

PURE MATHS WITH STATISTICS 3  
0770

BAMENDA ARCHDIOCESAN EXAMINATION BOARD (BAEBOC)  
MOCK G.C.E. EXAMINATION

MARCH 2026

ADVANCED LEVEL

|               |                            |
|---------------|----------------------------|
| Subject Title | PURE MATHS WITH STATISTICS |
| Paper Number  | PAPER 3                    |
| Subject Code  | 0770                       |

Duration: THREE HOURS

Full marks may be obtained for answers to ALL questions. All questions carry equal marks.

Mathematical formulae booklets published by the Board are allowed.

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

*Calculators are allowed.*

Start each question on a fresh page.

TURN OVER

1. i) Two events A and B are such that  $P(A) = 0.2$ ,  $P(A \cap B) = 0.22$  and  $P(A \cup B) = 0.18$ . Evaluate
- $P(A \cap B)$  (3marks)
  - $P(B)$  (2marks)
  - $P(A|B)$  (3marks)
- ii) In a transport agency, 60% of their buses are Mercedes and the rest are Hinos. 30% of the Mercedes buses are VIP's. *and 40% of the Hino's buses are VIP's.* Find the probability that a bus leaving that agency on a particular day.
- is a VIP bus (3marks)
  - is a Mercedes given that the bus is a VIP (3marks)

2. In an agricultural experiment the gain in mass, in kilograms of 100 pigs during a certain period were recorded as follows

| Gain mass(kg) | 5 - 9 | 10 - 14 | 15 - 19 | 20 - 24 | 25 - 29 | 30 - 34 |
|---------------|-------|---------|---------|---------|---------|---------|
| Frequency     | 2     | 29      | 37      | 16      | 14      | 2       |

- Calculate the mode, mean and standard deviation of the masses. (3,3,3marks)
  - Draw a cumulative frequency curve and from it estimate the interquartile range (4marks)
3. A discrete random variable X can take only the values 0, 1, 2, or 3 and the various probabilities are  $p(x=0) = b$ ,  $p(x=1) = 3b$ ,  $p(x=2) = 4b$ ,  $p(x=3) = 5b$  where b is a constant. Find
- the value of b (3marks)
  - the mean and variance of X (3,2marks)
  - the mean and variance of Y given that  $Y = 3X - 2$  (4marks)

4. i) During a weekday, heavy Lorries pass through a check point independently and at random. The Lorries pass at an average rate of 2 per 30 minutes. Find the probability that
- there will be no lorry passing through the check point in a given 30 minutes period (2marks)
  - at least three lorries will pass through the check point in a given hour (4marks)
- ii) In a basketball game the probability of scoring in a single trial is  $\frac{1}{10}$
- find the probability that more than 6 attempts are needed for a player to score the first basket (2marks)
  - What is the smallest value of n if there is to be at least a 90% chance of scoring the first basket on or before the  $n^{\text{th}}$  attempt? (4marks)

5. The continuous random variable X has probability density function  $f(x)$ , where

$$f(x) = \begin{cases} k, & 0 \leq x \leq 1 \\ k(2x-3), & 1 \leq x \leq 3 \\ 0, & \text{otherwise} \end{cases}$$

Find

- the value of the constant k (3marks)
- the mean and variance of x (3,4marks)
- If m is the median of X show that  $2m^2 - 6m + 3 = 0$  (3marks)

6. A coin is biased so that the probability of a Heads is 3 times the probability of a tail. The coin is tossed 100 times. Find the mean and variance of this binomial distribution if X is the number of tails. Using the normal distribution as an approximation to the binomial distribution. Find the probability that there will be
- 68 tails or less (3marks)
  - between 67 and 71 tails inclusive (4marks)
  - between 72 and 85 heads exclusive (3marks)

7. The following two samples are drawn from a population with mean  $\mu$  and variance  $\sigma^2$

Sample 1:  $n_1 = 15$ ,  $\Sigma x = 35.9$ ,  $\Sigma (x - \bar{x})^2 = 0.269$

Sample 2:  $n_2 = 20$ ,  $\Sigma x = 47.8$ ,  $\Sigma (x - \bar{x})^2 = 0.638$

- Find, to 2 decimal places, the unbiased estimates for  $\mu$  and  $\sigma^2$  from the population mean and variance from the pooled sample. (5marks)
- Using sample 1 only find the 96% confidence interval for  $\mu$ . (3marks)
- The manager of a certain company claims that the distances travelled by the company sales vans are normally distributed with mean 460km and standard deviation 27.4. A contractor selected a random sample of 120 of these distances travelled by the vans and found that the mean distance travelled was 454.5km. Test at the 5% level of significance whether the mean distance travelled by the vans has changed. (5marks)

8. The marks scored by 8 students in a mathematics and English tests are shown below

|         |    |    |    |    |    |    |    |   |
|---------|----|----|----|----|----|----|----|---|
| Maths   | 45 | 33 | 27 | 23 | 18 | 14 | 8  | 0 |
| English | 31 | 33 | 18 | 20 | 19 | 9  | 13 | 1 |

Calculate

- the product moment correlation coefficient for the data. (8marks)
- the least square regression line of maths on English. (2marks)
- the Kendall's coefficient of rank correlation. (3marks)