

# Contents

Foreword by James Hiebert	ix
Acknowledgments	xiii
Introduction	xv

## PART I: THE MATHEMATICAL TASKS FRAMEWORK

1. Analyzing Mathematics Instructional Tasks	1
Defining Levels of Cognitive Demand of Mathematical Tasks	2
Matching Tasks with Goals for Student Learning	4
Differentiating Levels of Cognitive Demand	5
Gaining Experience in Analyzing Cognitive Demands	8
Moving Beyond Task Selection and Creation	12
2. Using Cognitively Complex Tasks in the Classroom	14
The Evolution of Tasks During a Lesson	14
Patterns of Task Setup and Implementation	17
3. Learning from Cases	23
Theoretical Considerations	23
Moving on to Considerations of One's Own Practice	25
Advantages to Guided Reflection	27

## PART II: THE CASES

4. Introduction to the Cases	31
The Cases and Supporting Materials	31
How to Orchestrate Teacher Learning from the Cases	33
5. Linking Fractions, Decimals, and Percents Using an Area Model	37
The Case of Ron Castleman	37
Discussion Questions	46
Teaching Notes	47
Possible Solution Strategies	51

<b>6. Multiplying Fractions with Pattern Blocks</b>	<b>56</b>
The Case of Fran Gorman and Kevin Cooper	56
Discussion Questions	67
Teaching Notes	68
<b>7. Giving Meaning to Measures of Central Tendency</b>	<b>72</b>
The Case of Trina Naruda and Ursula Hernandez	73
Discussion Questions	82
Teaching Notes	82
<b>8. Using Algebra Tiles to Multiply Monomials and Binomials</b>	<b>88</b>
The Case of Monique Butler	88
Discussion Questions	96
Teaching Notes	96
<b>9. Organizing Data</b>	<b>101</b>
The Case of Nicole Clark	101
Discussion Questions	107
Teaching Notes	108
<b>10. Solving Problems</b>	<b>112</b>
The Case of Jerome Robinson	112
Discussion Questions	118
Teaching Notes	118
Possible Solution Strategies	121

### **PART III: USING THE CASES**

<b>11. Assisting the Learning of Teachers</b>	<b>131</b>
Transformative Professional Development	132
Key Professional Activities Related To Mathematical Tasks	137
Conclusion	149
<b>12. Assisting the Learning and Professional Practice of Principals</b>	<b>151</b>
Conducting Observations and Arranging for Tailored Professional Development	153
Providing Schoolwide Resources for Ongoing Teacher Development	160
Conclusion	163
<b>References</b>	<b>165</b>
<b>Index</b>	<b>171</b>
<b>About the Authors</b>	<b>181</b>