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Mark Scheme (Results)

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Pearson Edexcel Level 2 Award
in Statistical Methods (AST20)

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NOTES ON MARKING PRINCIPLES

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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

Question		Working	Answer	Mark	Notes
1		<table><tr><td></td><td>TV</td><td>WM</td><td>Tot</td></tr><tr><td>Sat</td><td>7</td><td>5</td><td>12</td></tr><tr><td>Sun</td><td>10</td><td>4</td><td>14</td></tr><tr><td>Tot</td><td>17</td><td>9</td><td>26</td></tr></table>	Two-way table	3	B3 for fully correct two-way table including Total oe (B2 for two-way table with correct labels, eg TV, WM, Sat, Sun AND 7 and 5 and 10 and 4 in correct places B1 for two-way table with correct labels, eg TV, WM, Sat, Sun)
2	(a)		40	1	B1 cao
	(b)		Labour	1	B1 cao
	(c)		22	2	M1 for 92 – "70" or 70 – "92" A1 cao
3	(a)		continuous	1	B1 cao
	(b)		5, 8, 8, 6, 3	2	M1 for using tallies or at least one correct frequency A1 for 5 correct tallies or 5 correct frequencies
	(c)		frequency polygon with vertices marked at (925, 5), (975, 8), (1025, 8), (1075, 6), (1125, 3)	4	B1 for axes with correctly labelled linear scales B1 for correct labels on axes, e.g. frequency and weight B2 for correct frequency polygon. Points plotted at mid points (ft table) (B1 for all points plotted accurately not joined or one error or one omission in plotting but joined or all points plotted accurately and joined with first joined to last or all points at the correct heights and consistently within or at ends of interval and joined- can include joining last to first to make a polygon

Question		Working	Answer	Mark	Notes
4	(a)		the greater the body length the greater the wingspan	1	B1 for the greater the body length the greater the wingspan oe, accept positive correlation
	(b)		(1.7, 4.45)	2	B1 for (1.7, 4.45) B1 for plotting (1.7, 4.45)
	(c)		5.1 – 5.9	2	M1 for sensible line of best fit (need not pass through mean point) A1 for 5.1 – 5.9
5	(a)		decision + correct reason	1	B1 for decision with correct reason, eg yes, should get (about) the same number of heads and tails
	(b)		3 correct things identified	3	B3 for 3 correct things identified. e.g. 1. No axis label 2. Only 6 coins used for T 3. Uses different sizes of coins 4. No scale or key 5. No title (B2 for two correct B1 for one correct)
6	(i)		$^1/_4$	3	M1 for $^a/_{16}$, where $a < 16$ A1 for $^4/_{16}$ oe
	(ii)		$^3/_8$		A1 for $^6/_{16}$ oe

Question		Working	Answer	Mark	Notes
7	(a)		169	1	B1 cao
	(b)		59, 70, 74	3	B1 for (lower quartile =) 59 B1 for (median =) 70 B1 for (upper quartile =) 74
	(c)		box plot	3	B3 (ft their table) for box plot with 1. correct whiskers 2. correct median 3. correct quartiles (B2 for 2 correct, B1 for 1 correct)
8	(a)		285, 290	3	B1 for reading 3 correct values from graph M1 for $^{(210+260+400+270)/}_{4}$ or $^{(260+400+270+230)/}_{4}$ A1 cao
	(b)		upwards	1	B1 for upwards (trend) oe
9	(a)(i)		0.4	4	M1 for $1 - (0.15 + 0.45)$ A1 for 0.4 oe
	(a)(ii)		0.85		M1 for '0.4' + 0.45 or $1 - 0.15$ (=0.85) A1 for 0.85 oe or ft part a
	(b)		9	2	M1 for 60×0.15 A1 cao

Question		Working	Answer	Mark	Notes
10	(a)		$8000 < h \leq 8500$	1	B1 cao
	(b)		$7500 < h \leq 8000$	1	B1 cao
	(c)	$4\times6750 = 27\ 000$ $3\times7250 = 21\ 750$ $8\times7750 = 62\ 000$ $10\times8250 = 82\ 500$ $4\times8750 = 35\ 000$ Tot = 228 250 $228\ 250 \div 29 = 7870.7$	7871	4	M1 for fx with x consistent within intervals (including end points) condone one error in multiplication M1 (dep) for use of midpoints condone one error M1 (dep on first M1) for use of $\sum fx \div 29$ A1 for awrt 7871
11	(a)		1.5	2	M1 for line drawn at 25 or 26 – 24.5 or 3 (squares) A1 for 1.5 oe
	(b)		4.75	2	M1 for 26.25 – "21.5" or "26.25" – 21.5 A1 for 4.5 – 5.0
	(c)		greater for girls	1	B1 for greater for girls oe
12	(a)		question + response boxes	2	B1 for a suitable question B1 for at least 3 non-overlapping exhaustive response boxes (NB time period must appear with question or response boxes)
	(b)		7	2	M1 for 53 ÷ "228" × 30 (=6.97…) A1 for 7 (accept 6)

Question		Working	Answer	Mark	Notes
13	(a)(i)		advantage	2	B1 for advantage, eg saves time, saves money, easier to do, etc
	(a)(ii)		explanation		B1 for correct explanation, eg not representative oe
	(b)	$n=10$ $\sum x = 24$ $\sum x^2 = 74$ $74 \div 10 - (24 \div 10)^2$ $= 1.64$	1.28	3	M1 for $\sum x \, (= 24)$ or $\sum x^2 \, (= 74)$ M1 for $\sum x^2 \div 10 - (\sum x \div 10)^2$ or $\sum (x - 2.4)^2 \div 10$ A1 for awrt 1.28
14	(a)		23	1	B1 cao
	(b)		correct bars drawn	2	M1 for bar with height 1.4 (28 small squares) or 0.6 (12 small squares) A1 cao
	(c)		positive	1	B1 for positive of ft their histogram
15	(a)		$^3/_5$ and $^2/_5$ $^3/_5$ and $^2/_5$ AND $^3/_5$ and $^2/_5$	3	B1 for $^3/_5$ or $^2/_5$ oe seen M1 for '$^3/_5$' and $1 - $ '$^3/_5$' oe marked for First spin A1 cao
	(b)		$^6/_{25}$	2	M1 for '$^3/_5$' $\times$ '$^2/_5$' oe A1 for $^6/_{25}$ oe

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Question		Working	Answer	Mark	Notes
16	(a)		correct comparison + working	3	M1 for 1275.75 ÷ 47 (=27.1…) or 907.5 ÷ 28 (=32.4…) M1 for 1275.75 ÷ 45 (=27.1…) and 907.5 ÷ 30 (=32.4…) A1 for greater for girls or boys faster (on average) or ft their figures provided at least M1 awarded)
	(b)		29.11	2	M1 for (1275.75 + 907.5) ÷ 75 A1 cao
17	(a)		114.1	2	M1 for 1078 ÷ 945 × 100 (=114.074…) A1 for awrt 114.1
	(b)		correct reason	1	B1 for correct reason, e.g. 5% increase on the base value (not the value in 2005) or 4.85(4)% increase (not 5%)