



Pearson

Mark Scheme (Results)

Summer 2017

Pearson Edexcel Level 2 Award
In Statistical Methods (AST20)

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- 1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- 2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- 3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- 4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- 5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- 6 Mark schemes will indicate within the table where QWC is being assessed. The strands are as follows:
 - i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.
 - ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.
 - iii) *organise information clearly and coherently, using specialist vocabulary when appropriate.*
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong 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.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

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, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, 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.

9 Probability

Probability answers must be given as fractions, percentages or decimals. 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.

Guidance on the use of codes within this mark scheme

M1 – method mark

A1 – accuracy mark

B1 – Working mark

C1 – communication mark

QWC – quality of written communication

oe – or equivalent

cao – correct answer only

ft – follow through

sc – special case

dep – dependent (on a previous mark or conclusion)

indep – independent

isw – ignore subsequent working

awrt – answer which rounds to

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Question		Working	Answer					Mk	Notes
1	(a)			2,3	2,5	2,7	2,9	2	B2 cao (B1 for one correct row or one correct column)
			4,1	4,3	4,5	4,7	4,9		
			7,1	7,3	7,5	7,7	7,9		
		8,1	8,3	8,5	8,7	8,9			
	(bi)		$\frac{1}{20}$					3	M1 for $\frac{a}{20}$, $0 < a < 20$ (this can be seen in either i or ii) A1 for $\frac{1}{20}$ oe
	(bii)		$\frac{7}{20}$						A1 ft for $\frac{7}{20}$ oe
2	(a)		5, 8, 9 0, 1, 4, 5, 6, 8, 8 1, 1, 2, 3, 4, 5, 6, 7, 9 1, 3, 6, 7, 8, 9 1, 3 1 5 represents 15 books					3	B2 cao (B1 for unordered diagram or ordered diagram with 1 or 2 errors or omissions) B1 for correct key, e.g. 1 5 represents 15 (books)
	(b)		33					1	B1 for 33 or ft 'diagram'
	(c)		18					2	M1 for 43 and 25 identified or ft 'diagram' A1 ft
3			3 things wrong or misleading					3	B3 for 3 things wrong or misleading from 1 no title 2 no units, e.g. years 3 overlapping intervals or 20 repeated oe 4 missing data or gap in intervals oe 5 it's 3D oe 6 broken pie charts (emphasise particular sectors) oe 7 40+ notation ambiguous oe (B2 for 2 B1 for 1)

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Question		Working	Answer	Mark	Notes
4	(a)		5, 7, 9, 3	2	M1 for using tallies (2 or more correct) or for 2 or more correct frequencies A1 for correct frequencies
	(b)		frequency polygon	3	M1 for correct labelling and scale on axes M1 for plotting points equally spaced at heights 5, 7, 9, 3 and joined by straight line segments or f.t. their table A1 correct frequency polygon or ft part a
5	(a)		question	2	B1 for appropriate question + time frame (may appear with answer boxes), e.g. how many cups of tea do you drink in a day? B1 for at least 3 non-overlapping exhaustive answer boxes with a unit e.g. cups or litres (may appear in question)
	(bi)		advantage	2	B1 for one advantage, e.g. quicker / cheaper / easier
	(bii)		biased		B1 for one reason, e.g. biased / (likely to be) small sample size oe
6	(a)		continuous	1	B1 cao
	(b)		$4 < w \leq 6$	1	B1 for $4 < w \leq 6$
	(c)		5.9	4	M2 for $\sum fx (=275)$ for $x =$ mid interval values- condone one error or omission (M1 for x consistently within intervals including end points - condone one error or omission M1 for ' $\sum fx' \div '\sum f' (=275 \div 47)$ A1 for answer in range 5.8 – 5.9

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Question		Working	Answer	Mark	Notes
7	(a)		29	1	B1 cao
	(bi)		positive	2	B1 for positive (correlation)
	(bii)		as the number of people increase so does the number of posters sold		B1 for dynamic description of relationship, e.g. as the number of people increase so does the number of posters sold
	(c)		(470, 34)	2	M1 for $4700 \div 10 (=470)$ or $340 \div 10 (=34)$ A1 cao
	(di)		point plotted	2	B1 for point plotted ft part c or (<i>their \bar{x}, their \bar{y}</i>)
	(dii)		line of best fit		B1 for sensible line of best fit (need not pass through mean point)
	(e)		32	1	B1 for 30 – 34
8	(a)		box plot	4	B1 for median (36) identified, may be circled in list B1 for quartile (28 or 38) identified, may be circled in list M1 for box plot with at least two correct values from 12, '28', '36', '38', 47 A1 cao
	(b)		negative skew	1	B1 for negative (skew) or ft 'box plot'

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Question		Working	Answer				Mark	Notes
9	(a)		10	8	7	25	4	B1 for 10, 8, 7, 9, 4 and 50 in correct positions B1 for 25 total males and 17 total Hamlet and 11 total Macbeth B1 for 25 total females and 22 total Othello B1 for 12 female Othello
	(b)		12	9	4	25		
			22	17	11	50		
	(b)		11				2	M1 for $^{61}_{138} \times 25 (=11.05\dots)$ A1 cao
10	(a)		63				1	B1 for 63 to 64
	(b)		14				2	M1 for $50 - 36 (=14)$ or line drawn at 65 or sight of 36 A1 cao
11	(a)		0.8				2	M1 for $0.35 + 0.45 (=0.8)$ oe A1 for 0.8 oe
	(b)		0.65				2	M1 for $1 - 0.35 (=0.65)$ oe A1 for 0.65 oe
	(c)		reason				1	B1 for correct reason, e.g. the three probabilities add to one oe
12	(a)		$10 < a \leq 20$				1	B1 cao
	(b)		histogram A + reason				2	B2 for (histogram) A with complete reason e.g. bars higher to the left or modal class further left in (histogram) A or because histogram B is closer to being symmetrical (than histogram A) (B1 for (histogram) A with incomplete reason) e.g. 0-10 bar is higher in (histogram) A

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Question		Working	Answer	Mark	Notes
13	(a)		reason	1	B1 for correct reason, e.g. much larger than other data
	(b)		42, 35	2	M1 for $(56 + 32 + 38) \div 3 (=42)$ or $((32 + 38 + 35) \div 3 (=35))$ A1 for 42 and 35
	(c)		downwards	1	B1 for downwards or ft provided M1 '42' and '35'
14	(a)		15	2	M1 for $90 \div 6 (=15)$ A1 cao
	(b)		reason	1	B1 for correct reason, e.g. (experimental probability) 0.2 much less than (theoretical probability) 0.5 OR 10 is significantly lower than the 25 values you would expect
15	(a)		102.9	2	M1 for $90.87 \div 88.32 \times 100 (=102.887\dots)$ A1 for 102.8 – 102.9 NB £102.9 or 102.9% are A0
	(b)		1.5% decrease from 2013 to 2014	2	B1 for 1.5% B1 for decrease (from 2013 to 2014) oe
16	(a)		0.096	2	M1 for $0.3 \times 0.4 \times 0.8 (=0.096)$ A1 for 0.096 oe
	(b)		0.056	3	B1 for $1 - 0.3 (=0.7)$ or $1 - 0.8 (=0.2)$ may be seen on tree diagram M1 for '0.7' \times 0.4 \times '0.2' (=0.056) A1 for 0.056 oe

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Question	Working	Answer	Mark	Notes
17		2.58	2	M1 for $27.8 - 4.6^2 (=6.64)$ A1 for $2.57 - 2.58$
18		8.1	3	M1 for $5.5 \times 31 (=170.5)$ or $8.25 \times 28 (=231)$ or $10.5 \times 31 (=325.5)$ M1 for $('170.5' + '231' + '325.5') \div 90 (=8.077\dots)$ A1 for $8.0 - 8.1$

