

EDEXCEL FOUNDATION

Stewart House 32 Russell Square London WC1B 5DN

January 2002

Advanced Supplementary/Advanced Level

General Certificate of Education

Subject STATISTICS 6683

Paper No. S1



Question number	Scheme	Marks
1.	<p>(a)(i) A <u>test</u>/<u>investigation</u>/<u>process</u> adopted for <u>collecting data</u> to provide evidence for or against a hypothesis</p> <p>(ii) Sub-set of possible outcomes of an experiment.</p> <p>(b) Advantage — Quick, cheap, vary parameters/predict</p> <p>Disadvantage — Does not replicate real-world situation in every detail.</p>	<p>B1 (1)</p> <p>B1 (1)</p> <p>B1</p> <p>B1 (2)</p>
2.	<p>(a) Frequency densities: 16, $10\frac{2}{3}$, 14, 12, 9, $\frac{2}{3}$, 1 can be implied</p> <p>Scales & labels</p> <p>Histogram (no gaps)</p> <p>Heights & bases correct</p> <p>(b) No. of days = $(14 \times \frac{1}{2}) + (12 \times 1) + (9 \times 1) + (\frac{2}{3} \times \frac{2}{3})$ $= 28\frac{1}{3}$</p> <p>Allow $28\frac{1}{3}$; 28.3; 28.3</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>M1 dep</p> <p>A1 (5)</p> <p>M1</p> <p>A1 (2)</p>

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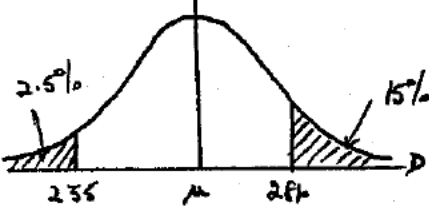
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4.	<p>Aliter: (a) $P(\text{Does not win either}) = 1 - P(B_1 \cup B_2)$</p> $= 1 - (0.5 + 0.3 - 0.2)$ $= \underline{0.4}$ <p>(b) $P(\text{Wins exactly one}) = P(B_1 \cap B_2') + P(B_1' \cap B_2)$</p> $= 0.3 + 0.1$ $= \underline{0.4}$	<p>M1 A1 A1 (3) M1 A1 (2)</p>
5.	 <p>(a) $P(D < 235) = 0.025$</p> $\therefore \frac{235 - \mu}{\sigma} = -1.96$ $\therefore \underline{\mu - 235 = 1.96\sigma}$ <p>(b) $P(D > 286) = 0.15$</p> $\therefore \frac{286 - \mu}{\sigma} = 1.0364$ $\therefore \underline{286 - \mu = 1.0364\sigma}$ <p>(c) Solving for μ or σ Substituting for other unknown</p> $\mu = 268.360 \dots \quad \sigma = 17.0204 \dots$ <p>(d) $\mu \pm \sigma = 268.36 \pm 17.02$</p> $= (251, 285)$	<p>M1 A1 A1 (2) M1 B1 A1 (3) M1 M1 A1 A1 (4) M1 A1 (2)</p>

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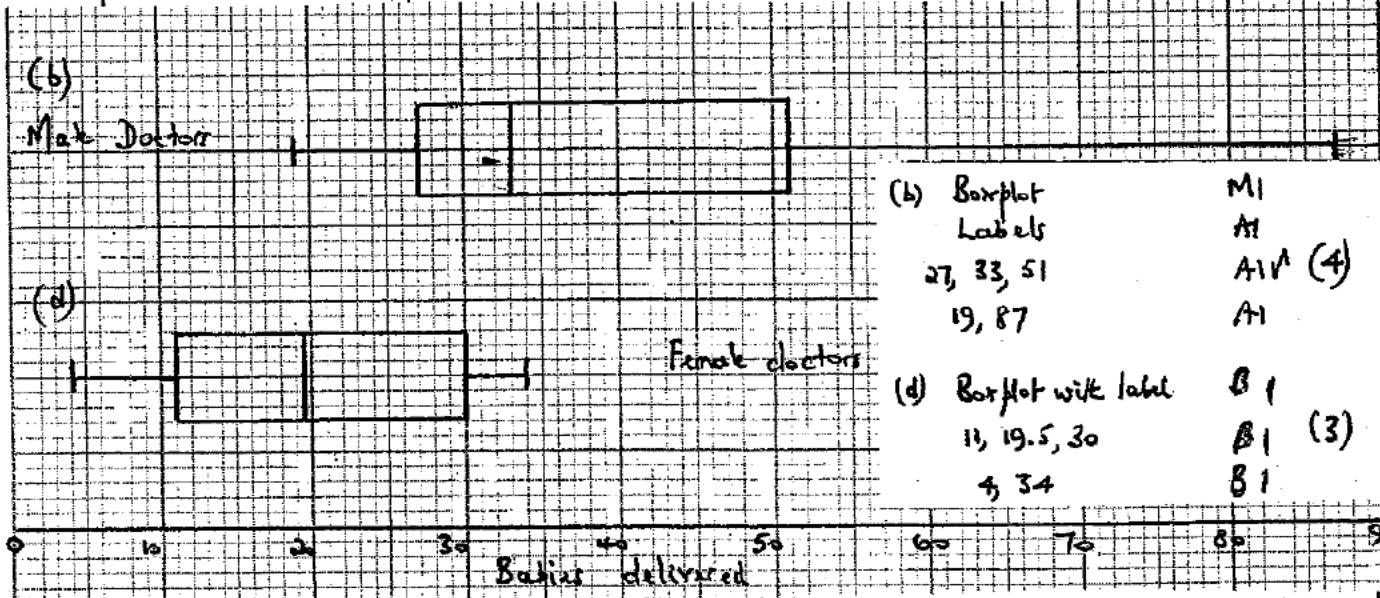
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6.	(a) $Q_2 = 33$ $Q_1 = 27; Q_3 = 51$ $IQR = 51 - 27 = 24$	B1 B1 B1 (3)



(c) $\mu = \frac{618}{15}$ $= 41.2$	$\frac{\sum x^2}{15}$	M1
$\sigma^2 = \frac{31864}{15} - 41.2^2$	41.2	ca. A1
$\Rightarrow \sigma = 20.65978\dots$	$\frac{\sum x^2}{15} - \mu^2$	M1
$\sum (x - \bar{x})^2 = 6403.4$	20.7	A1 (5)
(e) Median male > Median female IQR male > IQR female Range male > Range female etc.	} Any Two sensible independent comments	B1
Males: +ve skew; Females: slight +ve skew/almost symmetrical		B1 (2)

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7.	<p>(a) S (Response)</p> <p>(a) Scales & Labels Points (8, 9 points \rightarrow B1)</p> <p>(e) (\bar{t}, \bar{s}) plotted Correct line</p>	<p>B1 B2 (3) B1 B1 (2)</p>

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7.	<p>(b) $S_{yy} = 694650 - \frac{2310^2}{10} = 161040$</p> <p>$S_{tt} = 66490$, $S_{yy} = 87235$</p> <p>$r = \frac{87235}{\sqrt{66490 \times 161040}}$</p> <p>$= 0.843035 \dots$</p> <p>SR: 0.843 without working \Rightarrow B1 only</p> <p>(c) No change; coding does not affect p.c.c.</p> <p>(d) $\hat{\beta} = \frac{72587.5}{63671.875} = 1.140024 \dots$</p> <p>$\hat{\alpha} = 187.5 - (1.140024 \dots \times 125.625) = 44.2844 \dots$</p> <p>$\therefore \underline{s = 44.3 + 1.14t}$</p> <p>(e) Graph</p> <p>(f) Both points above the line, so more line up Predictions of s from t less accurate</p>	<p>M1 A1</p> <p>A1 A1</p> <p>M1 A1 ✓</p> <p>0.843 A1 (1)</p> <p>B1; B1 (2)</p> <p>M1</p> <p>M1</p> <p>A1 (3)</p> <p>Graph </p> <p>B1</p> <p>B1 (2)</p>