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) $\mu = \dfrac{1075}{25} = 43$	cao	B1
	$\sigma^2 = \dfrac{46625}{25} - (43)^2 = 16$ $\sqrt{\left(\dfrac{\sum x^2}{n} - \mu^2\right)}$		M1
	$\underline{\text{SC}}$ $S_{n-1} = $ AWRT 4.08 B1		
	$\therefore \sigma = 4$ Do not ignore subsequent working	cao	A1 (3)
	(b) One value is 8 below μ and the other is 8 above μ		B1
	$\therefore$ Mean is unchanged		B1 (2)
2.	(a) $S_{xx} = 6599600 - \dfrac{(7300)^2}{10}$		M1
	$= 1270600$	cao	A1 (2)
	(b) $r = \dfrac{S_{xy}}{\sqrt{S_{xx} S_{yy}}} = \dfrac{-13060}{\sqrt{1270600 \times 140.9}}$	Correct subst^n of their values	M1
	$= -0.976075\ldots$ -0.976		A1 (2)
	(c) As height increases temperature decreases (Must be in CONTEXT)		B1 (1)
	)		

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
3.	(a) $P(Y < 80) = P\left(Z < \dfrac{\pm(80 - 100)}{\sqrt{256}}\right)$ $= P(Z < \pm1.25)$ $= 1 - \Phi(1.25) = 0.1056$ (b) $P(100 - k \leq Y \leq 100 + k) = 0.516$ $\therefore P(Y \leq 100 + k) = 0.516 + \frac{1}{2}(1 - 0.516)$ $= 0.758$ $\therefore P\left(Z \leq \frac{k}{16}\right) = 0.758$ $\therefore \frac{k}{16} = 0.7 \Rightarrow k = 11.2$	Standardising M1 Allow $\sqrt{256}$ or 256 ±1.25 A1 ISW A1 (3) 0.758 B1 $\pm \frac{k}{16}$ B1 $\frac{k}{16} = \Phi^{-1}(0.758)$ M1 $= 0.7$ B1 (5) $k = 11.2$ A1
4.	(a) $d = 0.2$ (b) $P(-1 \leq X \leq 2) = P(0) + P(1) + P(2)$ $= 0.6$ (c) $F(-0.4) = 0.3$ (d) $E(x) = (-2 \times 0.1) + \cdots + (3 \times 0.1)$ $= 0.3$ $\therefore E(3X + 4) = (3 \times 0.3) + 4$ $= 4.9$ (e) $Var(x) = (-2^2 \times 0.1) + \cdots + (3^2 \times 0.1) - (0.3)^2$ NB $E(X^2) = 2.10$ $= 2.01$ $Var(2x + 3) = 4Var(x) = 4 \times 2.01$ $= 8.04$	cao B1 (1) M1 A1 (2) $\alpha < 1.0$ B1√ (1) Attempt at $\sum x P(X = x)$ M1 $y = 3x + 4$ A1 $-2, 1, 4, 7, 10, 13$ M1A1 $E(Y) = 4.9$ M1A1 Use of $E(aX + b)$ M1 A1 (4) Attempt at $\sum x^2 P(X=x) - \mu^2$ M1 A1 $y = 2x + 3$ $E(Y) = 36$ B1 $E(Y^2) = 21$ B1 $Var(Y) = 21 - (3.4)^2 = 8.04$ M1A1√ Use of $Var(aX + b)$ M1 A1 √ (4)

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
5.	(a)	2 — B1 $4, 3, 5$ M1A1 $21, 16, 10$ M1 A1 39 B1 (6)
	(b) $P\left(\text{at least one}\right) = \dfrac{21+3+\cdots+10}{100}$ or $1-\dfrac{39}{100}$	M1
	$= \dfrac{61}{100} = \underline{0.61}$	A1√ (2)
	(c) $P\left(\text{only } A\right) = \dfrac{21}{100} = \underline{0.21}$	B1√ (1)
	(d) $P\left(\text{only one}\right) = \dfrac{21+16+10}{100}$	M1
	$= \dfrac{47}{100} = \underline{0.47}$	A1√ (2)
	(e) $P\left(A\middle|\text{only reads one}\right) = \dfrac{0.21}{0.47}$ Use of $\dfrac{P(A\cap B)}{P(B)}$ etc M1 i.e.- Their (c) / Their (d)	
	$= \dfrac{21}{47} = 0.4468\ldots$ AWRT 0.45 A1√ (2)	

EDEXCEL FOUNDATION - LONDON EXAMINATIONS

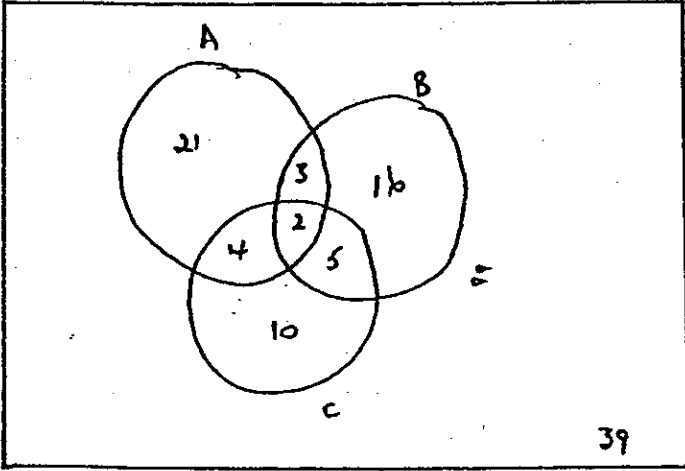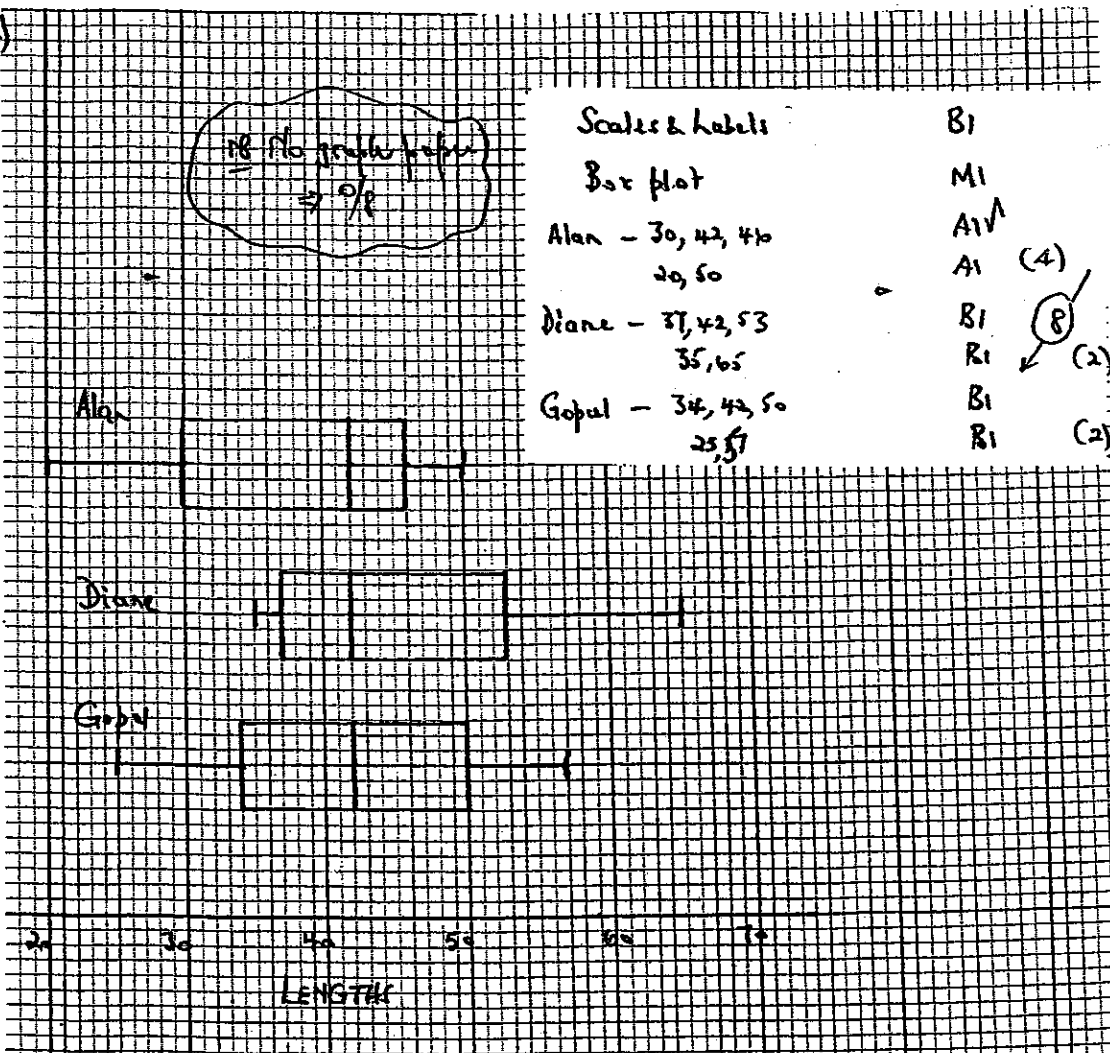Stewart House 32 Russell Square London WC1B 5DN

June 2001

Advanced Supplementary/Advanced Level

General Certificate of Education

Subject STATISTICS 6683   Paper No. S1

Question number	Scheme	Marks
6.	(a) $Q_1 = 30$; $Q_2 = \frac{1}{2}(41+43) = 42$; $Q_3 = 46$	B1; M1A1; B1 (4)

	(b) NB No graph paper $\Rightarrow 0/6$	Scales & labels B1
		 Box plot M1
		 Alan — 30, 42, 46 A1
		    20, 50 A1 (4)
		 Diane — 37, 42, 53 B1 ⑧
		    35, 65 R1 (2)
		 Gopal — 34, 43, 50 B1
		    25, 57 R1 (2)

	(c) Alan Diane Gopal -ve skew +ve skew symmetrical	B1 B1
	all same median	B1
	all same IQR	B1
	Any other comment eg- Diane tends to throw more lengths than the other two	B1 (4)

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
7.	(a) Scales & Labels B1 Points B2 (9,8 point B1) ③ N No graph paper → 0's	
	(b) $\sum x = 76$, $\sum y = 120$ Con be implied B1 B1 (2)	
	$b = \dfrac{10 \times 749 - 76 \times 120}{10 \times 746 - (76)^2} = \dfrac{-1630}{1684}$ Use of S_{xy}/S_{xx} a.e.f. M1 Correct subst^n A1 $= -0.96793\ldots$ AWRT -0.97 A1 (3)	
	$a = \dfrac{120}{10} - (-0.96793\ldots)\left(\dfrac{76}{10}\right)$ Use of $\bar{y} - b\bar{x}$ M1 Correct subst without prem. approx A1 $= 19.356\ldots$ 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 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)	