Statistics S1 Advanced Subsidiary

For Edexcel

Paper D

Time: 1 hour 30 minutes

Instructions and Information

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration.

Full marks may be obtained for answers to ALL questions.

The booklet 'Mathematical Formulae and Statistical Tables', available from Edexcel, may be used.

When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Advice to Candidates

You must show sufficient working to make your methods clear to an examiner.
Answers without working may gain no credit.

Published by Elmwood Press
80 Attimore Road
Welwyn Garden City
Herts. AL8 6LP

Tel. 01707 333232

1. (*a*) Explain briefly what you understand by **(2)**

(i) a statistical experiment,

(ii) an event.

(*b*) Give one advantage and one disadvantage of using a statistical model. **(2)**

---

2. A and B are two events such that $P(A) = 0.45$, $P(B) = 0.35$ and $P(A \cap B) = 0.15$.

(*a*) Draw a Venn diagram to represent this information **(3)**

Find

(*b*) $P(A' \cap B)$ **(2)**

(*c*) $P(A \mid B)$ **(3)**

(*d*) State with a reason whether A and B are independent. **(2)**

---

3. Sarah has a bag of 15 sweets of which 4 are toffees, 6 are peppermints and 5 are chocolates. She takes and eats sweets from the bag without looking.

(*a*) Find the probability that Sarah does not pick a chocolate in her first two selections. **(2)**

(*b*) Find the probability that there is at least one peppermint in the first two selections. **(3)**

(*c*) If the first two sweets selected were both peppermints find the probability that the 4th sweet is a toffee. **(3)**

---

4. (*a*) Describe two features of the normal distribution. **(2)**

(*b*) Apples are known to have masses that are normally distributed with a variance of 400 (gram^2). If 10% of the apples have a mass of less than 155 grams, find the mean weight for these apples. **(4)**

(*c*) Find the probability that a randomly chosen apple has a mass between 170 and 190 grams. **(3)**

(*d*) If 4 such apples are selected, find the probability that only one of them has a mass of between 170 and 190 grams. **(3)**

---

5. The table below shows the amount of wine consumption per head per year in Great Britain for five year intervals between 1960 and 2000.

Year y	1960	1965	1970	1975	1980	1985	1990	1995	2000
Litres L	4.8	5.2	6	7	7.2	7	7.4	7.8	8.1

(a) Draw a scatter diagram to illustrate this data. **(3)**

You may assume

$\sum y = 17820, \quad \sum L = 60.5, \quad \sum y^2 = 35285100,$

$\sum L^2 = 417.13$ and $\sum yL = 119909$

(b) Find the product moment correlation coefficient between y and L. **(7)**

(c) Calculate the least squares regression line for L on y in the form $L = a + by$. **(3)**

(d) Draw this regression line on your graph. **(2)**

---

6. The discrete random variable X has probability function

$$\mathrm{f}(x) = \begin{cases} \dfrac{x+2}{k} & x = 2, 3, 4 \\ 0 & \text{otherwise} \end{cases}$$

(a) Show that $k = 15$. **(2)**

Find the value of

(b) (i) $E(X)$,

(ii) $Var(X)$ **(5)**

(c) $E(X + 3)$ **(2)**

(d) $Var(2X - 4)$ **(2)**

(e) $F(3.2)$ **(2)**

---

7. The back to back stem and leaf diagram represents the scores that two local village cricket teams achieved over the course of their seasons each comprising 21 games.

(*a*) Find the median and quartiles for both teams. **(6)**

(*b*) Draw box plots for both on the same scale. **(3)**

(*c*) Comment on any differences and skewness. **(4)**

Southover		Northchurch
8	10	3 5 7
7 1	11	
8 5	12	1 4 4 5
7 6 2	13	2 2 7 8 9
	14	3 8 9
9 4	15	5 6
7 5 1	16	
8 6 2	17	4
	18	2
8 4	19	1
5 3	20	9
0	21	

Key
4|15
= 154 runs

Key
15|6
= 156 runs

TOTAL 75 MARKS