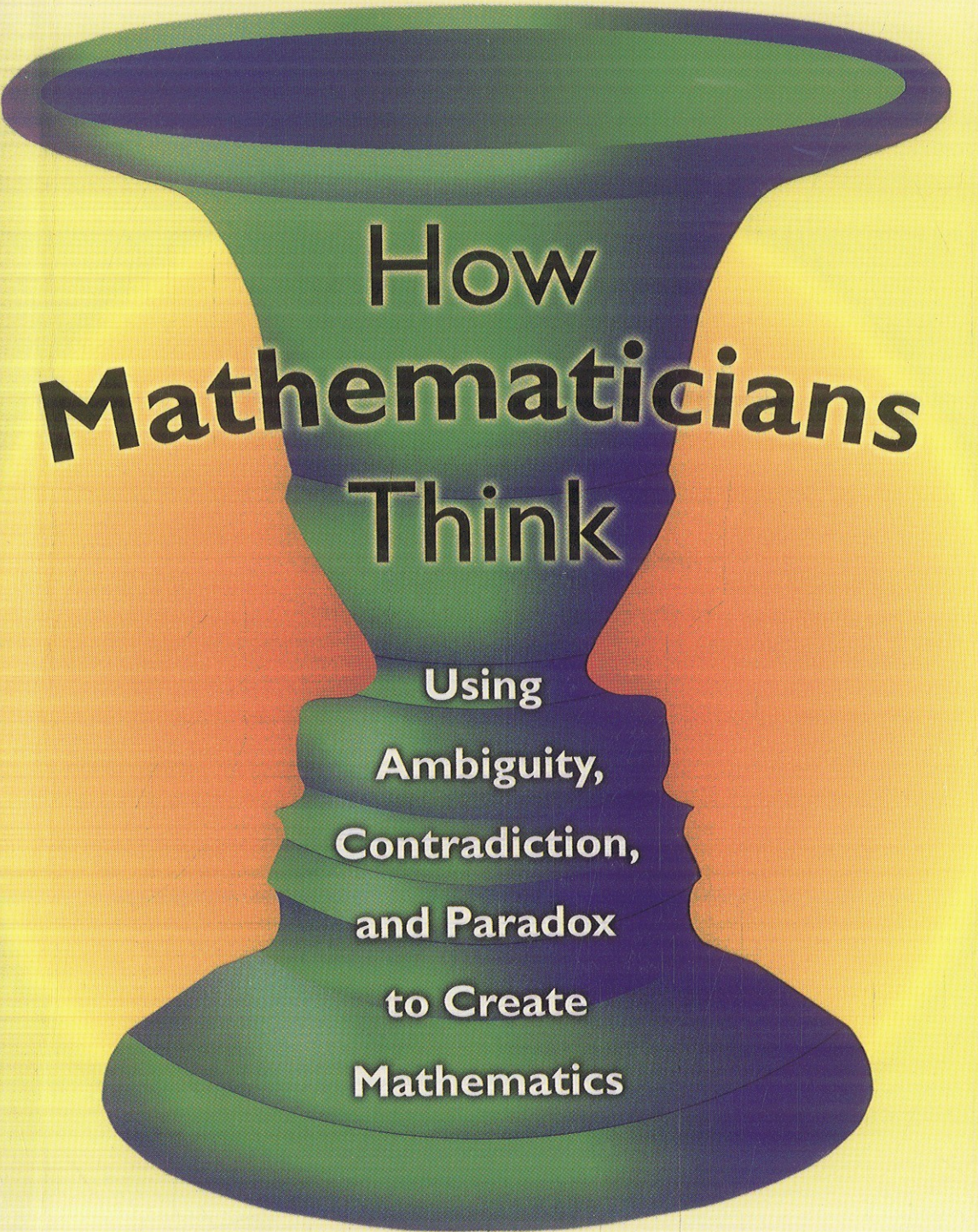


WILLIAM BYERS



# How Mathematicians Think

Using  
Ambiguity,  
Contradiction,  
and Paradox  
to Create  
Mathematics

# \*   *Contents*   \*

<i>Acknowledgments</i>	vii
INTRODUCTION	
Turning on the Light	1
SECTION I	
THE LIGHT OF AMBIGUITY	21
CHAPTER 1	
Ambiguity in Mathematics	25
CHAPTER 2	
The Contradictory in Mathematics	80
CHAPTER 3	
Paradoxes and Mathematics: Infinity and the Real Numbers	110
CHAPTER 4	
More Paradoxes of Infinity: Geometry, Cardinality, and Beyond	146
SECTION II	
THE LIGHT AS IDEA	189
CHAPTER 5	
The Idea as an Organizing Principle	193
CHAPTER 6	
Ideas, Logic, and Paradox	253
CHAPTER 7	
Great Ideas	284
SECTION III	
THE LIGHT AND THE EYE OF THE BEHOLDER	323
CHAPTER 8	
The Truth of Mathematics	327

## CONTENTS

### CHAPTER 9

Conclusion: Is Mathematics Algorithmic  
or Creative? 368

*Notes* 389

*Bibliography* 399

*Index* 407