

Statistics S1 Advanced Subsidiary

For Edexcel

Paper J

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. A and B are two independent events such that $P(A) = 0.25$ and $P(B) = 0.4$.

Evaluate the following probabilities

- (a) $P(A|B)$ (2)
- (b) $P(A \cap B)$ (2)
- (c) $P(A \cup B)$. (2)
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2. Andrew goes to work each day either by bus or by car. If he takes the car one day, the probability that he takes the car the next day as well is 0.3. If he takes the bus one day, the probability that he takes the bus the following day is 0.6.

He takes the bus on Monday.

Find the probability that

- (a) he takes the car on Wednesday, (3)
- (b) he takes the bus on Wednesday. (3)
-

3. In a game of Monopoly you need to throw a six on a dice to 'Get out of jail'. Find the probability that Mark

- (a) does not manage to throw a six until his fourth attempt, (3)
- (b) throws a six by his third attempt. (4)
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4. The following stem and leaf diagram shows the number of minutes late that a train arrives at its destination over a period of 40 days.

0	1 2 2 3 4 4
0	5 5 6 6 6 7 8 9
1	0 2 2 4 4 4
1	5 5 6 6 7 7 8
2	0 1 2 3 3
2	4 4 6 9
3	1 1 3
3	6

Key 2|4 = 24 minutes

- (a) Find the median and quartiles of these times. (3)
- (b) Draw a box plot to represent this information. (3)
- (c) Comment on the skewness of this distribution. (2)
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5. Jeremy has a novel way of giving his young son pocket money. Every Friday he asks the boy to toss two one pound coins and a 50p coin. Every coin that comes down heads the boy gets to keep.
- (a) Draw up a table to show all the possible amounts that the boy could obtain and their corresponding probabilities. (5)
- (b) Find $E(X)$ (2)
- (c) Over the course of a year (52 weeks) how much pocket money could the boy expect to receive? (2)
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6. Summarised below are the values of 200 properties (in £1000's) sold by an estate agent over a period of a year.

Value (£1000's)	0–	100–	150–	200–	250–	400–	600–
Number of houses	12	46	66	35	22	15	4

- (a) Using interpolation estimate the median and interquartile range. (7)
- (b) Why might the median and interquartile range be more appropriate than the mean and standard deviation in this case? (2)
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7. It is known that the breaking point of certain chains has a normal distribution with a mean of 70 kg and a standard deviation of 7 kg.

- (a) Explain why the Normal distribution is an appropriate model for measuring the breaking point of the chains that are used in a company. (2)
- (b) Find the probability that a chain will **not** break under a mass of 75 kg. (3)
- (c) If a company wants to be 95% certain that a chain will not break, what is the maximum load that they should allow to be put upon it? (5)
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8. The response time, in minutes, for a vehicle breakdown service to arrive for 200 different call outs is given in the table below.

Response time in minutes	–20	–40	–60	–90	–120	–180
Frequency	18	32	48	54	33	15

- (a) Draw a histogram to illustrate this data. (4)
- (b) Find the mean and the standard deviation. (4)
- (c) Do you consider the mean to be a good approximation for the average? Justify your answer. (2)
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9. The table below shows the heights of 10 fathers and their 8 year old sons.

Father's height in cm, f	178	183	175	180	192	194	188	179	181	185
Son's height in cm, s	122	125	120	129	128	136	130	123	124	126

You may use the fact that

$$\sum f = 1835 \quad \sum s = 1263 \quad \sum f^2 = 337069 \quad \sum s^2 = 159711 \quad \sum fs = 231982$$

- (a) Draw a scatter diagram for this data. (3)
- (b) Calculate the product moment correlation coefficient between f and s . (6)
- (c) Comment on what this value shows. (1)

TOTAL 75 MARKS