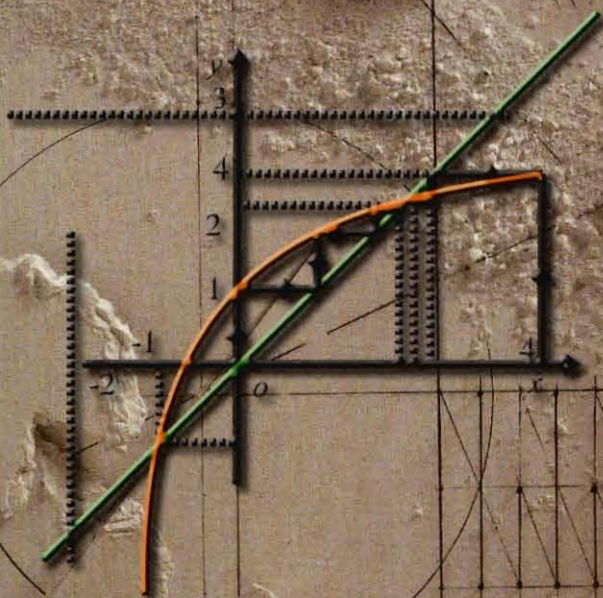


# *Building up* **MATHEMATICS**

## **Algebra and Geometry**

Secondary Education  
Third Year  
General Sciences Section



**SPECIMEN**

Center for Educational Research and Development



National  
Textbook

**New Curricula**

**Republic of Lebanon**

Ministry of National Education, Youth and Sports

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ALGEBRA AND GEOMETRY

**Secondary Education**

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National  
Textbook

**New Curricula**

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# **BUILDING UP MATHEMATICS**

ALGEBRA AND GEOMETRY

**Secondary Education**

Third Year

General Sciences Section

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# 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**



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## PREFACE

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The third year of secondary education is the last year in this stage. The mathematics book for “The General Sciences” consists of two parts: a part that deals with themes related to algebra and geometry, and a part that deals with calculus, probability, and statistics. The authors decided to dedicate a book to each part with the view that this division, although not quite realistic in mathematics, will make the book easier and more practical for the student and teacher to work with.

The two books continue to follow the same pattern as the other books. They were created and edited in compliance with the demands of the new program. Here we find: the scientific content, unambiguously detailed and defined; the targeted objectives, controlled and evaluated; and the explicitly shown method recommended.

Far from being a dry account of facts, this work is a tool that permits and promotes the active participation of learners. We wanted to create an instructive product suitable for an education based on the balanced and well-defined division of labor between three parties: the student - the instructor - the administrator.

The instructor is not only the possessor of knowledge but is more the leader of the class; he/she guides it in its choice of orientations, maintains its interest, promotes research among its members, and helps find results while indicating their applications.

At the heart of the educative system is the student, a person with the right to an education worthy of a free individual, independent and seeking knowledge. It is the student who, without feeling forced to put up with the knowledge he/she must learn, should feel constantly faced with situations that stimulate his/her desire to know more.

- In what concerns new notions (such as logic) that assume that the student has a high level of maturity, the appeal will be to his/her intuition and not to his/her reasoning.
- Pleasant and easy proofs were kept in the text while those that seemed to us complicated and difficult were omitted. Our objective was to introduce the student to reasoning and to prepare him/her to tackle the exercises at the end of the chapter with ease.
- The “Just for Fun” heading closes each chapter of the book. This will be the focus of a weekly session reserved for independent mathematical research with a theme (that the teacher will choose or modify according to the level of the class). Some may think that this approach is “not classical” and so oppose it by naming it a “waste of time.” We reply, however, that the benefits of such research by far compensate for the relative length of time allocated to it.
- This year, a new heading appears in some chapters. It is the heading “Selected Reading.” It presents the student with historical notes and useful comments.

Finally, any remarks, criticisms, or suggestions that colleagues would like to make will be received with attention.

*The authors*



# ALL THE CHAPTERS HAVE THE FOLLOWING STRUCTURE:



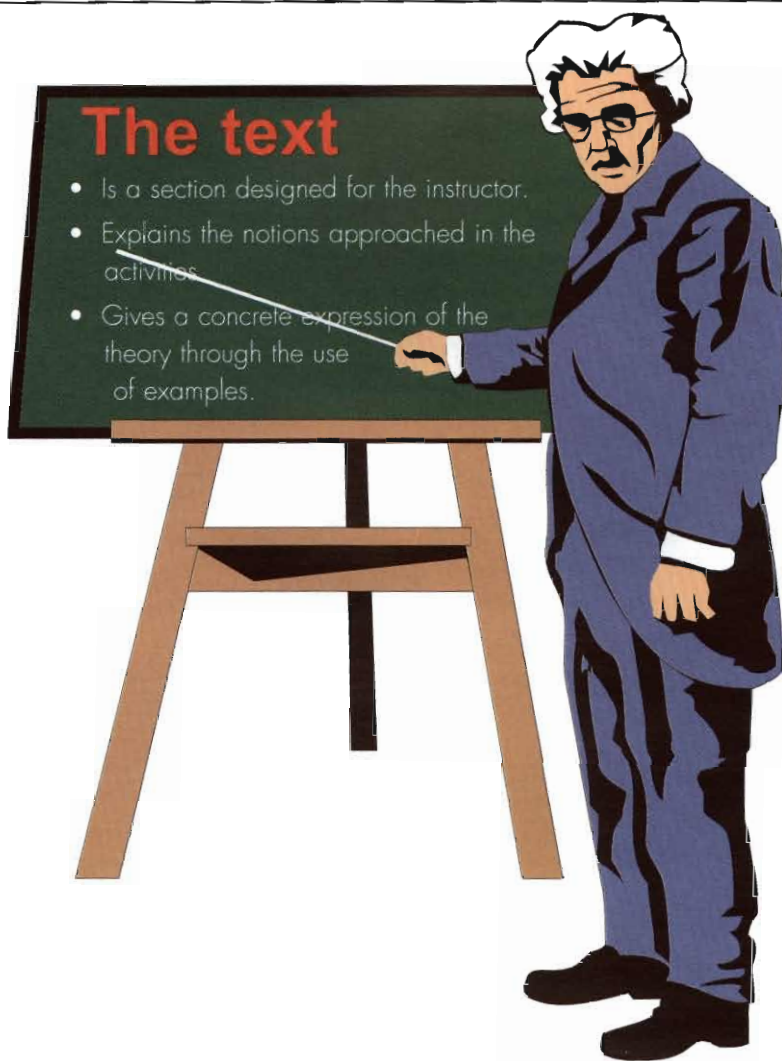
## Introduction:

- Indicates the prerequisites before the student can begin the chapter.
- Explains the importance of learning new concepts or new methods as well as their uses and applications.
- Outlines the objectives to be attained by the end of each chapter.

## Activities

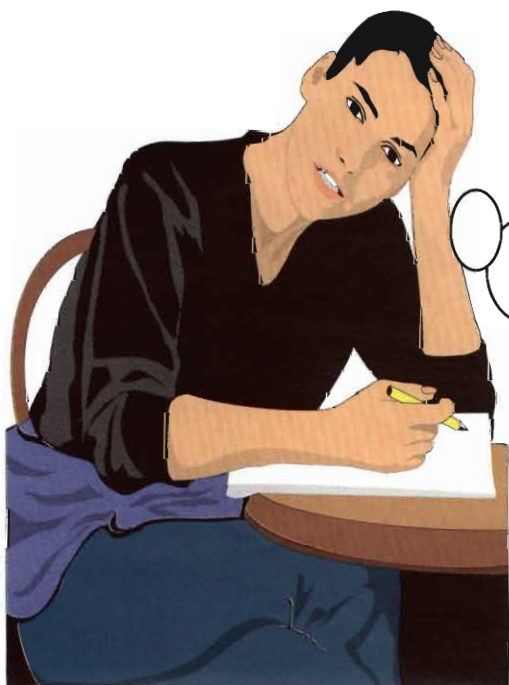
- Form a section designed for the student.
- Either recall the notions that the student insufficiently retains and that are necessary in approaching the new notion, or directly tackle this approach by leading the student to construct, in an appropriate manner, his/her mathematical knowledge.





## The text

- Is a section designed for the instructor.
- Explains the notions approached in the activities.
- Gives a concrete expression of the theory through the use of examples.



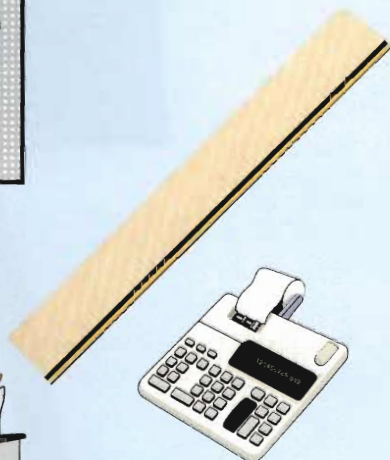
## Focus and Self Evaluation

Consists of two parts completely designed for the student:

- The first recommends a practical method, warns against a proof, or stresses a formula.
- The second gives the student an opportunity to check whether he/she has understood the chapter's main points in a relatively short time.

# Exercises and problems

- The exercises are distributed according to the themes dealt with in the text and are a direct application of the results and methods derived.



## Just for fun

This is a weekly activity led by the instructor and carried out by the students, who are divided into small groups, to promote group work and research.



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