

Edexcel GCE
Statistics S1
Bronze Level B4
(Mark Scheme)

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Question Number	Scheme	Marks
<p>1. (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p> <p>(e)</p>	$S_{xx} = 57.22 - \frac{(21.4)^2}{10} = 11.424$ $S_{xy} = 313.7 - \frac{21.4 \times 96}{10} = 108.26$ $b = \frac{S_{xy}}{S_{xx}} = 9.4765\dots$ $a = \bar{y} - b\bar{x} = 9.6 - 2.14b = (-10.679\dots)$ $y = -10.7 + 9.48x$ <p>Every (extra) <u>hour</u> spent using the programme produces about <u>9.5 marks improvement</u></p> $y = -10.7 + 9.48 \times 3.3 = 20.6$ <p>Model may not be valid since [8h is] outside the range [0.5 - 4].</p>	<p>M1 A1</p> <p>A1</p> <p>(3)</p> <p>M1 A1</p> <p>M1</p> <p>A1</p> <p>(4)</p> <p>B1ft</p> <p>(1)</p> <p>M1,A1</p> <p>(2)</p> <p>B1</p> <p>(1)</p> <p>[11]</p>
<p>2. (a)</p> <p>(b)</p> <p>(c)</p>	$-1 \times p + 1 \times 0.2 + 2 \times 0.15 + 3 \times 0.15 = 0.55$ $p = 0.4$ $p + q + 0.2 + 0.15 + 0.15 = 1$ $q = 0.1$ $\text{Var}(X) = (-1)^2 \times p + 1^2 \times 0.2 + 2^2 \times 0.15 + 3^2 \times 0.15 - 0.55^2$ $= 2.55 - 0.3025 = 2.2475$ $E(2X-4) = 2E(X) - 4$ $= -2.9$	<p>M1 M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>(5)</p> <p>M1A1, M1</p> <p>A1</p> <p>(4)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>[11]</p>

Question Number	Scheme	Marks
3. (a)	Use overlay	B2 (2)
(b)	$S_{xy} = 28750 - \frac{315 \times 620}{8} = 4337.5$ **answer given**	M1
	$S_{xx} = 15225 - \frac{315^2}{8} = 2821.875$	M1A1
(c)	$b = \frac{4377.5}{S_{xx}}, = 1.537... = 1.5$	(3) M1,A1
	$a = \bar{y} - b\bar{x} = \frac{620}{8} - b\frac{315}{8} = 16.97... = 17.0$	M1,A1
(d)	Use overlay	(4) B1, B1
(e)	Brand D,	(2) B1
	since a long way above / from the line	B1
	dependent upon 'Brand D' above	B1
	Using line: $y = 17 + 35 \times 1.5 = 69.5$	M1A1 (4) [15]

Question Number	Scheme	Marks								
<p>4. (a)</p> <table border="1" data-bbox="336 253 552 367"> <tr> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>$3a$</td> <td>$2a$</td> <td>a</td> <td>b</td> </tr> </table>	0	1	2	3	$3a$	$2a$	a	b		<p>B1</p>
0	1	2	3							
$3a$	$2a$	a	b							
(b)	$3a + 2a + a + b = 1$ $2a + 2a + 3b = 1.6$ $14a = 1.4$ $a = 0.1$ $b = 0.4$	<p>or equivalent M1 (1)</p> <p>or equivalent M1</p> <p>M1</p> <p>cao B1</p> <p>cao B1 (5)</p>								
(c)	$P(0.5 < x < 3) = P(1) + P(2)$ $= 0.2 + 0.1$ $= 0.3$	<p>M1</p> <p>A1 ft (2)</p>								
(d)	$E(3X - 2) = 3E(X) - 2$ $= 3 \times 1.6 - 2$ $= 2.8$	<p>M1</p> <p>cao A1 (2)</p>								
(e)	$E(X^2) = 1 \times 0.2 + 4 \times 0.1 + 9 \times 0.4 (= 4.2)$ $\text{Var}(X) = "4.2" - 1.6^2$ $= 1.64$	<p>M1</p> <p>M1</p> <p>A1 (3)</p>								
(f)	$\text{Var}(3X - 2) = 9 \text{Var}(X)$ $= 14.76$	<p>M1</p> <p>awrt 14.8 A1 (2)</p>								
		<p>[15]</p>								

Question Number	Scheme	Marks
<p>5. (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>	$P(X < 39) = P\left(Z < \frac{39-30}{5}\right)$ $= P(Z < 1.8) = \underline{0.9641} \quad (\text{allow awrt } 0.964)$ $P(X < d) = P\left(Z < \frac{d-30}{5}\right) = 0.1151$ $1 - 0.1151 = 0.8849$ $\Rightarrow z = -1.2 \quad (\text{allow } \pm 1.2)$ $\therefore \frac{d-30}{5} = -1.2 \quad \underline{d = 24}$ $P(X > e) = 0.1151 \quad \text{so } e = \mu + (\mu - \text{their } d) \text{ or}$ $\frac{e-30}{5} = 1.2 \text{ or } - \text{their } z$ $\underline{e = 36}$ $P(d < X < e) = 1 - 2 \times 0.1151$ $= 0.7698 \quad \text{awrt } \underline{0.770}$	<p>M1</p> <p>A1</p> <p>(2)</p> <p>M1</p> <p>B1</p> <p>M1A1</p> <p>(4)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>[10]</p>
<p>6. (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p> <p>(e)</p> <p>(f)</p>	$p + q = 0.45$ $\sum xP(X = x) = 4.5$ $3p + 7q = 1.95$ <p>Attempt to solve equations in (a)</p> $q = 0.15$ $p = 0.30$ $P(4 < X < 7) = P(5) + P(7)$ $= 0.2 + q = 0.35$ $\text{Var}(X) = E(X^2) - [E(X)]^2 = 27.4 - 4.5^2$ $= 7.15$ $E(19 - 4X) = 19 - 4 \times 4.5 = 1$ $\text{Var}(19 - 4X) = 16\text{Var}(X)$ $= 16 \times 7.15 = 114.4$	<p>B1</p> <p>M1</p> <p>A1</p> <p>(3)</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>(3)</p> <p>M1</p> <p>A1]</p> <p>(2)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>B1</p> <p>(1)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>[13]</p>

Statistics for S1 Practice Paper Bronze Level B4

Qu	Max Score	Modal score	Mean %	Mean score for students achieving grade:							
				ALL	A*	A	B	C	D	E	U
1	11		78	8.56		9.56	8.77	8.11	7.62	6.87	4.57
2	11		78	8.62		10.63	10.15	9.47	8.15	6.36	3.19
3	15		77	11.58		13.60	12.66	11.98	11.17	10.13	7.18
4	15		73	10.97		14.42	13.43	11.93	9.76	7.12	3.29
5	10		64	6.40		8.89	6.87	4.88	3.75	3.11	1.07
6	13		67	8.69		12.21	10.96	9.42	7.27	5.21	1.96
	75		73	54.82		69.31	62.84	55.79	47.72	38.80	21.26