Contents

Preface ix

1 Toward a Common Research Perspective 1
   Thomas A. Romberg, Thomas P. Carpenter, and Elizabeth Fennema

I CONTENT

2 Graphing in the K-12 Curriculum: The Impact of the 11
   Graphing Calculator
   Frank Demana, Harold L. Schoen, and Bert Waits

3 Seizing the Opportunity to Make Algebra Mathematically and 41
   Pedagogically Interesting
   Michal Yerushalmi and Judah L. Schwartz

4 Aspects of Understanding: On Multiple Perspectives and 69
   Representations of Linear Relations and Connections
   Among Them
   Judit Moschkovich, Alan H. Schoenfeld, and Abraham Arcavi
CONTENTS

II STUDENT THINKING

5 Functions and Graphs—Perspectives on Student Thinking 101
   Sharon Dugdale

III TEACHING THINKING

6 Teachers’ Thinking About Functions: Historical and Research Perspectives 131
   Thomas J. Cooney and Melvin R. Wilson

IV TEACHER KNOWLEDGE

7 Integrating Research on Teachers’ Knowledge of Functions and Their Graphs 159
   F. Alexander Norman

V CLASSROOM INSTRUCTION

8 Functions, Graphing, and Technology: Integrating Research on Learning and Instruction 189
   Carolyn Kieran

VI CURRICULAR IMPLICATIONS

9 Curricular Implications of Graphical Representations of Functions 239
   Randolph A. Philipp, William O. Martin, and Glen W. Richgels
VII REACTIONS

10 The Urgent Need for Proleptic Research in the Representation of Quantitative Relationships 279
   James Kaput

11 Some Common Themes and Uncommon Directions 313
   Steven R. Williams

Author Index 339

Subject Index 345