{3125}$ or 0.09216	M1 M1 A1 [3]	At least three of these seen or implied. No extras or repeats. At least two correct terms, no incorrect coefficients; ft their table. Allow in terms of k Allow 0.0922 (3 sf)
14	(d)	$(1, 1, 1, 1, 3)$ $(1, 1, 1, 2, 2)$ $(\frac{12}{25})^4 \times \frac{4}{25} \times 5 + (\frac{12}{25})^3 \times (\frac{6}{25})^2 \times {}^5C_2$ oe	B1 B1 M1 A1	B1B1 for both sets in any order, without extras. Both soi. B1 for both sets in any order, with extras. $(\frac{12}{25})^4 \times \frac{4}{25}$ or $(\frac{12}{25})^3 \times (\frac{6}{25})^2$ oe seen. Ignore coeffs. ft their table For either $(\frac{12}{25})^4 \times \frac{4}{25} \times 5$ or $(\frac{12}{25})^3 \times (\frac{6}{25})^2 \times {}^5C_2$ oe ft their table
		Alternative method for M1A1 or $(\frac{12}{25})^4 \times \frac{4}{25} \times (4+1) + (\frac{12}{25})^3 \times (\frac{6}{25})^2 \times ({}^4C_2 + 4)$	M1 A1	oe For either $(\frac{12}{25})^4 \times \frac{4}{25} \times (4+1)$ or $(\frac{12}{25})^3 \times (\frac{6}{25})^2 \times ({}^4C_2 + 4)$ oe
		$= \frac{41472}{390625}$ or 0.10616832	A1 [5]	Allow 0.106 (3 sf)

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