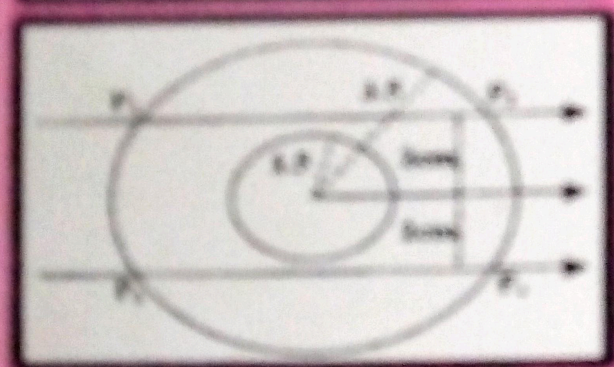
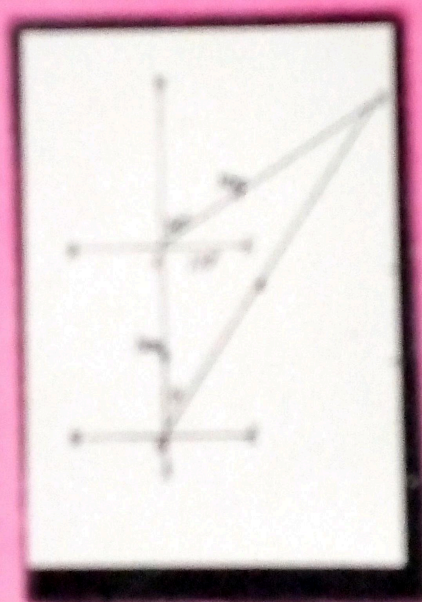
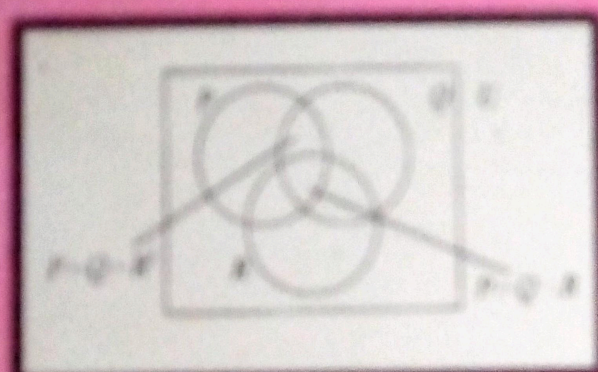


COLLEGE MATHEMATICS SERIES
(VOLUME 1)

FOUNDATION MATHEMATICS:

1



L. N. EZEAKO • U. Y. ABUBAKAR • A. I. ENAGI

Edited by
N. LAKINWANDE, Y. MAIYESIMI

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(VOLUME 1)

A Publication of the Department of Mathematics / Computer Sciences,
Federal University of Technology, P. M. B. 65, Minna, Nigeria.

Foundation Mathematics 1

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FOREWORD

The book titled **Foundation Mathematics : 1**, is Volume 1 in the *College Mathematics Series*. This volume has been prepared primarily for the remedial students in Nigerian universities.

During the course of their lectures with the remedial students at the Federal University of Technology, Minna, the authors discovered that there is a need to close the gap between the secondary school and the university approaches to the teaching of mathematics. While the secondary school approach is teaching, the university approach is essentially the lecture method, thus remedial students and even the fresh intakes into the university, need a sort of re-orientation and initiation into the system. Most of the universities offering remedial programmes admit thousands of students and there is hardly any lecture hall that can accommodate even a thousand students. Many students therefore find it difficult, if not impossible, to gain much from the lectures. Their problem is further compounded by the inadequacy of textbooks in the libraries of these institutions.

It is in this light that the authors decided to come to the aid of these students by preparing this text. This book has been well-written with many examples provided to properly guide the students and make them well-grounded in the relevant topics, thus saving them from the window of vulnerability often resulting in examination malpractices and cultism.

Even though the book has been prepared for remedial students in the universities, it is my candid opinion that it will be of immense value to students preparing for SSCE in Mathematics.

I wish to commend the authors and indeed, all the lecturers in the Department of Mathematics/Computer Science at the Federal University of Technology, Minna for this strategic delivery initiative and sincerely hope that they will come forward with other books in various areas of Mathematics for students in tertiary institutions.

Finally, I wish to enthusiastically recommend the book to the intended users with glee.

Professor K. R. Adeboye.

Former Dean

School of Sciences & Science Education

Federal University of Technology, Minna

PREFACE

Within a period spanning the past decade or even beyond, the dearth of mathematics textbooks at the post-secondary and tertiary education levels - in particular - has agitated the minds of students and teachers alike in this country. The need had arisen to modernize both the contents and methodology of long-existing textbooks in mathematics in order to make them capable of meeting the demands of modern technology as well as making these textbooks more "user friendly".

Believe it or not, the pressures of modern-day living in this part of the world make it quite difficult for most lecturers/teachers to write "comprehensive" textbooks in various subject areas - especially in mathematics.

I strongly believe that the effort of the Department of Mathematics/Computer Science, Federal University of Technology, Minna, in evolving the *College Mathematics Series*, is both worthwhile and commendable.

I have no doubt in my mind that the response of readers to this Volume I in the series would be very encouraging and would stimulate other on-coming components of the *College Mathematics Series*.

Thank you.

L.N. Ezeako

(Senior Lecturer)

Head of Department of Mathematics/Computer Science.

Federal University of Technology, Minna

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DEFINITION

A set is any well-defined collection or class of objects, where each object is a single indivisible entity.

EXAMPLES

- (a) The set of natural numbers between one and ten
 - (i) Implicit form; $A = \{x \mid x \in \mathbb{N} \text{ and } 1 < x < 10\}$
 - (ii) Explicit form; $A = \{2, 3, 4, 5, 6, 7, 8, 9\}$
- (b) The set of military Heads of state of independent Nigeria
 - (i) Implicit form; $H = \{y \mid y \text{ is } \mid \text{ was a military Head of State of independent Nigeria}\}$
 - (ii) Explicit form; $H = \{\text{Ironsí, Gowon, Murtala, Obasanjo, Babangida, Abacha, Abubakar}\}$

11. TYPES OF SETS

A and H above are both finite sets because each of these sets has a finite number of elements, but the set $K = \{2, 4, 6, 8, \dots\}$ which is the set of even natural numbers, is an infinite set. The Empty set or the Null set denoted by \emptyset or $\{\}$ is the set that contains no element.

Given sets A and B

- (i) $A \subseteq B$ if every element in A is an element of B and every element in B is also in A.
- (ii) $A \subset B$ (A is a subset of B)