





3. A large company is analysing how much money it spends on paper in its offices every year. The number of employees, x , and the amount of money spent on paper, p (£ hundreds), in 8 randomly selected offices are given in the table below.

x	8	9	12	14	7	3	16	19
p (£ hundreds)	40.5	36.1	30.4	39.4	32.6	31.1	43.4	45.7

(You may use $\sum x^2 = 1160$ $\sum p = 299.2$ $\sum p^2 = 11\,422$ $\sum xp = 3449.5$)

- (a) Show that $S_{pp} = 231.92$ and find the value of S_{xx} and the value of S_{xp} (5)

- (b) Calculate the product moment correlation coefficient between x and p . (2)

The equation of the regression line of p on x is given in the form $p = a + bx$.

- (c) Show that, to 3 significant figures, $b = 0.824$ and find the value of a . (4)

- (d) Estimate the amount of money spent on paper in an office with 10 employees. (2)

- (e) Explain the effect each additional employee has on the amount of money spent on paper. (1)

Later the company realised it had made a mistake in adding up its costs, p . The true costs were actually half of the values recorded. The product moment correlation coefficient and the equation of the linear regression line are recalculated using this information.

- (f) Write down the new value of
- (i) the product moment correlation coefficient,
- (ii) the gradient of the regression line. (2)







This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

1

(Total 9 marks)



Waiting time (in minutes)	Frequency
2–4	15
5–6	9
7	6
8	24
9–10	14
11–15	12

- (e) Describe the skewness of these data, giving a reason for your answer. (2)

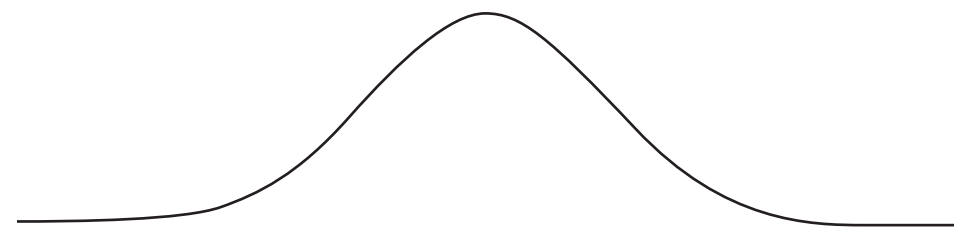


(2)

(1)

(7)

(3)

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7. In a large company,

78% of employees are car owners,
30% of these car owners are also bike owners,
85% of those who are not car owners are bike owners.

(a) Draw a tree diagram to represent this information.

(3)

An employee is selected at random.

(b) Find the probability that the employee is a car owner or a bike owner but not both.

(2)

Another employee is selected at random.

Given that this employee is a bike owner,

(c) find the probability that the employee is a car owner.

(3)

Two employees are selected at random.

(d) Find the probability that only one of them is a bike owner.

(3)



Question 7 continued

(Total 11 marks)

Q7

TOTAL FOR PAPER: 75 MARKS

END

