



AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF PUBLIC HEALTH
DEPARTMENT OF COMMUNITY HEALTH
DIPLOMA IN COMMUNITY HEALTH PRACTICE
END OF SEMESTER EXAMINATION AUGUST 2026

UNIT CODE: DCHP 119 **UNIT NAME:** BASIC MATHEMATICS (SUPPLEMENTARY PAPER)

DATE: **AUGUST 2026**

TIME: **Two Hours**

Start:

Finish

INSTRUCTIONS

1. This exam is marked out of 60 marks
2. This Examination comprises TWO Sections
 Section A: Compulsory Question (20 marks)
 Section B: Long Answer Questions (40 marks)

SECTION A: COMPULSORY (Answer all Questions in this Section) **(20 Marks)**

Question One

Solve the equations

$$X + 3y = 13$$

$$X^2 + 3y^2 = 43 \quad (3\text{mks})$$

Question Two

Find the value of x given that $\log(15 - 5x) - 1 = \log(3x - 2)$ (3mks)

Question Three

AMREF University volleyball team contains 3 women and 9 men. A selection of two players is required to represent the others in a competition.

- (a) Draw a tree diagram to show all the possible outcomes (2mks)
- (b) Determine the probability that the players selected are of different sex. (3mks)

Question Four

Three community health officers working 8 hrs. per day can complete a project task in 5 days. Each officer is paid ksh.40 per hour. Calculate the cost of hiring 5 workers if they work for 6 hours per day to complete the same project task. (3mks)

Question Five

Two types of flour X and Y costs Ksh.60 and Ksh.72 per kg respectively. The two types are mixed such that the cost of a kg of the mixture is ksh.70. Calculate the ratio of the mixture. (4mks)

Question Six

Find the inverse of the matrix $A \begin{bmatrix} 5 & 6 \\ 7 & 9 \end{bmatrix}$ (2mks)

SECTION B

ANSWER ANY TWO QUESTIONS IN THIS SECTION.

Question Six

During a community health field study, the following data was collected from a household in a slum.

A parent has two children whose age difference is 5 years. Twice the sum of the ages of the two children is equal to the age of their parent.

- (a) Taking x to be the age of the elder child, write the expression for:
 - (i) The age of the younger child (2mks)
 - (ii) The age of the parent (2mks)
- (b) In twenty years' time, the product of the children's ages will be 15 times the age of their parent.
 - (i) Form an equation in x and hence determine the present possible age of the elder child. (3mks)

- (ii) Find the possible age of the parent (3mks)
(iii) Determine the possible age of the younger child in 20 years' time. (3mks)

(c) The average speed of a pick-up was 20km/hr faster than the average speed of a lorry. The pick-up took 45 minutes less than the lorry to cover a distance of 180Km.

- (i) Determine the speed of the lorry and that of the pick-up. (4mks)
(ii) The distance between towns A and B is 240km. On a certain day, the pick-up started from town A at 8:30am and the lorry started from B at the same time. Determine the time that the lorry and the pick-up met. (3mks)

Question Seven

A tank has two inlet taps A and B and one outlet tap C. When empty, the tank can be filled by tap A alone in 4.5 hours or by tap B alone in 3hours. When full, the tank can be emptied by tap C in 2 hours.

- (a) The tank is initially empty. Find how long it would take to fill up the tank:
(i) If tap C is closed and taps A and B are opened at the same time (3mks)
(iii) If all the three taps are opened at the same time (3mks)
(b) The tank is initially empty and the three taps are opened as follows: A at 8:00 am and B at 8:45am and C at 9:00am.
(i) Find the fraction of the tank that would be filled by 9:00am (4mks)
(ii) Find the time the tank would be fully filled up (4mks)

(c) Using matrix method to solve the value of x and y in the following equations.

$$5x + 3y = 35$$

$$3x - 4y = -8 \quad (6mks)$$

Question Eight

AMREF SACCO is medium sized financial institution with a total of 200 active customers. The Sacco operates three different types of accounts namely; Current account, Savings account and Fixed deposit account. Further information from the bank indicates that:

- 84 customers operate savings accounts.
- 109 customers operate current accounts.

- 106 customers operate fixed deposit accounts.
- 45 customers operate both savings and current accounts.
- 36 customers operate both savings and fixed deposit accounts
- 43 customers operate both fixed deposit and current accounts.

Required:

- (a) Present above information in a Venn diagram (4mks)
- (b) The number of customers operating all the three accounts (4mks)
- (c) The number of customers operating both savings and fixed deposit accounts only (4mks)
- (d) The probability that a customer selected at random operates only two accounts (3mks)
- (e) Using illustrations briefly explain the following terms:
- (i) Diagonal matrix (2mks)
- (ii) Identity matrix (2mks)
- (iii) Squire matrix (1mks)

