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
	$\sigma^2 = \frac{45625}{25} - (43)^2 = 16$ $\sqrt{\left(\frac{\Sigma x^2}{n} - \mu^2\right)}$	M1
	$\therefore \sigma = 4$ cao	A1 (3)
	SR $S_{n-1} = \text{AWRT } 4.08$ B1 Do not ignore subsequent working	
	(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 subst^n of their values	M1
	$= -0.976075....$ -0.976	A1 (2)
	(c) As height increases temperature decreases (Must be IN CONTEXT)	B1 (1)

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3.	(a) $P(Y<80) = P\left(Z < \frac{\pm(80-100)}{\sqrt{256}}\right)$	Standardising M1
	Allow $\sqrt{256}$ or 256	
	$= P(Z < \pm 1.25)$	± 1.25 A1
	$= 1 - \Phi(1.25) = 0.1056$	ISW A1 (3)
	(b) $P(100-k \le Y \le 100+k) = 0.516$	
	$\therefore P(Y \le 100+k) = 0.516 + \frac{1}{2}(1-0.516)$	
	$= 0.758$	0.758 B1
		$\pm k/16$ B1
	$\therefore P(Z \le \frac{k}{16}) = 0.758$	$k/16 = \Phi^{-1}(0.758)$ M1
	$\therefore \frac{k}{16} = 0.7 \Rightarrow k = 11.2$	$= 0.7$ B1 (5)
		$k = 11.2$ A1
4.	(a) $\lambda = 0.2$	cao B1 (1)
	(b) $P(-1 < X \le 2) = P(0) + P(1) + P(2)$	M1
	$= 0.6$	A1 (2)
	(c) $F(-0.4) = 0.3$	$\alpha < 1.0$ B1√ (1)
	(d) $E(X) = (-2 \times 0.1) + \cdots + (3 \times 0.1)$	Attempt at $\sum x P(X=x)$ M1
	$= 0.3$	A1
	$\therefore E(3X+4) = (3 \times 0.3) + 4$	Use of $E(aX+b)$ M1
	$= 4.9$	A1 (4)
	$Y = 3X+4$	
	$-2, 1, 4, 7, 10, 13$ M1A1	
	$E(Y) = 4.9$ M1A1	
	(e) $Var(X) = (-2^2 \times 0.1) + \cdots + (3^2 \times 0.1) - (0.3)^2$	Attempt at $\sum x^2 P(X=x) - \mu^2$ M1
	NB $E(X^2) = 2.10$ $= 2.01$	A1
	$Y = 2X+3$	
	$E(Y) = 3.6$ B1 $E(Y^2) = 21$ B1	
	$Var(Y) = 21 - (3.6)^2 = 8.04$ M1A1√	
	$Var(2X+3) = 4Var(X) = 4 \times 2.01$	Use of $Var(aX+b)$ M1
	$= 8.04$	A1√ (4)

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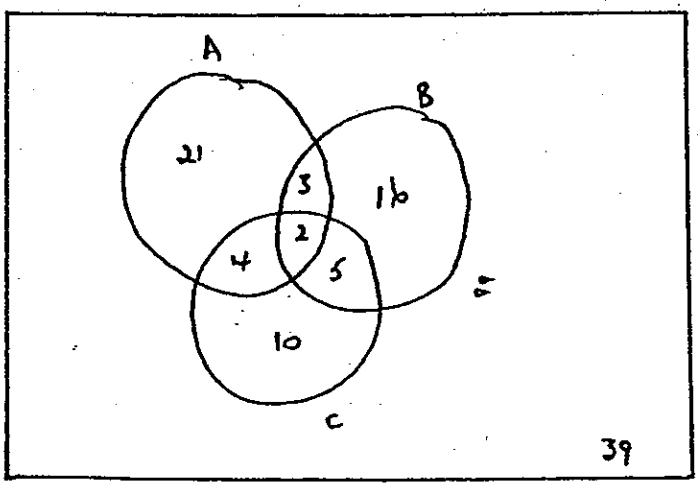
5.	(a) 	2 B1 4, 3, 5 M1 A1 21, 16, 10 M1 A1 39 B1 (6)
	(b) $P(\text{at least one}) = \frac{21+3+\cdots+10}{100}$ or $1-\frac{39}{100}$	M1
	$= \frac{61}{100} = 0.61$	A1√ (2)
	(c) $P(\text{only A}) = \frac{21}{100} = 0.21$	B1√ (1)
	(d) $P(\text{only one}) = \frac{21+16+10}{100}$	M1
	$= \frac{47}{100} = 0.47$	A1√ (2)
	(e) $P(A \mid \text{only reads one}) = \frac{0.21}{0.47}$	Use of $\frac{P(A\cap B)}{P(B)}$ etc M1 ie:- Their (c) / Their (d)
	$= \frac{21}{47} = 0.4468\ldots$	AWRT 0.45 A1√ (2)

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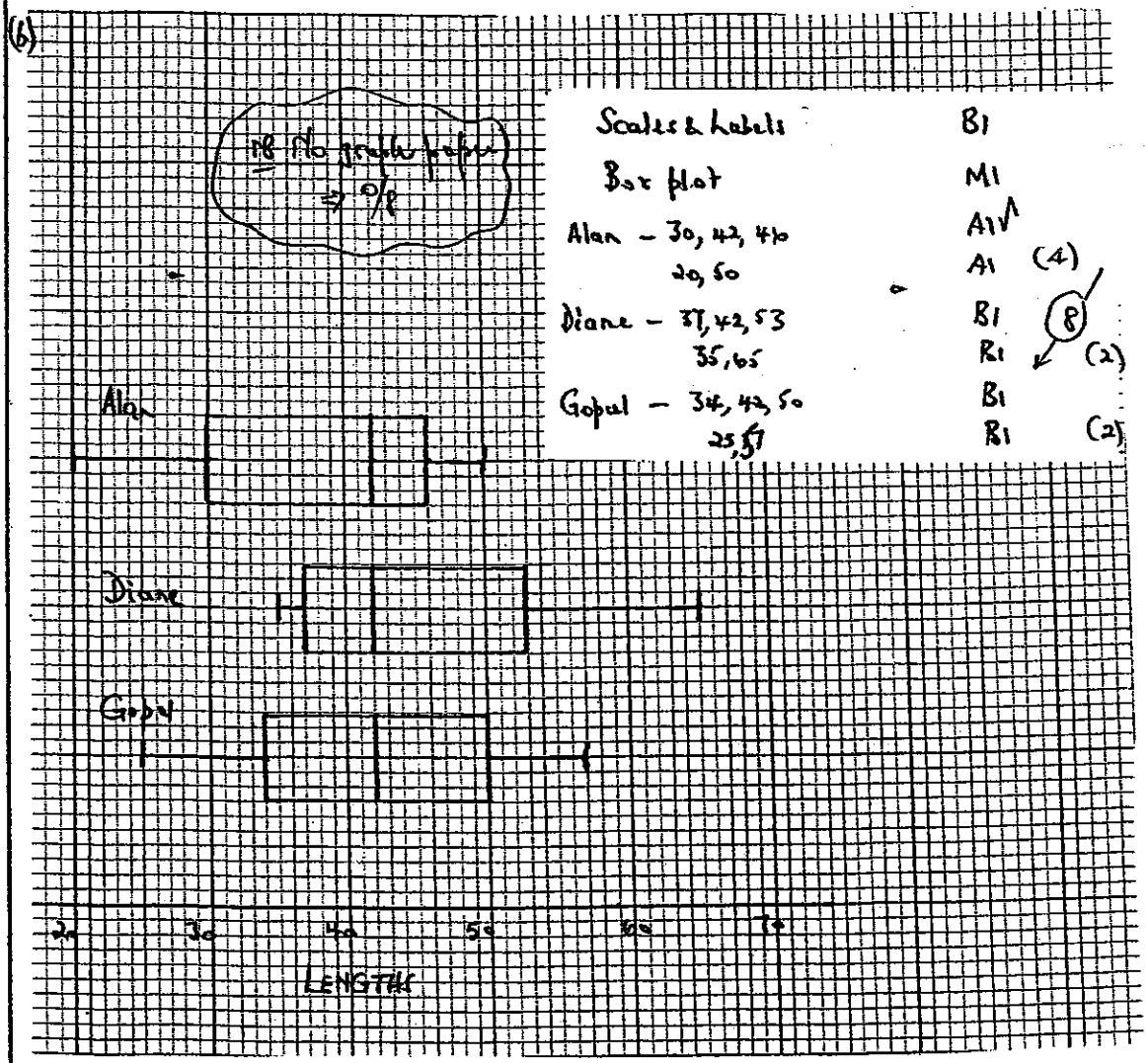
6.	(a) $Q_1 = 30$; $Q_2 = \frac{1}{2}(41+43) = 42$; $Q_3 = 46$	B1; M1A1; B1 (4)
	(b) 	
	(c) Alan Diane Gopal -ve skew +ve skew symmetrical B1 all same median B1 all same IQR B1 Any other comment eg – Diane tends to obtain more lengths than the other two B1 (4)	

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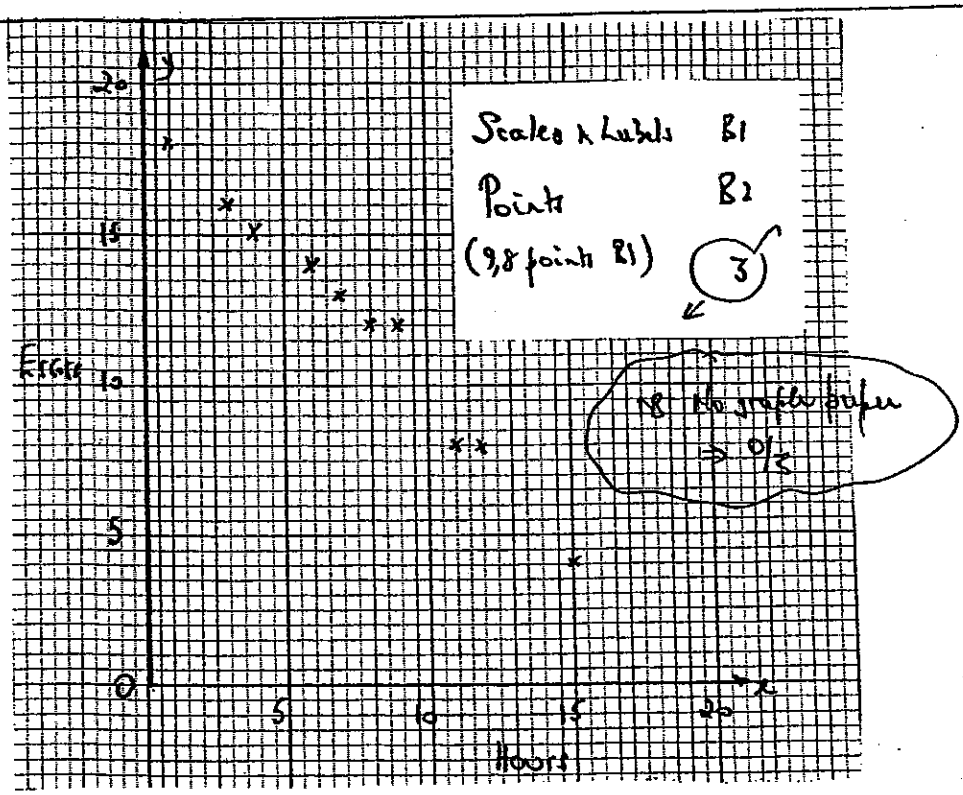
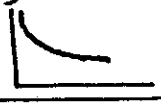
7.	(a) 	
	(b) $\Sigma x = 76$, $\Sigma y = 120$	Can be implied B1 B1 (2)
	$b = \frac{10 \times 749 - 76 \times 120}{10 \times 746 - (76)^2} = \frac{-1630}{1684}$	Use of S_{xy}/S_{xx} a.e.f. M1
	$= -0.96793\ldots$	Correct subst: A1
		AWRT -0.97 A1 (3)
	$a = \frac{120}{10} - (-0.96793\ldots)\left(\frac{76}{10}\right)$	Use of $\bar{y} - b\bar{x}$ M1
	$= 19.356\ldots$	Correct subst without from. approx A1
		AWRT 19.4 A1 (3)
	$\therefore y = 19.4 - 0.968x$ or $19.4 - 0.97x$	B1 (1)
	(c) $b \Rightarrow$ for every extra hour of practice I (−0.968) less error will be made	B1ft
	$a \Rightarrow$ without practice 19/20 errors will be made.	B1ft (2)
	(d)(i) Yes – all points reasonably close to the line	B1
	(ii) No – more likely to be 	B1 (2)