

Contents

Foreword	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	ix
Preface	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	xi
Acknowledgments	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	xiii
About the Authors	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	xv
Chapter 1: Mathematics Assessment Probes	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	1
What Types of Understandings and Misunderstandings		
Does a Mathematics Assessment Probe Uncover?		2
How Were the Mathematics Assessment Probes Developed?		7
What Is the Structure of a Mathematics Assessment Probe?		10
What Additional Information Is Provided With Each Mathematics Assessment Probe?		15
What Mathematics Assessment Probes Are Included in the Book?		20
Chapter 2: Instructional Implications	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	22
Differentiating Instruction		23
Assessing Point of Entry		24
Analyzing Trends in Student Thinking		24
Giving Student Interviews		25
Promoting Student-to-Student Dialogue		26
Developing Vocabulary		26
Allowing for Individual Think Time		28
Improving Students’ Processing Skills		29
Assessing Effectiveness of Instructional Activities		29
Moving Beyond the Individual Classroom		30
Summary		31
Chapter 3: Number and Operations Assessment Probes	<i>“What Is the Value of 2/3?” and “What Is the Meaning of 2/3?”</i>	32
Probe 1 What Is the Value of the Digit?		33
Teachers’ Notes: What Is the Value of the Digit?		34
Student Responses to “What Is the Value of the Digit?” Probe		37
Probe 1a Variation: What Is the Value of the Digit? Card Sort		38
Probe 2 What Is the Meaning of 2/3?		39
Teachers’ Notes: What Is the Meaning of 2/3?		40
Student Responses to “What Is the Meaning of 2/3?”		43
Probe 2a Variation: What Is the Meaning of 2/3? Card Sort		44

Probe 3 Is It Equivalent?	45
Teachers' Notes: Is It Equivalent?	46
Student Responses to "Is It Equivalent?"	49
Probe 3a Variation: Is It Equivalent? Card Sort	50
Probe 4 What's Your Estimate?	51
Teachers' Notes: What's Your Estimate?	52
Student Responses to "What's Your Estimate?"	55
Probe 5 Is It an Estimate?	56
Teachers' Notes: Is It an Estimate?	57
Student Responses to "Is It an Estimate?"	59
Probe 6 Is It Simplified?	61
Teachers' Notes: Is It Simplified?	62
Student Responses to "Is It Simplified?"	64
Probe 6a Is It Simplified? Algebraic Variation	65
Probe 7 Where Is One Million?	66
Teachers' Notes: Where Is One Million?	67
Student Responses to "Where Is One Million?"	69
Probe 8 How Low Can You Go?	71
Teachers' Notes: How Low Can You Go?	72
Student Responses to "How Low Can You Go?"	74
Probe 8a Variation: How Low Can You Go?	75
Probe 9 What's Your Addition Strategy?	76
Teachers' Notes: What's Your Addition Strategy?	77
Student Responses to "What's Your Addition Strategy?"	81
Probe 9a Variation: What's Your Addition Strategy? Decimals	82
Probe 9b Variation: What's Your Addition Strategy? Fractions	83
Probe 10 What's Your Subtraction Strategy?	84
Teachers' Notes: What's Your Subtraction Strategy?	85
Student Responses to "What's Your Subtraction Strategy?"	89
Probe 10a Variation: What's Your Subtraction Strategy? Decimals	90
Probe 10b Variation: What's Your Subtraction Strategy? Fractions	91
Probe 11 What's Your Multiplication Strategy?	92
Teachers' Notes: What's Your Multiplication Strategy?	93
Student Responses to "What's Your Multiplication Strategy?"	96
Probe 11a Variation: What's Your Multiplication Strategy? Decimals	98
Probe 12 What's Your Division Strategy?	99
Teachers' Notes: What's Your Division Strategy?	100
Student Responses to "What's Your Division Strategy?"	103
Probe 12a Variation: What's Your Division Strategy? Decimals	105
Chapter 4: Geometry, Measurement, and Data	
Assessment Probes	106
Probe 1 What's the Measure?	107
Teachers' Notes: What's the Measure?	108
Student Responses to "What's the Measure?"	110

Probe 1a Variation: What's the Measure?	111
Probe 2 Are Area and Perimeter Related?	112
Teachers' Notes: Are Area and Perimeter Related?	113
Student Responses to "Are Area and Perimeter Related?"	115
Probe 3 What's the Area?	117
Teachers' Notes: What's the Area?	118
Student Responses to "What's the Area?"	120
Probe 4 What's the Capacity?	122
Teachers' Notes: What's the Capacity?	123
Student Responses to "What's the Capacity?"	125
Probe 5 Is It Transformed?	126
Teachers' Notes: Is It Transformed?	127
Student Responses to "Is It Transformed?"	130
Probe 6 Are They Similar?	131
Teachers' Notes: Are They Similar?	132
Student Responses to "Are They Similar?"	134
Probe 7 What Do You Mean?	136
Teachers' Notes: What Do You Mean?	137
Student Responses to "What Do You Mean?"	142
Probe 7a Variation: What Do You Mean?	144
Probe 8 Name of the Graph?	145
Teachers' Notes: Name of the Graph?	146
Student Responses to "Name of the Graph?"	149
Probe 9 Graph Construction	151
Teachers' Notes: Graph Construction	152
Student Responses to "Graph Construction"	155
Chapter 5: Algebra Assessment Probes	157
Probe 1 Expressions: Equal or Not Equal?	158
Teachers' Notes: Expressions: Equal or Not Equal?	159
Student Responses to "Expressions: Equal or Not Equal?"	163
Probe 2 Is It the Same as $a + b$?	165
Teachers' Notes: Is It the Same as $a + b$?	166
Student Responses to "Is It the Same as $a + b$?"	168
Probe 3 M & N's?	170
Teachers' Notes: M & N's?	171
Student Responses to "M & N's?"	173
Probe 4 What's the Substitute?	175
Teachers' Notes: What's the Substitute?	176
Student Responses to "What's the Substitute?"	179
Probe 5 Is It True?	180
Teachers' Notes: Is It True?	181
Student Responses to "Is It True?"	185
Probe 6 Solving Equations	187
Teachers' Notes: Solving Equations	188
Student Responses to "Solving Equations"	192

Probe 7 Correct Representation of the Inequality?	194
Teachers' Notes: Correct Representation of the Inequality?	195
Student Responses to "Correct Representation of the Inequality?"	199
Probe 8 Is It a Variable?	200
Teachers' Notes: Is It a Variable?	201
Student Responses to "Is It a Variable?"	205
Probe 9 Binomial Expansion	207
Teachers' Notes: Binomial Expansion	208
Student Responses to "Binomial Expansion"	211
Probe 10 Is It Quadratic?	213
Teachers' Notes: Is It Quadratic?	214
Student Responses to "Is It Quadratic?"	218
Resource A: Note Template	220
References	222
Index	225