

SECTION A: STATISTICS

Answer ALL questions. Write your answers in the spaces provided.

1. A company is introducing a job evaluation scheme. Points (x) will be awarded to each job based on the qualifications and skills needed and the level of responsibility. Pay (£ y) will then be allocated to each job according to the number of points awarded.

Before the scheme is introduced, a random sample of 8 employees was taken and the linear regression equation of pay on points was $y = 4.5x - 47$

- (a) Describe the correlation between points and pay.

(1)

- (b) Give an interpretation of the gradient of this regression line.

(1)

- (c) Explain why this model might not be appropriate for all jobs in the company.

(1)



Question 1 continued

(Total for Question 1 is 3 marks)



2. A factory buys 10% of its components from supplier A , 30% from supplier B and the rest from supplier C . It is known that 6% of the components it buys are faulty.

Of the components bought from supplier A , 9% are faulty and of the components bought from supplier B , 3% are faulty.

- (a) Find the percentage of components bought from supplier C that are faulty.

(3)

A component is selected at random.

- (b) Explain why the event “the component was bought from supplier B” is not statistically independent from the event “the component is faulty”.

(1)



Question 2 continued

(Total for Question 2 is 4 marks)



3. Naasir is playing a game with two friends. The game is designed to be a game of chance so that the probability of Naasir winning each game is $\frac{1}{3}$. Naasir and his friends play the game 15 times.

(a) Find the probability that Naasir wins

- (i) exactly 2 games,
 - (ii) more than 5 games.

(3)

Naasir claims he has a method to help him win more than $\frac{1}{3}$ of the games. To test this claim, the three of them played the game again 32 times and Naasir won 16 of these games.

(b) Stating your hypotheses clearly, test Naasir's claim at the 5% level of significance.

() $\cup y$ $\cup y_1$ $\cup y_2$ $\cup \dots$ \cup

(4)



Question 3 continued



Question 3 continued

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Question 3 continued

(Total for Question 3 is 7 marks)



4. Helen is studying the daily mean wind speed for Camborne using the large data set from 1987. The data for one month are summarised in Table 1 below.

Windspeed	n/a	6	7	8	9	11	12	13	14	16
Frequency	13	2	3	2	2	3	1	2	1	2

Table 1

- (a) Calculate the mean for these data. (1)
- (b) Calculate the standard deviation for these data and state the units. (2)

The means and standard deviations of the daily mean wind speed for the other months from the large data set for Camborne in 1987 are given in Table 2 below. The data are not in month order.

Month	A	B	C	D	E
Mean	7.58	8.26	8.57	8.57	11.57
Standard Deviation	2.93	3.89	3.46	3.87	4.64

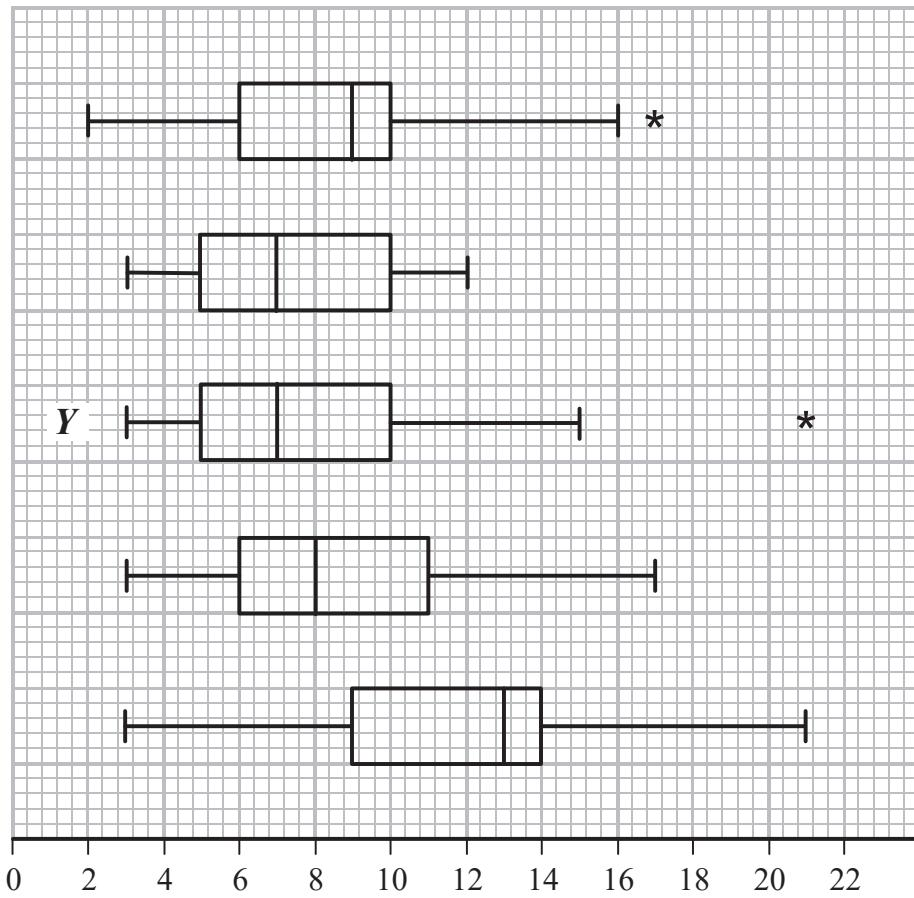
Table 2

- (c) Using your knowledge of the large data set, suggest, giving a reason, which month had a mean of 11.57 (2)

The data for these months are summarised in the box plots on the opposite page. They are not in month order or the same order as in Table 2.

- (d) (i) State the meaning of the * symbol on some of the box plots.
(ii) Suggest, giving your reasons, which of the months in Table 2 is most likely to be summarised in the box plot marked Y. (3)



Question 4 continued

(Total for Question 4 is 8 marks)



5. A biased spinner can only land on one of the numbers 1, 2, 3 or 4. The random variable X represents the number that the spinner lands on after a single spin and $P(X = r) = P(X = r + 2)$ for $r = 1, 2$

Given that $P(X = 2) = 0.35$

- (a) find the complete probability distribution of X .

(2)

Ambroh spins the spinner 60 times.

- (b) Find the probability that more than half of the spins land on the number 4

Give your answer to 3 significant figures.

(3)

The random variable $Y = \frac{12}{X}$

- (c) Find $P(Y - X \leqslant 4)$

(3)



Question 5 continued



Question 5 continued

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Question 5 continued

(Total for Question 5 is 8 marks)

TOTAL FOR SECTION A IS 30 MARKS

