Paper Reference(s)

6683

Edexcel GCE

Statistics S1

Advanced/Advanced Subsidiary

Wednesday 14 January 2004 – Morning

Time: 1 hour 30 minutes

Materials required for examination	**Items included with question papers**
Answer Book (AB16)	Nil
Graph Paper (ASG2)	
Mathematical Formulae (Lilac)	

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may NOT use calculators such as the Texas Instruments TI 89, TI 92, Casio CFX 9970G, Hewlett Packard HP 48G.

Instructions to Candidates

In the boxes on the answer book, write the name of the examining body (Edexcel), your centre number, candidate number, the unit title (Statistics S1), the paper reference (6683), your surname, other name and signature.
Values from the statistical tables should be quoted in full. When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
This paper has six questions.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the Examiner. Answers without working may gain no credit.

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1. An office has the heating switched on at 7.00 a.m. each morning. On a particular day, the temperature of the office, t °C, was recorded m minutes after 7.00 a.m. The results are shown in the table below.

m	0	10	20	30	40	50
t	6.0	8.9	11.8	13.5	15.3	16.1

(*a*) Calculate the exact values of S_{mt} and S_{mm}.

(4)

(*b*) Calculate the equation of the regression line of t on m in the form $t = a + bm$.

(3)

(*c*) Use your equation to estimate the value of t at 7.35 a.m.

(2)

(*d*) State, giving a reason, whether or not you would use the regression equation in (*b*) to estimate the temperature

(i) at 9.00 a.m. that day,

(ii) at 7.15 a.m. one month later.

(4)

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2. The random variable X is normally distributed with mean μ and variance σ^2.

(*a*) Write down 3 properties of the distribution of X.

(3)

Given that $\mu = 27$ and $\sigma = 10$

(*b*) find $P(26 < X < 28)$.

(4)

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3. A discrete random variable X has the probability function shown in the table below.

x	0	1	2	3
$\mathrm{P}(X = x)$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{12}$	$\frac{1}{12}$

Find

(*a*) $\mathrm{P}(1 < X \leq 3)$,

(2)

(*b*) $\mathrm{F}(2.6)$,

(1)

(*c*) $\mathrm{E}(X)$,

(2)

(*d*) $\mathrm{E}(2X - 3)$,

(2)

(*e*) $\mathrm{Var}(X)$

(3)

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4. The events A and B are such that $\mathrm{P}(A) = \frac{2}{5}$, $\mathrm{P}(B) = \frac{1}{2}$ and $\mathrm{P}(A \mid B') = \frac{4}{5}$.

(*a*) Find

(i) $\mathrm{P}(A \cap B')$,

(ii) $\mathrm{P}(A \cap B)$,

(iii) $\mathrm{P}(A \cup B)$,

(iv) $\mathrm{P}(A \mid B)$.

(7)

(*b*) State, with a reason, whether or not A and B are

(i) mutually exclusive,

(2)

(ii) independent.

(2)

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5. The values of daily sales, to the nearest £, taken at a newsagents last year are summarised in the table below.

Sales	Number of days
1 – 200	166
201 – 400	100
401 – 700	59
701 – 1000	30
1001 – 1500	5

(*a*) Draw a histogram to represent these data.
(5)

(*b*) Use interpolation to estimate the median and inter-quartile range of daily sales.
(5)

(*c*) Estimate the mean and the standard deviation of these data.
(6)

The newsagent wants to compare last year's sales with other years.

(*d*) State whether the newsagent should use the median and the inter-quartile range or the mean and the standard deviation to compare daily sales. Give a reason for your answer.
(2)

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6. One of the objectives of a computer game is to collect keys. There are three stages to the game. The probability of collecting a key at the first stage is $\frac{2}{3}$, at the second stage is $\frac{1}{2}$, and at the third stage is $\frac{1}{4}$.

(*a*) Draw a tree diagram to represent the 3 stages of the game.
(4)

(*b*) Find the probability of collecting all 3 keys.
(2)

(*c*) Find the probability of collecting exactly one key in a game.
(5)

(*d*) Calculate the probability that keys are not collected on at least 2 successive stages in a game.
(5)

END