

Statistics S1 Advanced Subsidiary

For Edexcel

Paper K

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.

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1. Give an example of,
- (a) discrete data, (2)
- (b) continuous data. (2)
-

2. A biased coin has a $\frac{2}{3}$ chance of falling heads.
Find the probability that in three tosses of the coin,
- (a) there is exactly one head, (3)
- (b) there is at least one head. (2)
-

3. 100 students were asked how much time they spent on their mobile phones the previous day, to the nearest minute.

Time in minutes	10 – 19	20 – 24	25 – 29	30 – 39	40 – 49	50 – 64	65 – 89
Number of students	9	18	28	25	12	5	3

- (a) Draw a histogram to represent this information. (4)
- (b) Find the number of students that said they used the phone for between 15 and 27 minutes. (2)
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4. Carol owns two hair dressing salons. A summary of the number of clients and takings for the previous Saturday are shown below:

	n	mean	s.d.
Salon A	70	£32.50	£5.50
Salon B	85	£35.00	£4.80

Find the mean and standard deviation for the two combined salons. (8)

5. The lifetime of a certain make of battery is known to be normally distributed. The factory tested a sample of 2000 batteries and found that 5% of them lasted less than 95 hours and 8% lasted more than 140 hours.
- (a) Find the mean and standard deviation for the lifetime of these batteries. (6)
- (b) Find the probability that a battery selected at random will last for more than 125 hours. (3)

A radio requires three of these batteries **all** to be working in order to function.

- (c) Find the probability that the radio will work for longer than 125 hours. (2)
-

6. The stem and leaf diagram shows the distances traveled to work, in miles, by 30 employees at a small office.

Distance	2 3 = 23 miles	Totals
0	3 3 5 5 5 7 7 8 8	(9)
1	1 2 2 2 2 3 4 5 5 6 6 7 7 8	(14)
2	3 6 6 7	(4)
3	5	(1)
4	4	(1)
5	8	(1)

- (a) Find the mode. (1)
- (b) Find the median, upper quartile, lower quartile and IQR. (4)

An outlier is defined as any value that lies more than $1.5 \times \text{IQR}$ above the upper quartile or below the lower quartile.

- (c) Draw a box plot to illustrate this information, identifying any outliers clearly. (5)

The mean of this data is 16.3.

- (d) State the skewness of this distribution and show how the mean, mode and median supports this. (2)

7. A loaded die is such that the probability of throwing a 5 is $\frac{1}{2}$ but all other numbers are equally likely.

- (a) Copy and complete the probability table below. (3)

x	1	2	3	4	5	6
$P(X = x)$					$\frac{1}{2}$	

If this die is rolled three times, find the probability of:

- (b) Scoring 3 or less each time, (3)
- (c) Scoring exactly one five. (3)
- (d) Find $E(X)$ and $Var(X)$. (5)

8. It is thought that the rate at which a car consumes petrol is dependent on the speed at which the car is being driven. The summary of the results for 18 different recordings, between 35 mph and 55 mph, is given below.

x denotes the speed in mph and y the petrol consumption in mpg.

$$\sum_{n=18} x = 758 \quad \sum x^2 = 32600 \quad \sum y = 785 \quad \sum y^2 = 34750 \quad \sum xy = 33420$$

- (a) Find the product moment correlation coefficient between x and y . (7)
- (b) Find the linear regression line in the form $y = a + bt$. (4)
- (c) What would you expect the petrol consumption to be for a car being driven at 40 mph? (2)
- (d) Would it be sensible to use this regression line for all speeds? Explain your answer. (2)

TOTAL 75 MARKS