

Name:

Total Marks:

A level Applied Mathematics Paper 3A Statistics



Practice Paper 2

Time: 60 mins

Information for Candidates

- This practice paper follows the Edexcel GCE A Level Specifications
- There are 6 questions in this question paper
- The total mark for this paper is 49.
- The marks for **each** question are shown in brackets.
- Full marks may be obtained for answers to ALL questions

Advice to candidates:

- You must ensure that your answers to parts of questions are clearly labelled.
- You must show sufficient working to make your methods clear to the Examiner
- Answers without working may not gain full credit

Question 1

The table shows the time, to the nearest minute, spent waiting for a taxi by each of 80 people one Sunday afternoon.

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

(a) Write down the upper class boundary for the 2–4 minute interval. (1)

A histogram is drawn to represent these data. The height of the tallest bar is 6 cm.

(b) Calculate the height of the second tallest bar. (3)

(c) Estimate the number of people with a waiting time between 3.5 minutes and 7 minutes. (2)

(d) Use linear interpolation to estimate the median, the lower quartile and the upper quartile of the waiting times. (4)

(Total 10 marks)

Question 2

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)

(Total 11 marks)

Question 3

A and B are two events such that

$$P(B) = \frac{1}{2} \quad P(A | B) = \frac{2}{5} \quad P(A \cup B) = \frac{13}{20}$$

(a) Find $P(A \cap B)$. (2)

(b) Draw a Venn diagram to show the events A , B and all the associated probabilities. (3)

Find

(c) $P(A)$ (1)

(d) $P(B | A)$ (2)

(e) $P(A' \cap B)$ (1)

(Total 9 marks)

Question 4

Before Roger will use a tennis ball he checks it using a "bounce" test. The probability that a ball from Roger's usual supplier fails the bounce test is 0.2. A new supplier claims that the probability of one of their balls failing the bounce test is less than 0.2. Roger checks a random sample of 40 balls from the new supplier and finds that 3 balls fail the bounce test.

Stating your hypotheses clearly, use a 5% level of significance to test the new supplier's claim. (5)

(Total 5 marks)

Question 5

The number of atoms of a radioactive substance, n , is measured at various times, t , minutes after the start of an experiment. The table below shows the data

t	3.9	5.5	6.8	8.5	10.6	11.5	13.3	14.7	16.5	17.8
n	10.1	13.1	14.6	20.7	27.9	31.5	40	49.9	64.7	75.6

The data is coded using the changes of variable $x = t$ and $y = \log_{10} n$.

- (a) Calculate the product moment correlation coefficient for the coded data. (1)
- (b) With reference to your answer to part **a**, comment on the suitability of a linear regression model for these data (2)

The regression line of y on x is found to be $y = 0.7606 + 0.0635x$.

Given that the data can be modelled by an equation of the form $n = ab^t$ where a and b are constants, find the values of a and b . (3)

- (d) Give an interpretation of the constant a in this equation. (1)
- (e) Explain why this model is not reliable for estimating the number of atoms after 24 hours. (1)

(Total 8 marks)

Question 6

- (a) State what is measured by the product moment correlation coefficient **(1)**

The table below shows the marks attained by 12 students in English and Mathematics tests

<i>English, e</i>	5	9	7	11	20	4	6	17	12	10	15	16
<i>Maths, m</i>	6	8	9	13	20	9	8	17	14	8	17	18

- (b) Find the product moment correlation coefficient for these data, correct to 3 significant figures **(1)**

A teacher claims that students who do well in their English test also tend to do well in their practical test.

- (c) Test this claim at a 0.05 significance level, stating your hypotheses clearly **(3)**
- (d) Give an interpretation of the value 0.05 in your hypotheses test **(1)**

(Total 6 marks)

TOTAL FOR PAPER IS 49 MARKS
