

Statistics S1 Advanced Subsidiary

For Edexcel

Paper A

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. The discrete random variable X has the probability distribution specified below.

x	-2	-1	0	1	2
$P(X = x)$	0.1	0.2	0.3	d	0.1

Find

- (a) the value of d (1)
 - (b) $P(-1 \leq X < 2)$ (2)
 - (c) $E(X)$ (2)
 - (d) $E(3X + 2)$ (2)
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2. A police radar gun records the speeds of passing cars along a road.

Speed mph, s	24 – 28	28 – 32	32 – 36	36 – 40	40 – 44	44 – 48
Number of cars	2	8	42	30	18	6

By using the coding $t = \frac{s - 34}{4}$ calculate

- (a) the mean of t (2)
 - (b) standard deviation of t (3)
 - (c) Hence find the mean and standard deviation of these speeds. (4)
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3. (a) Explain what you understand by the terms exclusive and exhaustive when referring to events. (2)

Events A and B are exclusive and A , B and C are exhaustive.
 $P(A) = 0.3$, $P(C) = 0.5$, $P(A \cap C) = 0.1$ and $P(B \cap C) = 0.15$.

(b) Draw a Venn diagram to illustrate this information. (4)

Hence find

- (c) $P(B)$. (2)
 - (d) $P(B \cup C)$. (2)
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4. Over a period of time Jack has calculated that his journey to school is distributed approximately normally with a mean of 30 min and a standard deviation of 3.5 min. Find the probability that on a given morning his journey takes:
- (a) less than 28 minutes. (4)
- (b) more than 33 minutes. (3)
- (c) If he is due in school by 8.45 am, find the latest time at which he can leave home and be 95% sure of not being late. (3)
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5. Thirty married couples at a wedding reception were asked how many years they had been married with the following results

12	5	21	10	18	13	22	16	30	9
15	52	16	10	2	5	14	11	32	4
1	7	5	6	11	3	15	12	8	5

- (a) Draw a stem and leaf diagram to represent this information (3)
- (b) What is the modal value? (1)
- (c) Find the median and upper and lower quartiles. (6)
- (d) Describe the skewness of this distribution (1)
- (e) Given that the mean of these figures is 13 years show how the mean, mode and median can reinforce your answer to part (d). (1)
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6. In a clothing factory three women are all producing the same type of shirts. Ann produces 30% of the output Barbara 45% and Carol 25%. Of the shirts produced it is found that the percentage that are faulty are 6% for Ann, 5% for Barbara and 4% for Carol.

- (a) Draw a tree diagram to represent this information. (4)
- Find the probability that
- (b) A randomly selected shirt is found to be faulty. (3)
- (c) Given that the shirt is faulty find the probability that it was produced by Barbara. (2)
- (d) Given that the shirt is NOT faulty find the probability that it was produced by either Ann or Carol. (3)
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7. The yield from a tomato crop was compared to the amount of fertiliser that was used.

Fertilizer, f (ml)	20	40	60	80	100	120	140	160
Yield of crop, y	128	136	148	159	170	175	172	160

- (a) Plot the data on a scattergraph (3)
- (b) Find the least squares regression line in the form $y = a + bf$. (7)
- (c) Draw the regression line on your graph (2)
- (d) Give an interpretation to the values of a and b (2)
- (e) Do you think it is sensible to use the regression line to predict the yield if 200 ml of fertilizer is used? (1)

TOTAL 75 MARKS