Building up MATHEMATICS

Secondary Education
Third Year
Literature and Humanities Section



New Curricula



Republic of Lebanon

Ministry of National Education, Youth and Sports



BUILDING UP MATHEMATICS

Secondary Education

Third Year Literature and Humanities Section



General Coordinator **Victor Melhem**

Proof Reader

May Abboud

BUILDING UP MATHEMATICS

Secondary Education

Third Year Literature and Humanities Section

Nazih Mokaddem

this manual is the Literature and Humanities version of the manual of the Sociology and Economics section

Educational Center for Research and Development



■ Documentary Research : Iconographic Team, ECRD

■ Publishing and Distribution :

Educational Company for Printing, Publishing and Distribution S.A.R.L.

Layout : Technical Team, SPC s.a.r.l. **Photographs :** Rita Breidy

Printing: Dar Lubnan

© ECRD 2000, Sin-El-Fil, Lebanon, P.O.Box: 55264
All Rights Reserved for ECRD

First Published 2000

3rd impression2011

The National Textbook Project

By issuing the textbooks for the third year of each educational cycle, the Educational Center for Research and Development will have completed the third and last installment of books called for by the New Curricula. We are placing these books in the hands of students with the great hope that we are moving, step by step, toward the goal of acquiring sound learning, using sophisticated educational means and up-to-date methodology that encourage and reinforce individual thinking and research, acquisition of skills, development of ethical and national attitudes, the feeling of national belonging as well as the feeling of belonging to humanity at large.

The on-going revolution in information, communication and educational-aids technology has undoubtedly limited the role of the textbook and lowered the rank it used so recently to occupy. However, in our society and in many other societies, the textbook remains the basic means of education, and it is our duty to exert our utmost effort and care to come up with the best product as to form and content. Yet we should not lose sight of the fact that the textbook is not sufficient by itself but should rather be used as a stepping stone to access other sources of information. What is important is to keep a clear vision and maintain the right course toward our objective. The means should not turn into the end and the student should always remain the focus of the learning/teaching process.

No one ignores or denies the fact that textbook writing requires very high academic and educational qualifications and very wide field experience. The authors committees undeniably possess such qualities. Yet the textbooks of the last two years contained some negative aspects. Such is the nature of human work, no matter how good the intentions or how great the effort extended. Here constructive criticism constitutes a real contribution to raising the standard of authorship, minimizing errors and filling gaps. We say that, with all due appreciation and respect to all those who have contributed to the success of this project.

The Educational Center for Research and Development is embarking this year on a process of evaluating the New Curricula and related textbooks, teacher training courses and student achievement. This is a natural and necessary step now that the new system has been put into effect. This process aims at identifying the curricular objectives that have been achieved as well as those that have not been achieved, with a view to proceeding with the positive aspects and correcting the negative ones.

As part of this correction process, we plan to review the versions that have been issued in order to secure good textbooks for our students, who always deserve the best.

March 13, 2000

President, Educational Center for Research and Development

Nemer FRAYHA



PREFACE

The idea that Mathematics, Sciences, and Technology have close and protitable connections is widely acknowledged. It is known that economics use the Mathematics at a large scale, and that it was at the origin of what is known currently as Financial Mathematics. For a few decades, the use of Mathematics in the social sciences becomes an increasing extensive curve. These sciences contribute, in their turn, to the development of certain branches of Mathematics, for example, the role played by sociologists in the development of statistics.

Statistics, Probabilities, Financial Mathematics, Analysis, Graphical interpretation, Equations and Logic are the titles of this handbook. These various topics expose the study of Mathematics rigorously, but stressing at the same time the practical and useful aspect of the exposed methods. Our objective is to make the student acquire the mathematical needs so as to continue the studies in various fields, for example, the fields of philosophy, law, history, psychology, communication etc..., and also to practice a number of careers in administration, banks, education, craft industries and other various companies. Our major concern is to present this basic knowledge and to relate it to the daily life problems, hopping that students feel the important role the Mathematics play in the comprehension and analysis of the problems revealed in society, and in making the good decisions to solve these problems.

We have also tried to incorporate in each chapter complete review for the topics treated in former classes; we have proceeded thus to avoid, as much as possible, the use of other handbooks. Part of this review is mentioned in the course, which explains the great emphasis put on this issue, the other part is reviewed in exercises and problems, where the student requires total knowledge of the concerned topic.

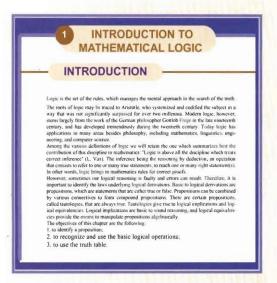
We finally wish we have made the task of the student and the teacher as easy and pleasant as possible.

The authors.

HOW TO USE THIS MANUAL

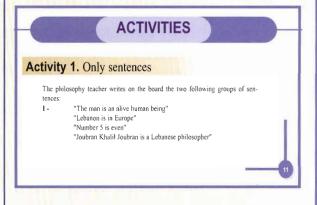
I. Introduction

Gives a general idea of the theme and fixes the objectives.



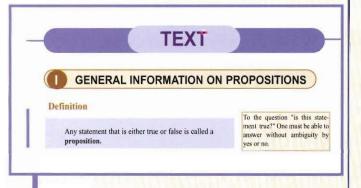
II. Activities

(Introduction to the subject)
Prepare the field to construct new concepts by using pre-known information.



III. Course

(Panoramic idea)
Gathers up definitions and properties and indicates the main uses and applications.



IV. FOCUS

(Notions to remember)
Summarizes the course, indicates the efficient methods and gives useful advice.

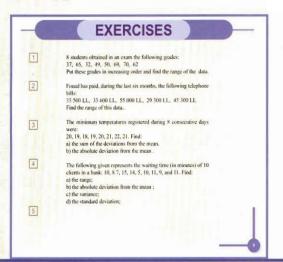


HOW TO USE THIS MANUAL

V. EXERCISES

(Preliminary steps)

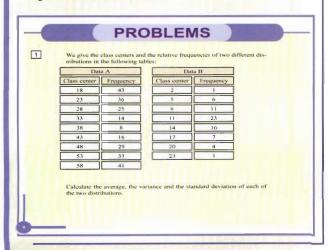
Help to assimilate the results, to master the new techniques and to solve direct application problems.



VII. Problems

(Analysis and syntheses)

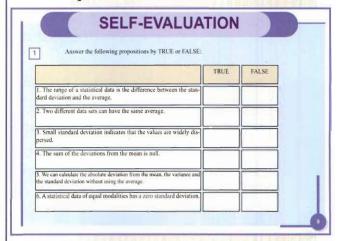
Help to use the new notions simultaneously with the old ones to solve application problems taken from diversified quotidian situations.



VI. Self evaluation

(An applicable test)

Allows the students to control by themselves their learning and their capacities to use the new results and techniques.



VIII. Just for fun

(To go further)

Gives the possibility to think about notions which prolong the course and which are useful and pleasant to know.



TABLE OF CONTENTS

CHAPTER		Trian Constitution of
1	Introduction to mathematical logic	11
2	Binary operations - Groups	29
3	Position measures of a statistical data	39
4	Rational functions	57
5	Situations-problems leading to the solution of equations and inequalities	73
6	Conditional probability	95
7	Dispersion measures of statistical data	109
8	Graphical interpretation	121
9	Exponential functions	141
10	Simple interest - Compound interest - Annuities.	155