EDEXCEL

GENERAL CERTIFICATE OF EDUCATION

Advanced Subsidiary/Advanced Level

Statistics S1

MARKING SCHEME

January 2005

Principal Examiner:

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Marking should be completed by **16 February 2005**.

General Instructions

1. The total number of marks for the paper is 75.

2. Method (M) marks are awarded for 'knowing a method and attempting to apply it', unless otherwise indicated.

3. Accuracy (A) marks can only be awarded if the relevant method (M) marks have been earned.

4. (B) marks are independent of method marks.

5. Method marks should not be subdivided.

6. For misreading which does not alter the character of a question or materially simplify it, deduct two from any A or B marks gained, in that part of the question affected. Indicate this action by 'MR' in the body of the script (but see also note 10).

7. If a candidate makes more than one attempt at any question:

   (a) If all but one attempt is crossed out, mark the attempt which is NOT crossed out.

   (b) If either all attempts are crossed out or none are crossed out, mark all the attempts and score the highest single attempt.

8. Marks for each question, or part of a question, must appear in the right-hand margin and, in addition, total marks for each question, even where zero, must be ringed and appear in the right-hand margin and on the grid on the front of the answer book. It is important that a check is made to ensure that the totals in the right-hand margin of the ringed marks and of the unringed marks are equal. The total mark for the paper must be put on the top right-hand corner of the front cover of the answer book.

9. For methods of solution not in the mark scheme, allocate the available M and A marks in as closely equivalent a way as possible, and indicate this by the letters 'OS' (outside scheme) put alongside in the body of the script.

10. All A marks are 'correct answer only' (c.a.o.) unless shown, for example, as A1 f.t. to indicate that previous wrong working is to be followed through. In the body of the script the symbol $\sqrt{}$ should be used for correct f.t. and $\sqrt{}$ for incorrect f.t. After a misread, however, the subsequent A marks affected are treated as A f.t., but manifestly absurd answers should never be awarded A marks.

11. Ignore wrong working or incorrect statements following a correct answer.

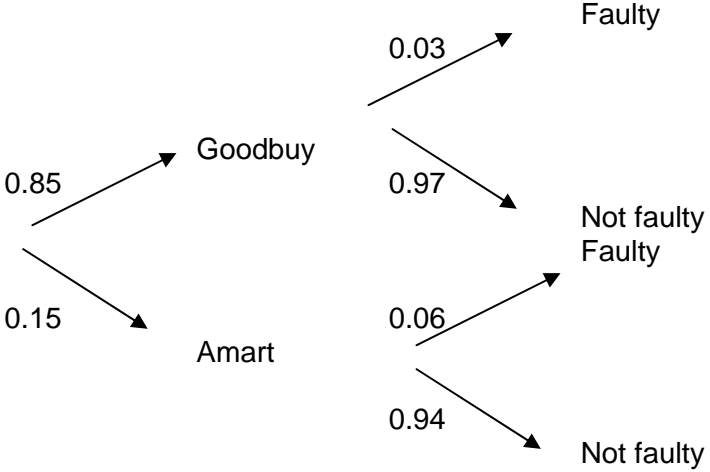# EDEXCEL

190 High Holborn London WC1V 7BH

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Advanced Subsidiary/Advanced Level

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Subject: **Statistics**   Paper: **S1**

Question Number	Scheme	Marks

1 (a)

Tree	**M1**
0.85,0.15	**A1**
0.03,0.97,0.06,0.94	**A1**

(3)

(b) $P(\text{Not faulty}) = (0.85 \times 0.97) + (0.15 \times 0.94)$ their values, all correct   **M1,A1**

$= 0.9655$ awrt 0.966   **A1**

(3)

(Total 6 marks)

EDEXCEL

190 High Holborn London WC1V 7BH

January 2005

Advanced Subsidiary/Advanced Level

General Certificate of Education

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Question Number	Scheme	Marks
2 (a)	$Q_1 = 33, \; Q_2 = 41, \; Q_3 = 52$	**B1B1B1** (3)
(b)		(6)
(c)	Median of Northcliffe is greater than median of Seaview. Upper quartiles are the same IQR of Northcliffe is less than IQR of Seaview Northcliffe positive skew, Seaview negative skew any 3 acceptable comments	**B1B1B1** (3)
(d)	On 75% of the nights that month both had no more than 52 caravans on site.	**B1** **B1** (2) (Total 14 marks)

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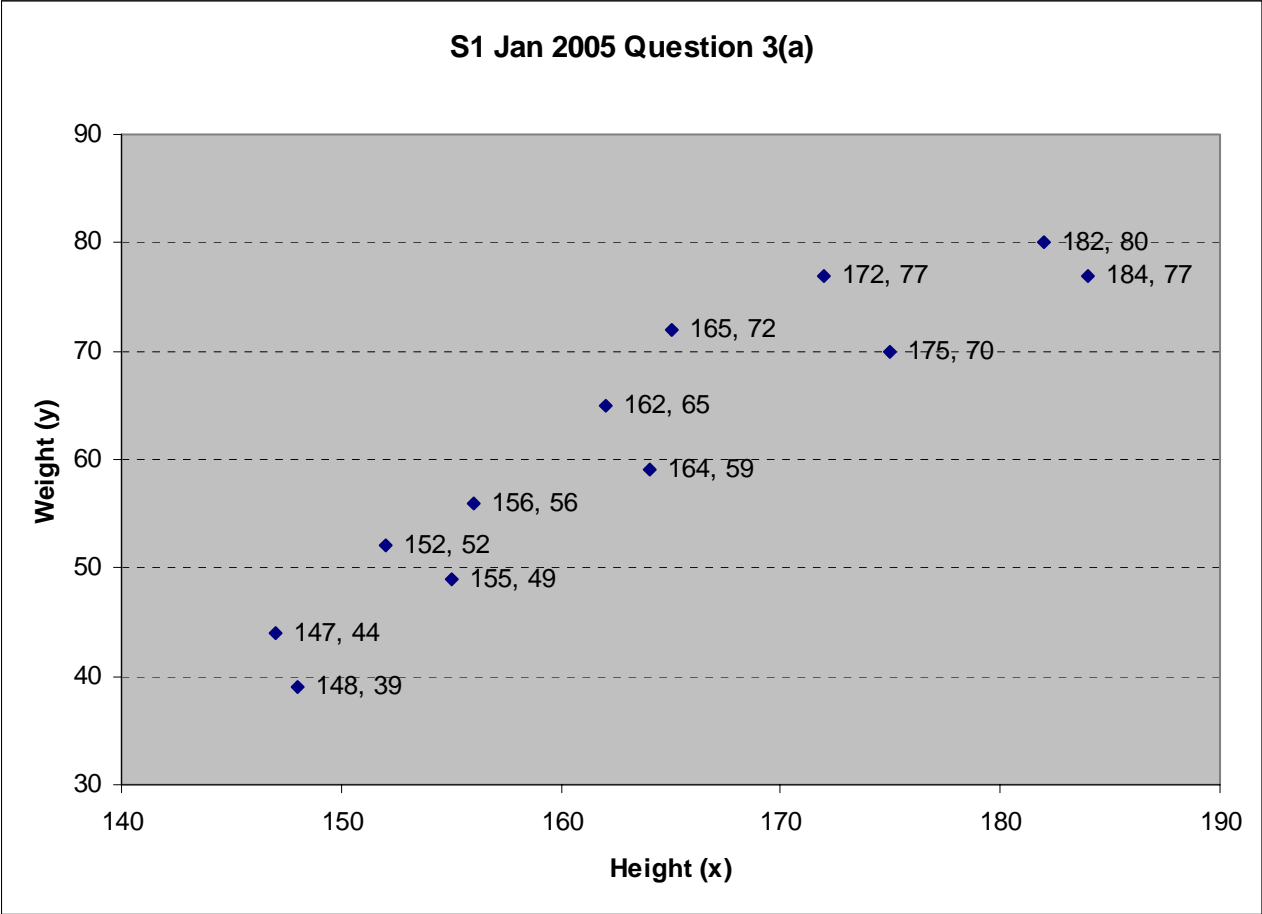190 High Holborn London WC1V 7BH

January 2005

Advanced Subsidiary/Advanced Level

General Certificate of Education

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Question Number	Scheme	Marks
3(a)	**S1 Jan 2005 Question 3(a)**	
	Scales and labels **B1**	
	10 or 11 points correct, all correct **B1,B1**	
		(3)

EDEXCEL

190 High Holborn London WC1V 7BH

January 2005

Advanced Subsidiary/Advanced Level

General Certificate of Education

Subject: **Statistics** Paper: **S1**

Question Number	Scheme		Marks
(b)	Positive; as x increases, y increases		**B1;B1**
			(2)
(c)	$S_{xy} = 122783 - \dfrac{1962 \times 740}{12} = 1793$	use of formula, cao	**M1A1**
			(2)
(d)	$b = \dfrac{S_{xy}}{S_{xx}} = \dfrac{1793}{1745} = 1.027507\ldots$	division, 1.028	**M1A1**
			(2)
(e)	$\bar{y} = \dfrac{740}{12} = 61\dfrac{2}{3}$	$61\dfrac{2}{3}$ or $61.\dot{6}$ or 61.7 **B1**	
	$s = \sqrt{\dfrac{47746}{12} - \left(\dfrac{740}{12}\right)^2} = 13.26859\ldots$	use of formula including root, 13.3	**M1A1**
			(3)
(f)	35.7, 87.7		**B1B1**
			(2)
(g)	All values between 35.7 and 87.7 so could be normal.	Reason required	**B1**
			(1)
			(Total 15 marks)

EDEXCEL

190 High Holborn London WC1V 7BH

January 2005

Advanced Subsidiary/Advanced Level

General Certificate of Education

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Question Number	Scheme	Marks
4 (a)	$k + 2k + 3k + 4k + 5k = 1$ $15k = 1$ $** \ k = \dfrac{1}{15} \ **$	$\sum P(X = x) = 1$ **M1** cso **A1** **(2)**
(b)	$P(X < 4) = P(1)+P(2)+P(3) \quad = \dfrac{1}{15}+\dfrac{2}{15}+\dfrac{3}{15}$ $= \dfrac{2}{5}$	sum of 3 probabilities **M1** $\dfrac{6}{15}$ or $\dfrac{2}{5}$ **A1** **(2)**
(c)	$E(X) = 1\times\dfrac{1}{15}+2\times\dfrac{2}{15}+3\times\dfrac{3}{15}+4\times\dfrac{4}{15}+5\times\dfrac{5}{15}$ $= \dfrac{11}{3}$	use of $\sum xP(X = x)$ **M1** $\dfrac{55}{15}$ or $\dfrac{11}{3}$ or $3\dfrac{2}{3}$ or $3.\dot{6}$ or 3.67 **A1** **(2)**
(d)	$E(3X - 4) = 3E(X) - 4 = 11 - 4$ $= 7$ **(OR** $E(3X - 4) = -1\times\dfrac{1}{15}+2\times\dfrac{2}{15}+5\times\dfrac{3}{15}+8\times\dfrac{4}{15}+11\times\dfrac{5}{15}$ $= 7$	3xtheirs-4 **M1** **A1** $\sum(3x - 4)kx$ **M1** cao **A1)** **(2)** **(Total 8 marks)**

EDEXCEL

190 High Holborn London WC1V 7BH

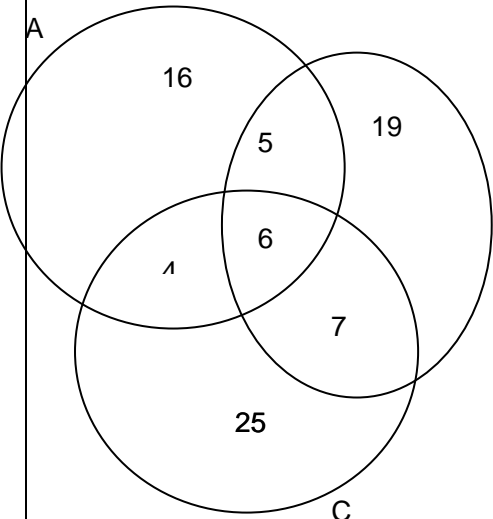**January 2005**

Advanced Subsidiary/Advanced Level

General Certificate of Education

Subject: **Statistics**   Paper: **S1**

Question Number	Scheme	Marks
5 (a)		6 **B1** subtract **M1** 4,5,7 **A1** subtract **A1** 16,19,25 **A1** 918 **B1** **(6)**
(b)	$P(\text{No defects}) = \dfrac{918}{1000} = 0.918$	**B1** **(1)**
(c)	$P(\text{No more than 1}) = \dfrac{918+16+19+25}{1000}$ **OR** $1 - \dfrac{5+6+4+7}{1000}$ $= 0.978$	**M1** 0.978 **A1** **(2)**
(d)	$P(\,B\,|\,\text{Only 1 defect}\,) \quad = \dfrac{P(B \text{ and } 1 \text{ defect})}{P(1 \text{ defect})} = \dfrac{\dfrac{19}{1000}}{\dfrac{16+19+25}{1000}}$ $= \dfrac{19}{60}$	conditional prob **M1** $\dfrac{19}{60}$ or $0.31\dot{6}$ or 0.317 **A1** **(2)**
(e)	$P(\text{Both had type B}) = \dfrac{37}{1000} \times \dfrac{36}{999}$ $= \dfrac{37}{27750}$ or $0.001\dot{3}$ or 0.00133	theirs from B x **M1** cao **A1** **(2)** **(Total 13 marks)**

Subject: **Statistics**   Paper: **S1**

Question Number	Scheme	Marks
6(a)	(Discrete) Uniform	**B1** (1)
(b)	e.g.Tossing a fair dice / coin	**B1** (1)
(c)	Useful in theory – allows problems to be modelled not necessarily true in practice	**B1** **B1** (2)
(d)	Carry out an experiment to establish probabilities	**B1** **B1** (2) **(Total 6 marks)**

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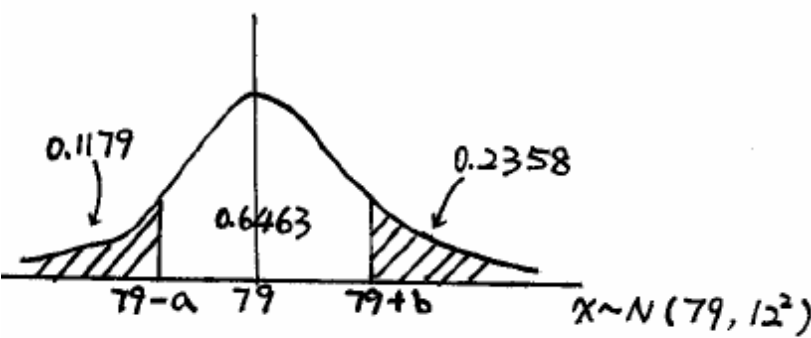**January 2005**

Advanced Subsidiary/Advanced Level

General Certificate of Education

Subject: **Statistics**   Paper: **S1**

Question Number	Scheme	Marks
7 (a)	$P(X < 70) \quad = P(Z < \dfrac{70-79}{12})$ standardise 79, 12 or 79, 144 **M1** $= P(Z < -0.75) = 0.2266$ -0.75, 0.2266 **A1A1**	**(3)**
(b)	$P(64 < X < 96) = P(\dfrac{64\text{-}79}{12} < Z < \dfrac{96-79}{12})$ standardise both, 79 & 12 only **M1** $= P(-1.25 < Z < 1.42) = 0.8166$ -1.25 & 1.42, 0.8166 **A1,A1**	**(3)**
(c)	 Shaded area i= $\dfrac{1}{3}(1-0.6463)$ **M1A1** $= 0.1179$ **A1**	**(3)**
(d)	$P(X \le 79 + b) = 0.7642$ 0.7642 **B1** $\Rightarrow \dfrac{b}{12} = 0.72$ standardise LHS = probability, all correct **M1A1** $b = 8.64$ **A1**	**(4)**
		(Total 13 marks)