

Mark Scheme (Results)

October 2020

Pearson Edexcel IAL In Statistics 1 Paper WST03/01

Question Number	Scheme	Marks
1.		
(a)	$E(2\overline{X}) = 2E(\overline{X}) = \frac{2(1+\alpha)}{2}$	M1
	$= 1 + \alpha \neq \alpha$ (therefore $2\overline{X}$ is a biased estimator of α)	A1
		(2)
(b)	$\overline{x} = 6$ $2\overline{x} - 1 =$	M1
	<u>11</u>	A1
		(2)
	NY .	Total 4
	Notes	
(a)	M1 for use of $2 \times \frac{1+\alpha}{2}$	
	A1cso correct comparison with α and no incorrect working seen.	
	$\frac{1+\alpha}{2} \neq \alpha \text{ is M0A0}$	
(b)	M1 for attempt at \overline{x} and use of $2\overline{x} - 1$ or ft use of their $E(\overline{X})$ from part (a) to	
	find an estimate for α	
	A1 11 cao	

Question Number	Scheme	Marks	
2.	E . 1 1 12.75 10.25 17	D1	
(a)	Expected values: 13.75, 19.25, 17	B1	
	$\frac{(18-13.75)^2}{13.75} \frac{(15-19.25)^2}{19.25} \frac{(17-17)^2}{17}$	M1	
	Pass 1.31 0.94 0 2.25	1 4 2	
	9.43	A2	
		(4)	
	H ₀ : <u>Degree/category</u> is independent of <u>department</u> (no association)		
(b)	H ₁ : Degree/category is not independent of department (association)	B1	
	v = (3-1)(3-1) = 4	B1	
	$\chi_4^2(5\%) = 9.488$	B1ft	
	· ·		
	$^{\circ}9.43^{\circ} < 9.488$, so do not reject H_0 / not significant	M1	
	Not enough evidence to show that the Degree/category is not independent of		
	department (no association) (at the 5% level of significance)	(5)	
		Total 9	
	Notes		
(a)	B1 All correct expected values (may be implied by A2)		
	M1 Attempting $\frac{(O-E)^2}{E}$ for their E (may be implied by one correct value)		
	A2 all 5 values correct (allow awrt)		
	(A1 any 2 values correct)		
(b)	B1 Both hypotheses required must mention degree/category and department at le "relationship" or "correlation" or "connection" or "link" award B0. B1 4 can be implied by 9.488 seen	ast once. Use of	
	B1ft 9.488 or better. Follow through their ν so may see $\chi^2_{3,0.05} = 7.815$ $\chi^2_{2,0.05}$	=5.991	
	M1 Correct non-contextual conclusion for their (a) and c.v. Can be implied by conclusion in context ft their (a) and c.v. A1ft A correct comment in context.	correct	
	Condone "relationship" or "connection" here but not "correlation".		
	Follow through from their test statistic and cv, but hypotheses must be correct.		

Question Number	Scheme	Marks	
3.			
(a)	$ \begin{array}{ c c c c c c c } \hline & 200m & 400m & d & d^2 \\ \hline A & 3 & 1 & 2 & 4 \\ \hline B & 2 & 2 & 0 & 0 \\ \hline C & 1 & 4 & -3 & 9 \\ \hline D & 4 & 5 & -1 & 1 \\ \hline E & 7 & 7 & 0 & 0 \\ \hline G & 5 & 3 & 2 & 4 \\ \hline \end{array} $	M1 A1	
	$\sum d^2 = 18$	A1	
	$r_s = 1 - \frac{6 \times 18}{7 \times 48} = \frac{19}{28} = \text{awrt } \underline{\textbf{0.679}}$	dM1 A1	
		(5)	
(b)	$H_0: \rho = 0$ $H_1: \rho > 0$	B1	
	Critical value 0.7143	B1	
	$(0.679 < 0.7143)$ so insufficient evidence to reject H_0	M1	
	There is insufficient evidence to suggest a positive correlation between the finishing order in the 200 metre race and the finishing order in the 400 metre race.	Alft	
(a)	Thousand tied lengths so year events	(4) B1	
(c)	There are tied lengths so use average ranks Then use $r_s = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}}$	dB1	
		(2)	
	Notes	Total 11	
(a)	M1 for an attempt to rank athletes lists (at least 3 correct for each) A1 for correct rankings for both (may be reversed). Can be implied by correct $\sum d^2$ A1 $\sum d^2 = 18$ dM1 (dep upon previous M1) for use of the correct formula, follow through their $\sum d^2$ A1 awrt 0.679		
(b)	B1 both hypotheses correct ρ or ρ_s B1 for correct c.v. (sign should match H_1 or r_s) M1 ft their r_s and their c.v. A1 ft a correct contextualised comment including positive correlation and races/finishing orders (oe) with all previous marks in (b) scored		
(c)	B1 for use of average ranks or use of 1.5 or 6.5(for C and D)/4.5 or 3.5 (for B and G) dB1 (dep on 1 st B1) for use of pmcc (with the average ranks)		

Question Number	Scheme	Marks
4. (a)	Randomly select a student from 1 to 7 oe	B1
	Take every 7 th student	B1
		(2)
(b)	$v = 10 - 1 = 9$ $\chi_9^2(10\%) = 14.684$	B1 B1ft
	No evidence (at 10% level of significance) that the digits generated do not	10.1
	follow a uniform distribution.	dB1
		(3)
(c)	H ₀ : Uniform distribution is a good fit (for the two-digit numbers generated)	B1
	H_1 : Uniform distribution is not a good fit (for the two-digit numbers generated)	
	$egin{array}{ c c c c c c c c c c c c c c c c c c c$	
	$ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot$	
	31 40 2.025 24.025	B1
	49 40 2.025 60.025	M1 A1
	30 40 2.5 22.5	WII AI
	42 40 0.1 44.1	
	48 40 1.6 57.6	
	200 200 8.25 208.25	
	$\sum \frac{(O-E)^2}{E} = 8.25$ or $\sum \frac{O^2}{E} - 200 = 8.25$	A1
	$\chi_4^2(10\%) = 7.779$	B1
	[8.25 > 7.779] Reject H ₀ / Significant	M1
	There is evidence to suggest the two-digit numbers generated may not follow a	
	uniform distribution.	A1
		(8)
(d)	To generate a simple random sample, Luka would need to generate two-digit numbers (from 00 to 69)	B1
	But Luka's table would not be suitable for generating random two-digit numbers	B1ft
		(2)
		Total 15
	Notes	
(a)	B1 for the idea of generating a random number to determine first student selected	
	B1 for every 7th student (not just select 40 students)	
(b)	B1 for correct degrees of freedom (may be implied by 2 nd B1)	
	B1ft for correct critical value 14.684 or better—ft their d.f. so may see $\chi_{10}^2(10\%)$	=15.987
(c)	B1 (dependent upon 2 nd B1) for correct conclusion in context with digits (oe) and B1 Both hypotheses correct	uniform distr.
	B1 All expected values = 40	
	M1 Attempting $\frac{(O-E)^2}{E}$ or $\frac{O^2}{E}$ with at least 3 correct (1 dp truncated or rounded) or	or f.t. their E
	A1 all $\frac{(O-E)^2}{E}$ or $\frac{O^2}{E}$ correct (1 dp truncated or rounded). May be implied by 8.25	or 208.25
	A1 8.25 oe	
	B1 correct critical value 7.779 or better	
	M1 for a correct non-contextual conclusion (ignore any contradictory contextual c	omments for
	this mark) based on their cv and their test statistic	
	A1 correct conclusion in context with all previous marks scored	
(d)	B1 for the idea of generating two-digit numbers (for a simple random sample)	
	B1ft Luka's table not suitable for generating two-digit random numbers for a simp	ole random
	sample, ft parts (b) and (c)	D 27-1
SC:	If B0B0 scored, 'table only suitable for generating one-digit random numbers' sc	ores B0B1

Question Number	Scheme	Marks
5.		
(a)	$s_A^2 = \frac{1}{39} (790258 - 140.4^2 \times 40)$ $s_B^2 = \frac{1}{31} (581430 - 134.7^2 \times 32)$	M1
	= 45.4256 <u>awrt 45.4</u> = 26.4232 <u>awrt 26.4</u>	A1 A1
		(3)
(b)	$H_0: \mu_A - \mu_B = 5$	B1
	$H_1: \mu_A - \mu_B > 5$	B1
	s.e. = $\sqrt{\frac{45.4256}{40} + \frac{26.4232}{32}}$ (= awrt 1.4)	M1
	$z = \frac{\pm (140.4 - 134.7 - 5)}{\text{s.e.}} = \text{awrt } 0.50$	dM1 A1
	c.v. = 1.6449	B1
	(Do not reject H_0) Insufficient evidence to support the greengrocer's belief .	
	(Insufficient evidence that the difference in weight between type <i>A</i> oranges and type <i>B</i> oranges is over 5 grams).	A1ft
		(7)
(c)	Large sample sizes so	
	Sample means are normally distributed (CLT)	B1
	$s_A^2 = \sigma_A^2$ and $s_B^2 = \sigma_B^2$	B1
		(2)
		Total 12
()	Notes	
(a)	M1 one correct expression A1 either awrt 45.4 or awrt 26.4 A1 both awrt 45.4 and awrt 26.4	
(b)	B1 Allow equivalent rearrangements. Must use μ	
	B1 Allow equivalent rearrangements. Must use μ .	
	For both hypotheses do not allow e.g. μ_1 and μ_2 unless each has been clearly def	ined
	M1 attempt at standard error (allow one slip) ft their (a) dM1 standardising with (140.4 – 134.7 – 5) and their s.e. (dep on previous M1) A1 for 0.5 or awrt 0.50	
	B1 correct c.v. 1.6449 or better. Allow –1.6449 or better with use of $\mu_B - \mu_A$	
	Allow $p = \text{awrt } 0.309$ Alft correct ft conclusion in context with either greengrocer's belief (oe) or differ weights (oe) dependent on all B and M marks scored.	rence in
(c)	B1 must comment on both sample means, \overline{A} and \overline{B} B1 must comment on both variances/standard deviations	

6. (a) $\overline{T} \sim N(4, \frac{4}{35})$ M1 A1 (2) (b) $\overline{K} \sim N(\lambda, \frac{\lambda}{40})$ M1 $\overline{V} \sim N(\lambda, \frac{\lambda}{40})$ M1 $\overline{V} \sim N(\lambda, \frac{\lambda}{40})$ M1 $\overline{V} \sim N(\lambda, \frac{\lambda}{40})$ B1 M1 $\overline{V} \sim N(\lambda, \frac{\lambda}{40})$ (c) $\overline{V} \sim N(\lambda, \frac{\lambda}{40})$ (4) $\overline{V} \sim N(\lambda, \frac{\lambda}{40})$ M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{\sigma}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0 A1 0.0198$	Question Number	Scheme	Marks
(b) $\overline{k} \sim N(\lambda, \frac{\lambda}{40})$ M1 $2 \times 2.5758 \times \sqrt{\frac{\lambda}{40}} = 2.6$ B1 M1 $\lambda = \operatorname{awrt} \underline{10.2}$ A1 (c) $2 \times 0.99 \times 0.01$ M1 $= \underline{0.0198}$ A1 (2) Total 8 (a) M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{\sigma}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$	6.		
(b) $\overline{K} \sim N(\lambda, \frac{\lambda}{40})$ M1 $2 \times 2.5758 \times \sqrt{\frac{\lambda}{40}} = 2.6$ B1 M1 $\lambda = \text{awrt } \underline{10.2}$ A1 (c) $2 \times 0.99 \times 0.01$ M1 $= \underline{0.0198}$ A1 (2) Total 8 (a) M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{\sigma}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$	(a)	$\overline{T} \sim N(4, \frac{4}{35})$	M1 A1
$2 \times 2.5758 \times \sqrt{\frac{\lambda}{40}} = 2.6$ $2 \times 0.99 \times 0.01$ $= 0.0198$ (a) $M1 \text{ for Normal distribution}$ $A1 \text{ for correct mean and variance (allow N(4, awrt 0.114))}$ (b) $M1 \text{ for use of } \frac{\lambda}{40} \text{ if } \lambda = \sigma \text{ is used, then M0}$ $B1 \text{ for ± 2.5758 (may be implied by sight of 10.188)}$ $M1 \text{ for use of } 2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6 \text{ with } z > 2$ $A1 \text{ awrt } 10.2 \text{ (an answer of } 10.15\text{ or awrt } 10.2 \text{ on its own scores M1B0M1A1})}$ $SC: \text{ Use of } \sqrt{\lambda} \text{ instead of } \lambda \text{ leading to an answer of awrt } 3.19 \text{ scores M0B1M1A0}$ (c) $M1 \text{ for } 2p(1-p) \text{ for any } p 0$			(2)
$\lambda = \operatorname{awrt} \frac{10.2}{40}$ $\lambda = \operatorname{awrt} \frac{10.2}{40}$ (c) $\frac{2 \times 0.99 \times 0.01}{2000}$ $= \frac{0.0198}{40}$ (a) $\frac{1}{40}$ M1 $= \frac{0.0198}{40}$ (b) M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2 p(1-p)$ for any $p = 0$	(b)	$\overline{K} \sim \mathrm{N}(\lambda, rac{\lambda}{40})$	M1
(c) $2 \times 0.99 \times 0.01$ $= \underline{0.0198}$ A1 $= \underline{0.0198}$ A1 (2) Total 8 Notes (a) M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$		$2 \times 2.5758 \times \sqrt{\frac{\lambda}{40}} = 2.6$	B1 M1
(c) $\frac{2\times0.99\times0.01}{} = \underline{0.0198}$ $= \underline{0.0198}$ (a) ${}$ M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) ${}$ M1 for use of $\frac{2}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2\times z\times\frac{'\sigma'}{\sqrt{40}}=2.6$ with $ z >2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) ${}$ M1 for $2p(1-p)$ for any $p = 0$		$\lambda = \text{awrt } \mathbf{\underline{10.2}}$	A1
$= \underline{0.0198} \qquad \qquad$			(4)
(a) Notes Notes (a) M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$	(c)		
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(a) M1 for Normal distribution A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$			
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A1 for correct mean and variance (allow N(4, awrt 0.114)) (b) M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0 B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$	(9)		
B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$	(a)		
B1 for ± 2.5758 (may be implied by sight of 10.188) M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$			
M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$	(b)	M1 for use of $\frac{\lambda}{40}$ if $\lambda = \sigma$ is used, then M0	
M1 for use of $2 \times z \times \frac{'\sigma'}{\sqrt{40}} = 2.6$ with $ z > 2$ A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any $p = 0$		B1 for ±2.5758 (may be implied by sight of 10.188)	
A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B0M1A1) SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any p 0			
SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores M0B1M1A0 (c) M1 for $2p(1-p)$ for any p 0		M1 for use of $2 \times z \times \frac{1}{\sqrt{40}} = 2.6$ with $ z > 2$	
(c) M1 for $2 p(1-p)$ for any $p \ 0$		A1 awrt 10.2 (an answer of 10.15or awrt 10.2 on its own scores M1B01	M1A1)
		SC: Use of $\sqrt{\lambda}$ instead of λ leading to an answer of awrt 3.19 scores	M0B1M1A0
	(c)		

Question Number	Scheme	Marks
7.		
(a)	$C_1 + C_2 + C_3 \sim N(480, 3 \times 1.25^2)$	M1 A1
	$P(C_1 + C_2 + C_3 > 475.8) = P\left(Z > \frac{475.8 - 480}{\sqrt{3 \times 1.25^2}} (= -1.94)\right)$	M1
	= awrt <u>0.974</u>	A1
		(4)
(b)	$W = T_1 + T_2 + T_3 + T_4 + T_5 + C_1 + C_2 \sim N(5 \times 60 + 2 \times 160, 5 \times 2^2 + 2 \times 1.25^2)$	M1 A1
	$P(W > 625) = P\left(Z > \frac{625 - 620}{\sqrt{23.125}} (=1.03975)\right)$	M1
	= awrt <u>0.149</u>	A1
		(4)
(c)	$Y = (n-1)T_1 - \sum_{r=2}^{n} T_r$ $Y \sim N(\mu, \sigma^2)$	
	$Y \sim N(\mu, \sigma^2)$	
	$\mu = (n-1) \times 60 - (n-1) \times 60 = 0$	M1 A1
	$\sigma^2 = (n-1)^2 \times 4 + (n-1) \times 4 = 4n^2 - 4n$	M1 A1
	$\frac{40-0}{\sqrt{4n^2-4n}} = 1.38$	M1 B1
	$4n^2 - 4n - 840(.159) = 0$	dM1
	n=15	A1
		(8)
	Notes	Total 16
(a)	M1 for setting up Normal distribution with mean 480	
(4)	A1 for correct expression for variance (= 4.6875) or for standard deviation (= 2.165) M1 standardising with 475.8, 480 and their standard deviation (their standard deviation $\neq 3.75$) A1 awrt 0.974	
(b)	M1 for setting up Normal distribution with mean 620 A1 for correct expression for variance (= 23.125) or for standard deviation (= 4.8088) M1 standardising with 625, 620 and their standard deviation A1 awrt 0.149	
(c)	M1 for a single combined normal distribution (may be implied by a single standardisation) A1 correct expression for μ	
	M1 for use of $a^2 \times 4 + a \times 4$	
	A1 correct expression for σ^2	
	M1 standardising with their mean and their sd = z where $1 < z < 1.5$ B1 awrt 1.38	
	dM1 solving their 3TQ (working must be shown if answer is incorrect) (depender A1 15 cao (must reject –14 if found). Must come from compatible signs in standa	