

EDEXCEL FOUNDATION - LONDON EXAMINATIONS

Stewart House 32 Russell Square London WC1B 5DN

June 2001

Advanced Supplementary/Advanced Level

General Certificate of Education

Subject STATISTICS 6683

Paper No. S1

Question number	Scheme	Marks
1.	(a) $\mu = \frac{1075}{25} = 43$ cao B1 $\sigma^2 = \frac{46625}{25} - (43)^2 = 16$ $\sqrt{(\frac{\sum x^2}{n} - \mu^2)}$ M1 $\therefore \sigma = 4$ cao A1 (3) <i>Sk S_{n-1} = AWT 4.08 B1</i> <i>Do not ignore subsequent working</i> (b) One value is 8 below μ and the other is 8 above μ B1 $\therefore$ Mean is unchanged B1 (2)	
2.	(a) $S_{xx} = 6599600 - \frac{(7300)^2}{10}$ M1 $= 1270600$ cao A1 (2) (b) $r = \frac{S_{xy}}{\sqrt{S_{xx} S_{yy}}} = \frac{-13060}{\sqrt{1270600 \times 140.9}}$ Correct substitⁿ of their values M1 $= -0.976075 \dots$ -0.976 A1 (2) (c) As height increases temperature decreases (Must be in context) B1 (1)	

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3.	(a) $P(Y < 80) = P\left(Z < \frac{80 - 100}{\sqrt{256}}\right)$ Standardising Allow $\sqrt{256}$ or 256 ± 1.25 A1 ISW A1 (3) $= P(Z < \pm 1.25)$ $= 1 - \Phi(1.25) = \underline{0.1056}$ (b) $P(100 - k \leq Y \leq 100 + k) = 0.516$ $\therefore P(Y \leq 100 + k) = 0.516 + \frac{1}{2}(1 - 0.516)$ 0.758 B1 $\pm k/16$ B1 $k/16 = \Phi^{-1}(0.758)$ M1 $= 0.7$ B1 (3) $k = 11.2$ A1 $\therefore P(Z \leq \frac{k}{16}) = 0.758$ $\therefore \frac{k}{16} = 0.7 \Rightarrow \underline{k = 11.2}$	
4.	(a) $\lambda = \underline{0.2}$ cao B1 (1) (b) $P(-1 \leq X \leq 2) = P(0) + P(1) + P(2)$ M1 A1 (2) $= 0.6$ (c) $F(-0.4) = \underline{0.3}$ $\alpha < 1.0$ B1 (1) (d) $E(X) = (-2 \times 0.1) + \dots + (3 \times 0.1)$ Attempt at $\sum x^2 P(X=x)$ M1 A1 A1 $= \underline{0.3}$ $\therefore E(3X+4) = (3 \times 0.3) + 4$ Use of $E(aX+b)$ M1 A1 (4) $= 4.9$ (e) $Var(X) = (-2^2 \times 0.1) + \dots + (3^2 \times 0.1) - (0.3)^2$ Attempt at $\sum x^2 P(X=x) - \mu^2$ M1 A1 A1 $\underline{E(X) = 2.10} = \underline{2.01}$ Use of $Var(aX+b)$ M1 A1 (4) $Var(2X+3) = 4Var(X) = 4 \times 2.01$ $= \underline{8.04}$	

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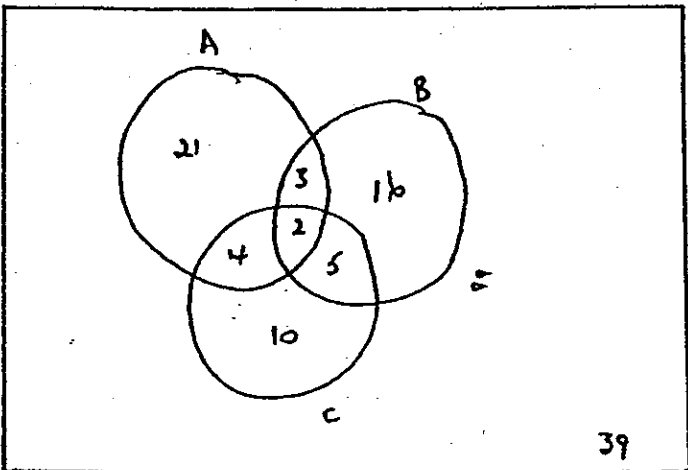
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5.	(a)  (b) $P(\text{at least one}) = \frac{21+3+\dots+10}{100}$ or $1 - \frac{39}{100}$ $= \frac{61}{100} = 0.61$ (c) $P(\text{only A}) = \frac{21}{100} = 0.21$ (d) $P(\text{only one}) = \frac{21+16+10}{100}$ $= \frac{47}{100} = 0.47$ (e) $P(A \text{only reads one}) = \frac{0.21}{0.47}$ $= \frac{21}{47} = 0.4468\dots$	2 B1 4, 3, 5 M1A1 21, 16, 10 M1A1 39 B1 (6) M1 A1✓ (2) B1✓ (1) M1 A1✓ (2) Use of $\frac{1(A \cap B)}{P(B)}$ etc M1 ie:- Their (c) / Their (d) A1✓ (2) AWRT 0.445

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6.	(a) $Q_1 = 30$; $Q_2 = \frac{1}{2}(41+43) = 42$; $Q_3 = 46$ (b) Scales & Labels Bar plot Alan - 30, 42, 46 20, 25 Diane - 37, 42, 53 35, 65 Gopal - 34, 42, 50 25, 57	BI; M1A1; BI (4) BI M1 A1✓ A1 (4) BI R1 (2) BI R1 (2)
(c)	Alan Diane Gopal -ve skew +ve skew symmetrical all same median all same IQR Any other comment eg- Diane tends to draw more lengths than the other two	BI BI BI BI (4)

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7.	(a) (b) $\sum x = 76, \sum y = 120$ $b = \frac{10 \times 749 - 76 \times 120}{10 \times 746 - (76)^2} = \frac{-1630}{1684} = -0.96793...$ Can be implied B1 B1 (2) Use of $\sum y / \sum x$ a.e.f. M1 Correct subst? A1 AWRT -0.97 A1 (3) $a = \frac{120}{10} - (-0.96793...)(\frac{76}{10})$ Use of $\bar{y} - b\bar{x}$ M1 Correct subst without prem. approx A1 AWRT 19.4 A1 (3) $= 19.356...$ $\therefore y = 19.4 - 0.968x$ or $19.4 - 0.97x$ B1 (1) (c) $b \Rightarrow$ for every extra hour of practice 1 (-0.968) less errors will be made B1 $a \Rightarrow$ without practice 19/20 errors will be made. B1 (2) (d)(i) Yes - all points reasonably close to the line B1 (ii) No - more likely to be B1 (2)	