

# building up MATHEMATICS

Secondary  
Education  
Second Year  
Sciences Section



$$\int \sin x \, dx = -\cos x$$

**SPECIMEN**

قلم منصوص عليه

Center for Educational Research and Development



National  
Textbook

New Curriculum

**Republic of Lebanon**

Ministry of National Education, Youth and Sports

■  
**BUILDING UP  
MATHEMATICS**  
■

**Secondary Education**

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Textbook

**New Curricula**



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# **BUILDING UP MATHEMATICS**

**Secondary Education**

Second Year

Sciences Section

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# The National Textbook Project

This is the second installment of textbooks completed by the Center as part of a three-stage effort to produce the 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 and modern learning, using sophisticated educational means and up-to-date methodology that encourage and reinforce individual thinking and research, the acquisition of skills, the 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 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 qualifications and qualities, yet last year's textbooks did contain some faults and gaps which were duly pointed out by researchers in many articles, and, indeed, we have benefited from some of them. Such is the nature of human work, no matter how good the intentions or how great the effort exerted.

Constructive criticism is a real contribution to raising the standard of authorship, minimizing errors and filling gaps. We only hope that criticism will always be objective and motivated by a desire to enhance educational reform in order to achieve better products.

A favorite adage handed down from our old scholars: "He who criticizes you is as helpful as a co-author". Let all criticism directed at the Center be of this caliber.

In closing, we hope that we all will have benefited from our experience and that the textbooks of the third and final stage be closer to realizing our hopes and more beneficial to our students. We are now preparing ourselves to assess the parts so far achieved of the new curricula and to assure that our educational movement is proceeding on the right track for achieving the best results.

June 2, 1999

**President, National Center for Educational  
Research and Development**

**Nemer FRAYHA**



## PREFACE

The "**Building up Mathematics**" collection was 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 complex numbers) 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.

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

*The authors*



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