



# Mark Scheme (Results)

January 2020

Pearson Edexcel Award  
In Statistical Methods (AST10)  
Paper 1

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## NOTES ON MARKING PRINCIPLES

### 1 **Types of mark**

M marks: method marks

A marks: accuracy marks

B marks: unconditional accuracy marks (independent of M marks)

### 2 **Abbreviations**

cao – correct answer only

ft – follow through

isw – ignore subsequent working

SC: special case

oe – or equivalent (and appropriate)

dep – dependent

indep – independent

### 3 **No working**

If no working is shown then correct answers normally score full marks

If no working is shown then incorrect (even though nearly correct) answers score no marks.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

**5 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.

**6 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: e.g. incorrect cancelling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**7 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**8 Use of ranges for answers**

If an answer is within a range this is inclusive, unless otherwise stated.

**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.

**PAPER: AST10\_01**

<b>Question</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
1 (a)		7	1	B1 cao
(b)		Bar of height 15	1	B1
(c)		Tuesday and Thursday	1	B1
2 (a)		8	1	B1 cao
(b)		14	1	B1 for 14 or ft their key
(c)		Four and a quarter circles drawn.	1	B1 for four and a quarter circles or ft their key
3 (a)		64	1	B1 cao
(b)		C	1	B1 cao
(c)		21.99	1	B1 cao
(d)		4.99 and 7.99	1	B1
(e)		Point marked at 0.5	1	B1
(f)		Point marked at 0.75	1	B1

PAPER: AST10_01									
Question	Working	Answer		Mark	Notes				
4	(a)  (b)  (c)	Unlikely  Impossible  blue  $\frac{2}{10}$		1  1  1  1	B1 cao  B1 cao  B1 cao  B1 oe				
5		<table border="1"> <tr> <td><b>Type of television programme</b></td> <td><b>Tally</b></td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	<b>Type of television programme</b>	<b>Tally</b>				2	B1 for data collection sheet with column/row labelled types (of television programme) or a list of at least 3 types of television programme B1 for column/row labelled tally or frequency or for showing tallies in a column/row oe
<b>Type of television programme</b>	<b>Tally</b>								
6		2 aspects		2	B2 for two correct aspects from 1 personal question / may lie 2 no time frame 3 no zero option or no option for between 2 and 3 4 overlapping response boxes 5 amount of overtime may vary in different weeks (B1 for one correct aspect)				
7	1 – 0.63	0.37		2	M1 for 1 – 0.63 A1 for 0.37 oe				

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<b>Question</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
8 (a)		2 bars at correct height with correct shading	2	B1 for 2 bars drawn at the correct heights B1 for correct shading on the bars
(b)	$10 + 11 + 13 + 16 + 9$	59	2	M1 for $10 + 11 + 13 + 16 + 9$ (condone one reading error) A1 cao
(c)		2 correct comparisons	2	B2 for 2 correct comparisons (B1 for 1 correct comparison) e.g. <ul style="list-style-type: none"><li>• Lisa exercised less overall</li><li>• The greatest number of hours exercised in a week is the same for both girls</li><li>• Tamika exercised more than Lisa in three weeks.</li><li>• Initially the number of hours exercised per week for both girls is increasing.</li><li>• In week 3 Lisa and Tamika exercised for the same number of hours.</li><li>• In week 1 there is a 1 hour difference in the number of hours exercised by Lisa and Tamika.</li></ul>

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Question	Working	Answer	Mark	Notes
9 (a)	17, 19, 22, 23, 25, 27, 32, 39	24	2	M1 for correctly ordering the quiz scores A1 cao
(b)	$(27+19+23+32+25+17+39+22)/8$	25.5	2	M1 for $(27+19+23+32+25+17+39+22)/8$ A1 Accept 26 if 25.5 seen or correct working seen
(c)	39 – 17	22	2	M1 for 39 – 17 A1 cao
(d)		Mean for students is greater than the mean for teachers.  Range for students is greater than the range for teachers.	2	B1 for mean for students is greater (than mean for teachers) or ft '25.5'  B1 for range for students is greater (than the range for teachers) or ft '22'
10	(C, J) (C, W) (F, M) (F, J) (F, W) (T, M) (T, J) (T, W)	8 correct combinations	2	B2 for correct outcomes listed (no repeats or extras) (B1 for 4 or 5 or 6 or 7 correct outcomes listed, ignore repeats or extras)



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Question	Working	Answer	Mark	Notes
11 (a)		Discrete	1	B1 allow quantitative
(b)		7, 10, 5, 4, 3, 1	3	M1 for using tallies or at least one correct frequency A1 for 3 correct frequencies or tallies A1 cao
(c)		2	1	B1 for 2 or ft their table
(d)	$1 \times 7 + 2 \times 10 + 3 \times 5 + \dots$ $\dots + 4 \times 4 + 5 \times 3 + 6 \times 1$	79	2	M1 for $1 \times '7' + 2 \times '10' \dots$ $\dots + 3 \times '5' + 4 \times '4' + \dots$ $\dots + 5 \times '3' + 6 \times '1'$ A1 cao
12 (a)		15	1	B1 cao
(b)		37	2	M1 for 8 and 45 seen together A1 cao
(c)		$\frac{6}{25}$	1	B1 for $\frac{6}{25}$ oe
13 (a)		$\frac{4}{12}$	1	B1 for $\frac{4}{12}$ oe
(b)		for a correct reason	1	B1 for a correct reason e.g. too few trials

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Question	Working	Answer	Mark	Notes																									
14 (a)		categorical	1	B1 cao																									
(b)		<table border="1"> <thead> <tr> <th></th> <th>child</th> <th>adult</th> <th>senior</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td><b>action</b></td> <td>(18)</td> <td>(23)</td> <td>11</td> <td>(52)</td> </tr> <tr> <td><b>comedy</b></td> <td>19</td> <td>(4)</td> <td>(7)</td> <td>30</td> </tr> <tr> <td><b>romance</b></td> <td>(6)</td> <td>17</td> <td>(15)</td> <td>38</td> </tr> <tr> <td><b>Total</b></td> <td>(43)</td> <td>44</td> <td>33</td> <td>(120)</td> </tr> </tbody> </table>		child	adult	senior	Total	<b>action</b>	(18)	(23)	11	(52)	<b>comedy</b>	19	(4)	(7)	30	<b>romance</b>	(6)	17	(15)	38	<b>Total</b>	(43)	44	33	(120)	4	B1 for 11, 19 B1 for 30, 33 B1 for 38, 44 B1 for 17
	child	adult	senior	Total																									
<b>action</b>	(18)	(23)	11	(52)																									
<b>comedy</b>	19	(4)	(7)	30																									
<b>romance</b>	(6)	17	(15)	38																									
<b>Total</b>	(43)	44	33	(120)																									
(c)		Adult	1	B1 ft their table																									
(d)(i)		$\frac{6}{120}$	1	B1 for $\frac{6}{120}$ oe																									
(d)(ii)	$\frac{44+33}{120}$	$\frac{77}{120}$	2	M1 for $\frac{44+33}{120}$ A1 ft their table																									
15 (i)	$0.1 + 0.35$	0.45	2	M1 for $0.1 + 0.35$ A1 for 0.45 oe																									
(ii)	$1 - (0.25 + 0.45)$	0.3	2	M1 for $1 - (0.45 + 0.25)$ or $1 - (0.25 + 0.1 + 0.35)$ A1 for 0.3 oe																									

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<b>Question</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
16		Three aspects	3	B3 for three correct aspects from 1 no title / no vertical label 2 missing label (for Thursday) 3 vertical scale not equally spaced 4 no key 5 bars reversed (for Thursday) 6 bars not consistent width (B2 for two correct aspects B1 for one correct aspect)
17		Four points plotted correctly and joined.	2	B2 for (1, 230), (2, 200), (3, 190), (4, 210) plotted correctly and joined. (B1 for plotting at least 2 points correctly)
(b)		Upwards	1	B1 for upwards oe
(c)	175 + 150 + 140 + 165	630	2	M1 for 175 + 150 + 140 + 165 (condone one reading error) A1 for 630

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Question	Working	Answer	Mark	Notes												
18 (a)		<table border="1"><thead><tr><th>A</th><th>B</th><th>C</th><th>D</th></tr></thead><tbody><tr><td>0.5</td><td>1</td><td>3</td><td>6</td></tr><tr><td>46</td><td>41</td><td>28</td><td>25</td></tr></tbody></table>	A	B	C	D	0.5	1	3	6	46	41	28	25	2	B2 for all 8 correct (B1 for 5 or 6 or 7 correct)
A	B	C	D													
0.5	1	3	6													
46	41	28	25													
(b)		Points plotted at (4, 33) (6.5, 19) (9, 6)	2	B2 for all points plotted correctly (B1 for one point plotted correctly)												
(c)		Negative (correlation)	1	B1 for negative correlation												
19	Angles 60, 192, 108	Pie chart	3	M1 for at least one correct angle calculated or one correct angle drawn in the pie chart A1 for all angles correctly drawn A1 for correct labels for type of chocolate in 3 sectors												

