
TABLE OF CONTENTS

Introduction	5
Why another book on mathematical abilities?.....	5
What is the purpose of this book, and why is it different from others?	6
Why the term intellectually advanced mathematicians rather than another term?.....	6
How is the term intellectually advanced mathematicians(s) operationally defined?	8
How is this book arranged?	9
What is the (educational) philosophy behind the book?.....	9
Are there any final admonitions?	10
Chapter 1 What are Cognitive Characteristics of Intellectually Advanced Mathematicians?	13
What are the main thinking characteristics of intellectually advanced mathematicians?	13
What is... the ability to formalize mathematical material?	15
What is...the ability to generalize mathematical material?	19
What is...the ability to work with numerals and symbols?	20
What is...the ability to reason logically and sequentially?	22
What is...the ability to reason efficiently?	23
What is...the ability to reverse a mental process?	25
What is...flexibility of thought?	26
What is...mathematical memory?	28
What is...spatial ability?	30
Are there any final important points?	31
Chapter 2 How are Intellectually Advanced Students in Mathematics, Grades K-6, Identified?	36
How do intelligence quotient tests relate to identification?	37
How do aptitude tests relate to identification?	39
How do standardized tests relate to identification?	40
Should school grades be used for identification of intellectual advancement in mathematics?....	42
How do nomination forms relate to identification? What are teacher nomination forms?.....	43
What are parent nomination forms?	44
What are peer nomination forms?	45
Are there any caveats about nomination forms?	46
How do portfolios relate to identification?	46
What comprises Model-Eliciting Activities?	47
Are there any final thoughts about identifying intellectually advanced students in mathematics?48	48
Chapter 3 What Role Does Affect Play in Academic Achievement?	53
What is affect?	53
Why should we care about affect of intellectually advanced students in mathematics?.....	57
What instruments exist to assess affect among the intellectually advanced?	58
What might be done to manipulate affect among the intellectually advanced?	59

Chapter 4 What Role Does Creativity Play in Mathematics?	63
Why should we care about creativity in intellectually advanced students in mathematics?	63
How can creativity be assessed amongst intellectually advanced mathematicians?.....	65
What sorts of mathematical tasks foster creativity amongst intellectually advanced mathematicians?	66
What is Problem-Based Learning?	67
What are Model-eliciting Activities?.....	68
Why is creativity neglected amongst intellectually advanced students mathematicians?.....	69
Chapter 5 Serving Intellectually Advanced Mathematicians Inside the Classroom:	
What Teaching Tactics Should Be Used?	75
Why should exemplary classrooms have collaborative work?	75
What are the advantages of group-work. Why should it be done in mathematics?.....	76
What are the disadvantages of group-work?	78
Should homogeneous or heterogeneous groups be used in the classroom?.....	79
What is the appropriate size for group-work?	80
What sorts of activities should be used in the classroom to maximize instruction?	81
To maximize learning in mathematics, what sort of discourse should be facilitated?.....	83
Why is differentiation so popular in gifted education?	85
Chapter 6 Serving Intellectually Advanced Students Outside the Classroom: What Special	
Programs Exist?	92
What are mathematics camps and are they worth it?	92
What is the difference between summer math camps and summer residential programs?	95
What is a Super Saturday program?.....	97
What if I cannot send my child(ren) or student away from home for the summer or Saturday? ..	98
What after school programs exist in mathematics?.....	99
What is MATHCOUNTS?	99
What is Math Olympiad?	100
What are Math Circles?.....	100
What empirical research exists to substantiate the efficacy of these approaches?	101
Chapter 7 What is the Value of Mathematical Problem Solving in Serving Intellectually	
Advanced Mathematicians?.....	106
What is meant by aesthetics of mathematics?	107
How do mathematical problems help students appreciate the aesthetics of mathematics?.....	108
What is the value of having students become distinguished problem solvers?	108
What is the relationship between mathematical problem solving and future vocations?	111
Conclusion	117
What has been learned from reading this book?	117
What needs were unmet from this book?	118
Where do educators go from here?	119
Where do you go from here?	122