

Pure Maths With Stats

0770

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

JUNE 2020

ADVANCED LEVEL

Subject Title	Pure Mathematics With Statistics
Paper No.	Paper 3
Subject Code No.	0770

GCE REVISION

Three hours

Full marks may be obtained for answers to ALL questions.

Mathematical formulae and tables produced by the GCE Board are allowed.

In calculations, you are advised to show all the steps in your working, giving the answer at each stage.

Electronic calculators are allowed

Start each question on a fresh page.

<http://www.gcerevision.com>

Turn Over

1. Two events A and B are such that $P(A) = \frac{1}{3}$, $P(B) = \frac{2}{9}$ and $P(A/B) = \frac{1}{2}$.

Find

- (a) $P(A \cap B)$,
- (b) $P(A \cup B)$,
- (c) $P(B/A')$.

State, with reasons, whether A and B are

- (d) mutually exclusive,
- (e) independent,
- (f) collectively exhaustive.

(2, 2, 3, 2, 2, 2 marks)

2. Some express bus services occasionally experience delays in their departure or arrival time. Over a period of twelve weeks, the delays, in minutes for a particular bus service were recorded in a grouped frequency distribution shown below.

Delays in minutes	0 - 5	6 - 11	12 - 17	18 - 23	24 - 29	30 - 35	36 - 41
Frequency	9	16	16	18	5	5	1

Compute, to one decimal place the

- (a) mean,
- (b) variance,
- (c) standard deviation,
- (d) mode of this distribution.

(4, 5, 4 marks)

3. The mean number of goals scored per match by a certain football team is 1.5.

Calculate, to four decimal places, the probability that the team will score

- (a) no goal in a match,
- (b) not more than three goals in a match,
- (c) less than three goals in two matches.

The team is to play n matches. Find the least value of n if the probability that the team is to score at least one goal is to be more than 0.95.

(3, 2, 8 marks)

4. The masses of oranges from an orchard are normally distributed with mean μ and standard deviation σ . 10% of the oranges from this orchard have masses less than 25 grammes and 5% have masses greater than 85 grammes.

Calculate, to 4 decimal places, the values of the mean, the standard deviation and the variance of the masses of oranges.

(13 marks)

5. A discrete random variable X has the following probability distribution.

x	1	3	6	n	12
$P(X = x)$	$\frac{1}{10}$	$\frac{3}{10}$	k	$\frac{1}{4}$	$\frac{3}{20}$

- (a) Find the value of the probability k .

Given that $E(X) = 6$, calculate the

- (b) value of n ,
 (c) variance of X ,
 (d) mean and variance of $5X - 4$.

(2, 3, 4, 4 marks)

6. The probability density function f , of a continuous random variable X , is defined by

$$f(x) = \begin{cases} kx(4 - x^2), & 0 \leq x \leq 3, \\ 0, & \text{elsewhere.} \end{cases}$$

- (a) Show that the value of the constant k is $-\frac{4}{9}$.
 (b) Calculate the mean of X .
 (c) If the upper quartile of the random variable X is q , show that $4q^4 - 32q^2 - 27 = 0$

(5, 5, 3 marks)

7. A shop manager complains that the average mass of chocolate bars of a certain type that he buys from a company is less than 8.5g as stated on each packet. The shop manager randomly selected a sample of 100 chocolate bars from a large delivery and found out that the sample has a mean mass of 8.36g and a variance of 0.5185g.

- (a) Calculate, to four decimal places, an estimate of the variance of the masses of the chocolate bars.
 (b) By stating clearly, the null and alternative hypotheses, test the manager's claim at the 5% level of significance.

(3, 10 marks)

8. The time, x , in minutes spent by some 10 students to prepare for a test and the marks, y , which they scored are shown in the table below.

Time, x	4	8	22	30	44	56	70	80	85	88
Marks, y	20	27	33	40	45	50	53	58	65	70

Given that $\sum x^2 = 32805$, $\sum y^2 = 23641$ and $\sum xy = 27037$,

- (a) calculate, to 4 decimal places, the product moment correlation coefficient for these data and briefly explain what information your answer gives you about the relationship between x and y .
 (b) find the equation of the regression line of y on x in the form $y = a + bx$, where a and b are constants.
 (c) A student who spent 50 minutes preparing for the test could not write because of ill health. Estimate the marks that this student would have scored if she wrote the test.

(9, 2, 2 marks)