

Edexcel GCE
Statistics S1
Gold Level G2
(Mark Scheme)

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Mr.S.V.Swarnaraja (Marking Examiner, Team Leader & Author)
www.swanash.com, Mobile: +94777304755 , email: swa@swanash.com**

Question Number	Scheme	Marks
1. (a)	$S_{yy} = 4305 - \frac{181^2}{8}$ $= \underline{209.875} \quad \text{(awrt 210)}$	M1 A1 (2)
(b)	$r = \frac{(-)23726.25}{\sqrt{3535237.5 \times "209.875"}}$ $= -\underline{0.87104\dots} \quad \text{(awrt -0.871)}$	M1 A1 (2)
(c)	Higher towns have lower temperature or temp. decreases as height increases	B1 (1)
(d)	$S_{hh} = 3.5352375$ (awrt 3.54) (condone 3.53)	B1 (1)
(e)	$r = -\underline{0.87104\dots} \quad \text{(awrt -0.871)}$	B1ft (1) [7]
2. (a)	$\frac{1}{2}$	B1 (1)
(b)	54	B1 (1)
(c)	+ is an 'outlier' or 'extreme value' Any heavy musical instrument or a statement that the instrument is heavy	B1 B1 (2)
(d)	$Q_3 - Q_2 = Q_2 - Q_1$ so symmetrical or no skew	B1 B1 (2)
(e)	$P(W < 54) = 0.75$ (or $P(W > 54) = 0.25$) $\frac{54 - 45}{\sigma} = 0.67$ $\sigma = 13.43\dots$	M1 M1B1 A1 (4) [10]

Question Number	Scheme	Marks																		
3.	<table border="1" data-bbox="336 241 1206 320"> <tr> <td>Width</td> <td>1</td> <td>1</td> <td>4</td> <td>2</td> <td>3</td> <td>5</td> <td>3</td> <td>12</td> </tr> <tr> <td>Freq. Density</td> <td>6</td> <td>7</td> <td>2</td> <td>6</td> <td>5.5</td> <td>2</td> <td>1.5</td> <td>0.5</td> </tr> </table> <p data-bbox="1066 331 1262 360">0.5 × 5 12 or 6</p> <p data-bbox="336 369 975 398">Total area is $(1 \times 6) + (1 \times 7) + (4 \times 2) + \dots = 70$</p> <p data-bbox="336 414 671 488">$(90.5 - 78.5) \times \frac{1}{2} \times \frac{140}{\text{their } 70}$</p> <p data-bbox="997 495 1257 524">"70 seen anywhere"</p> <p data-bbox="336 533 655 562">Number of runners is 12</p>	Width	1	1	4	2	3	5	3	12	Freq. Density	6	7	2	6	5.5	2	1.5	0.5	<p data-bbox="1286 253 1329 282">M1</p> <p data-bbox="1286 331 1329 360">A1</p> <p data-bbox="1286 432 1329 461">M1</p> <p data-bbox="1286 495 1329 524">B1</p> <p data-bbox="1286 533 1329 562">A1</p> <p data-bbox="1366 566 1409 595">[5]</p>
Width	1	1	4	2	3	5	3	12												
Freq. Density	6	7	2	6	5.5	2	1.5	0.5												
4. (a)	<p data-bbox="336 607 863 645">$\sum ft = 4837.5$ (allow 4838 or 4840)</p> <p data-bbox="336 678 703 752">Mean = $\frac{"4837.5"}{200} = 24.1875$</p> <p data-bbox="1013 678 1238 752">awrt <u>24.2</u> or $\frac{387}{16}$</p> <p data-bbox="336 779 719 875">$\sigma = \sqrt{\frac{134281.25}{200} - \left(\frac{4837.5}{200}\right)^2}$</p> <p data-bbox="368 902 951 931">= 9.293 (accept $s = 9.32$)</p> <p data-bbox="1093 902 1238 931">awrt <u>9.29</u></p> <p data-bbox="268 981 919 1055">(b) $Q_2 = [20.5] + \frac{(100/100.5 - 62)}{88} \times 5 = 22.659\dots$</p> <p data-bbox="1093 1003 1238 1032">awrt <u>22.7</u></p> <p data-bbox="268 1104 1254 1178">(c) $Q_1 = 10.5 + \frac{(50/50.25)}{62} \times 10 [= 18.56]$ (*) ($n + 1$ gives 18.604...)</p> <p data-bbox="268 1227 879 1256">(d) $Q_3 = 25.5$ (Use of $n + 1$ gives 25.734...)</p> <p data-bbox="336 1279 799 1308">IQR = 6.9 (Use of $n + 1$ gives 7.1)</p> <p data-bbox="268 1357 959 1386">(e) The data is skewed (condone "negative skew")</p> <p data-bbox="268 1435 1070 1464">(f) Mean decreases and st. dev. remains the same. (from(a))</p> <p data-bbox="336 1487 983 1516">The median and quartiles would decrease. ((b)(c))</p> <p data-bbox="336 1538 927 1568">The IQR would remain unchanged (from (d))</p>	<p data-bbox="1286 607 1329 636">B1</p> <p data-bbox="1286 701 1377 730">M1 A1</p> <p data-bbox="1286 813 1329 842">M1</p> <p data-bbox="1286 902 1329 931">A1</p> <p data-bbox="1366 943 1409 972">(5)</p> <p data-bbox="1286 1003 1377 1032">M1 A1</p> <p data-bbox="1366 1066 1409 1095">(2)</p> <p data-bbox="1286 1126 1377 1155">B1 cso</p> <p data-bbox="1366 1189 1409 1218">(1)</p> <p data-bbox="1286 1227 1329 1256">B1</p> <p data-bbox="1286 1279 1358 1308">B1 ft</p> <p data-bbox="1366 1317 1409 1346">(2)</p> <p data-bbox="1286 1357 1329 1386">B1</p> <p data-bbox="1366 1391 1409 1420">(1)</p> <p data-bbox="1286 1435 1329 1464">B1</p> <p data-bbox="1286 1487 1329 1516">B1</p> <p data-bbox="1286 1538 1329 1568">B1</p> <p data-bbox="1366 1574 1409 1603">(3)</p> <p data-bbox="1350 1615 1409 1644">[14]</p>																		

Question Number	Scheme	Marks
5. (a)	$Q_2 = 17 + \left(\frac{60-58}{29} \right) \times 2$ $= 17.1 \quad (17.2 \text{ if use } 60.5)$	M1 A1 (2)
5. (b)	$\sum fx = 2055.5 \quad \sum fx^2 = 36500.25$ <p>Evidence of attempt to use midpoints with at least one correct</p> <p>Mean = 17.129... awrt 17.1</p> $\sigma = \sqrt{\frac{36500.25}{120} - \left(\frac{2055.5}{120} \right)^2}$ $= 3.28 \quad (s = 3.294)$	B1 B1 M1 B1 M1 A1 (6)
5. (c)	$\frac{3(17.129 - 17.1379...)}{3.28} = -0.00802$ <p>No skew/ slight skew</p>	Accept 0 or awrt 0.0 M1 A1 B1 (3)
5. (d)	The skewness is very small. Possible.	B1 B1 (2) [13]

Question Number	Scheme	Marks
<p>6. (a) 18-25 group, area=7x5=35 25-40 group, area=15x1=15</p> <p>(b) (25-20)x5+(40-25)x1=40</p> <p>(c) Mid points are 7.5, 12, 16, 21.5, 32.5 $\sum f = 100$ $\frac{\sum ft}{\sum f} = \frac{1891}{100} = 18.91$</p> <p>(d) $\sigma_t = \sqrt{\frac{41033}{100} - \bar{t}^2}$ $\sigma_t = \sqrt{52.74...} = 7.26$</p> <p>(e) $Q_2 = 18$ $Q_1 = 10 + \frac{15}{16} \times 4 = 13.75$ $Q_3 = 18 + \frac{25}{35} \times 7 = 23$</p> <p>(f) 0.376... Positive skew</p>	<p style="text-align: center;">$\sqrt{\frac{n}{n-1} \left(\frac{41033}{100} - \bar{t}^2 \right)}$ alternative OK</p> <p>or 18.1 if (n+1) used</p> <p>or 15.25 numerator gives 13.8125</p> <p>or 25.75 numerator gives 23.15</p>	<p>B1 B1 (2) M1A1 (2) M1 B1 M1A1 (4) M1 M1 A1 (3) B1 M1A1 A1 (4) B1 B1] (2) [17]</p>
<p>7. (a) 200 or 200g</p> <p>(b) $P(190 < X < 210) = 0.6$ or $P(X < 210) = 0.8$ or $P(X > 210) = 0.2$ Correct use of 0.8 or 0.2 $Z = (\pm) \frac{210 - 200}{\sigma}$ $\frac{10}{\sigma} = 0.8416$ $\sigma = 11.882129...$</p> <p>(c) $P(X < 180) = P\left(Z < \frac{180 - 200}{\sigma}\right)$ $= P(Z < -1.6832)$ $= 1 - 0.9535$ $= 0.0465$ or awrt 0.046</p>	<p>0.8416 awrt 11.9</p>	<p>B1 (1) M1 A1 M1 B1 A1 (5) (3) [9]</p>

Statistics for S1 Practice Paper Gold Level G2

Qu	Max Score	Modal score	Mean %	Mean score for students achieving grade:							
				ALL	A*	A	B	C	D	E	U
1	7		66	4.63	5.97	5.55	4.97	4.59	4.25	3.94	3.18
2	10		48	4.81		7.16	5.15	4.23	3.62	3.15	2.27
3	5		49	2.45		3.02	2.19	1.86	1.53	1.55	1.05
4	14	0	53	7.40	12.10	11.32	9.17	7.43	5.88	4.41	2.10
5	13		50	6.50		9.67	7.41	6.04	4.73	3.64	1.89
6	17		53	9.07		13.14	10.12	8.41	7.05	6.00	4.00
7	9		48	4.33		6.57	4.55	2.87	2.31	1.31	0.75
	75		52	39.19		56.43	43.56	35.43	29.37	24.00	15.24