

Statistics S1 Advanced Subsidiary

For Edexcel

Paper E

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. Alan takes part in three swimming races. The probability of him winning the back stroke is $\frac{2}{3}$, winning the breaststroke is $\frac{2}{5}$ and winning the front crawl is $\frac{1}{4}$.

Find the probability that he wins at least 2 of his three races. (5)

2. At the driving range an amateur golfer is known to be able to hit distances that are normally distributed with a mean of 250 meters and a standard deviation of 40 meters.

Find the probability that he hits a shot,

(a) more than 300 meters, (3)

(b) between 180 and 220 meters. (4)

3. In a trial 400 people were asked if they could tell the difference between two types of cola. The results are shown below.

	Men	Women	Total
Could tell	110	122	232
Couldn't tell	90	78	168
Total	200	200	400

Find the probability that a person selected at random,

(a) is a person that can tell the difference, (2)

(b) is a woman who cannot tell the difference. (2)

(c) Given the person cannot tell the difference, find the probability that it is a man. (3)

4. The following table gives the marks obtained by 10 students for their written examinations and their coursework that together give their final mark.

Exam (e)	75	63	45	82	45	48	77	90	68	55
Coursework (c)	15	14	13	18	12	13	17	19	16	14

Use $\sum e = 648$ $\sum c = 151$ $\sum e^2 = 44350$ $\sum c^2 = 2329$ $\sum ec = 10109$

(a) Find the least squares regression line in the form $c = a + be$. (7)

(b) If a student scored 70 on the written exam, what score would you expect him to get for his coursework? (2)

5. The total number of misprints, X , in a newspaper with 50 pages was recorded one Sunday. The results when summarised showed that

$$\sum x = 260 \quad \sum x^2 = 1852$$

- (a) Calculate the mean and standard deviation for the number of errors per page. (4)

The following Sunday's newspaper was also checked and it was found that the mean was 3.8 errors and the standard deviation was 1.8 errors.

- (b) Find the mean and standard deviation for the number of errors per page for both Sundays together. (6)
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6. The amount of time, to the nearest minute, that 160 drivers were delayed during the rush hour due to road works on a motorway is shown in the table below.

Time t	$0 \leq t < 4$	$5 \leq t < 9$	$10 \leq t < 14$	$15 \leq t < 19$	$20 \leq t < 24$	$25 \leq t < 39$
Frequency	10	15	28	44	39	24

- (a) Using interpolation calculate the median and the 80th percentile. (4)

- (b) Draw a histogram for this data. (4)

- (c) How many drivers were recorded as being delayed for between 12 and 16 minutes? (3)
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7. The discrete random variable X has the following probability distribution.

x	-1	0	1	2	3
$P(X = x)$	0.2	0.2	0.2	0.2	0.2

- (a) Write down the name of this distribution. (1)

- (b) Find $P(0 \leq X < 3)$. (2)

- (c) Find

(i) $E(X)$

- (ii) $Var(X)$ (5)

- (d) Find

(i) $E(5X - 2)$

- (ii) $Var(5X - 2)$ (4)
-

8. A large garage takes a check of the age of 100 used cars, x , that it has for sale on its forecourt.

Age x	1	2	3	4	5	6	7	8	9	10
Number of cars	15	24	17	16	10	7	4	4	2	1

- (a) Find
 - (i) the mode, (1)
 - (ii) the median and quartiles, (5)
 - (iii) the mean. (3)
- (b) Draw a box plot to represent this data. (3)
- (c) The garage owner said, 'The distribution is positively skewed'. Use the values you have calculated to support this statement. (2)

TOTAL 75 MARKS