

Edexcel GCE
Statistics S1
Bronze Level B2
(Mark Scheme)

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Question Number	Scheme	Marks
<p>1. (a)</p> <p>(b)</p> <p>(c)</p>	$(S_{tt}) = 8702 - \frac{258^2}{10} \quad \text{or} \quad (S_{gt}) = 1550.2 - \frac{258 \times 63.6}{10}$ $(S_{tt} =) 2045.6, \quad (S_{gt} =) -90.68 \quad \text{awrt (2046),} \quad \text{awrt - 90.7}$ $r = \frac{-90.68}{\sqrt{2045.6 \times 7.864}} = -0.714956... \quad \text{awrt -0.715}$ <p>Positive</p> <p>e.g. high v corresponds to low t and low t corresponds to high g so expect high v to corresponds to high g <u>or</u> expect more revision to result in a better grade</p>	<p>M1</p> <p>A1, A1 (3)</p> <p>M1 A1 (2)</p> <p>B1</p> <p>B1 (2)</p> <p>[7]</p>
<p>2. (a)</p> <p>(b)</p> <p>(c)</p>	$[S_{xy} =] 23070 - \frac{477 \times 480}{12} [= 3990]$ $r = \frac{"3990"}{\sqrt{5606.25 \times 4244}}$ $= 0.81799... \quad \text{awrt 0.818}$ <p>0.818</p> <p>Positive correlation <u>or</u> value of r is close to 1 <u>or</u> value of $r > 0$ So there <u>is support</u> for the bank's claim <u>or</u> "increase in unemployment is accompanied by increase in house repossessions"</p>	<p>B1</p> <p>M1</p> <p>A1 (3)</p> <p>B1ft (1)</p> <p>B1</p> <p>B1 (2)</p> <p>[6]</p>

Question Number	Scheme	Marks
<p>3. (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>	<p>$\sum t = 140$ (or $\bar{t} = 17.5$) and $\sum m = 32$ (or $\bar{m} = 4$)</p> <p>$(S_m) = 469.5 - \frac{"140" \times "32"}{8}$</p> <p>$(S_m) = -90.5$</p> <p>$b = \frac{S_m}{S_{tt}} = \frac{-90.5}{354}$</p> <p>$b = -0.255649\dots$ (allow $\frac{181}{708}$)</p> <p>$a = \frac{"32"}{8} - b \times \frac{"140"}{8}$</p> <p>So equation of the line is $m = 8.47 - 0.256t$</p> <p>$(8.47 - 0.256 \times 10) = 5.9\dots$</p> <p>Should be reliable since 10 is in the range (of the data)</p>	<p>B1 B1</p> <p>M1</p> <p>A1cso (4)</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1 (4)</p> <p>B1</p> <p>(1)</p> <p>B1 (1)</p> <p>[10]</p>
<p>4. (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>	<p>$S_{xy} = 1818.5 - \frac{41 \times 406}{10}, = 153.9$ (could be seen in (b))</p> <p>$S_{xx} = 188 - \frac{41^2}{10} = 19.9$ (could be seen in (b))</p> <p>$b = \frac{153.9}{19.9}, = 7.733668\dots$</p> <p>$a = 40.6 - b \times 4.1 (= 8.89796\dots)$</p> <p>$y = 8.89 + 7.73x$</p> <p>A typical car will travel 7700 miles every year</p> <p>$x = 5, y = 8.89 + 7.73 \times 5 (= 47.5 - 47.6)$</p> <p>So mileage predicted is</p>	<p>awrt 154</p> <p>awrt 7.73</p> <p>awrt 5.9</p> <p>awrt 48000</p> <p>M1, A1</p> <p>A1 (3)</p> <p>M1, A1</p> <p>M1</p> <p>A1 (4)</p> <p>B1ft (1)</p> <p>M1</p> <p>A1 (2)</p> <p>[10]</p>

Question Number	Scheme	Marks
5. (a)	$k + 4k + 9k = 1$ $14k = 1$ $k = \frac{1}{14} \quad \text{**given**}$	M1 A1 (2)
(b)	$P(X \geq 2) = 1 - P(X = 1) \quad \text{or} \quad P(X = 2) + P(X = 3)$ $= 1 - k = \frac{13}{14} \quad \text{or} \quad 0.92857... \quad \text{awrt } 0.929$	M1 A1 (2)
(c)	$E(X) = 1 \times k + 2 \times k \times 4 + 3 \times k \times 9 \quad \text{or} \quad 36k$ $= \frac{36}{14} = \frac{18}{7} \quad \text{or} \quad 2\frac{4}{7} \quad \text{(or exact equivalent)}$	M1 A1 (2)
(d)	$\text{Var}(X) = 1 \times k + 4 \times k \times 4 + 9 \times k \times 9, - \left(\frac{18}{7}\right)^2$ $\text{Var}(1 - X) = \text{Var}(X)$ $= \frac{19}{49} \quad \text{or} \quad 0.387755... \quad \text{awrt } 0.388$	M1 M1 M1 A1 (4) [10]

Question Number	Scheme	Marks
6. (a)	$S_{pp} = 106397 - \frac{833^2}{7} = 7270$	M1 A1
	$S_{tp} = 42948 - \frac{341 \times 833}{7} = 2369,$	A1 A1
	$S_{tt} = 18181 - \frac{341^2}{7} = 1569.42857... \text{ or } \frac{10986}{7}$	(4)
	(b) $r = \frac{2369}{\sqrt{7270 \times 1569.42857..}}$	M1 A1ft
	$= 0.7013375$ awrt (0.701)	A1
	(c) (Pmcc shows positive correlation.) Older patients have higher blood pressure	(3)
	(d) Points plotted correctly on graph: -1 each error or omission	B1
	(e) $b = \frac{2369}{1569.42857..} = 1.509466...$	(1)
	$a = \frac{833}{7} - b \times \frac{341}{7} = 45.467413...$	B2
	$p = 45.5 + 1.51t$	(2)
$b = \frac{2369}{1569.42857..} = 1.509466...$	M1 A1	
(f) Line drawn with correct intercept, and gradient	M1	
(g) $t = 40, p = 105.84...$ from equation or graph. awrt 106	A1	
	(4)	
	B1ft B1	
	(2)	
	M1 A1	
	(2)	
	[18]	

Question Number	Scheme	Marks																														
7. (a)	$P(R = 3 \cap B = 0) = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$	M1, A1 (2)																														
(b)	<table border="1"> <tr><td>3</td><td>0</td><td>3</td><td>6</td><td>9</td></tr> <tr><td>2</td><td>0</td><td>2</td><td>4</td><td>6</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td><i>B</i></td><td></td><td></td><td></td><td></td></tr> <tr><td><i>R</i></td><td>0</td><td>1</td><td>2</td><td>3</td></tr> </table>	3	0	3	6	9	2	0	2	4	6	1	0	1	2	3	0	0	0	0	0	<i>B</i>					<i>R</i>	0	1	2	3	All 0s All 1,2,3s All 4,6,9s B1 B1 B1 (3)
3	0	3	6	9																												
2	0	2	4	6																												
1	0	1	2	3																												
0	0	0	0	0																												
<i>B</i>																																
<i>R</i>	0	1	2	3																												
(c)	$a = \frac{7}{16}$	B1																														
	$b = c = d = \frac{1}{16}$	B1 B1 (3)																														
(d)	$E(T) = \left(1 \times \frac{1}{16}\right) + \left(2 \times \frac{1}{8}\right) + \left(3 \times \frac{1}{8}\right) + \left(4 \times \frac{1}{16}\right) + \dots$ $= 2\frac{1}{4} \quad \text{or exact equivalent e.g. } 2.25, \frac{9}{4}$	M1 A1 (2)																														
(e)	$\text{Var}(T) = \left(1^2 \times \frac{1}{16}\right) + \left(2^2 \times \frac{1}{8}\right) + \left(3^2 \times \frac{1}{8}\right) + \left(4^2 \times \frac{1}{16}\right) + \dots - \left(\frac{9}{4}\right)^2$ $= \frac{49}{4} - \frac{81}{16} = 7\frac{3}{16} \text{ or } \frac{115}{16} \quad (\text{o.e.}) \quad \text{awrt } 7.19$	M1 A1, M1 A1 (4) [14]																														

Statistics for S1 Practice Paper Bronze Level B2

Qu	Max Score	Modal score	Mean %	Mean score for students achieving grade:							
				ALL	A*	A	B	C	D	E	U
1	7	7	83	5.81	6.39	6.32	5.89	5.59	5.21	4.88	4.01
2	6		80	4.78	5.87	5.74	5.43	5.04	4.57	3.97	2.68
3	10	9	83	8.25	9.44	9.13	8.48	8.05	7.48	7.11	5.12
4	10		75	7.54		8.54	7.60	7.25	6.67	6.18	4.32
5	10		73	7.30		9.07	8.09	7.02	5.87	4.46	2.12
6	18		79	14.23		15.83	14.71	13.64	12.59	11.19	8.86
7	14		78	10.96		13.24	11.31	9.24	8.15	7.14	4.30
	75		78	58.87		67.87	61.51	55.83	50.54	44.93	31.41