

## TABLE OF CONTENTS

Introduction.....	ii
Balance Math™ .....	1, 2, 4, 6, 7, 10, 12, 13, 15, 17, 18, 21, 23, 25, 27, 30, 32, 35, 36, 39
Inside-Out Math.....	3, 8, 11, 14, 19, 22, 26, 28, 31, 34, 37
Tic Tac Math .....	5, 9, 16, 20, 24, 29, 33, 38
Hints .....	40
Answers.....	41

### The Value of *Balance Math™ and More!*

These activities sharpen students' critical thinking and computational skills while developing their algebraic reasoning. The first book in the series (Level 1) focuses on addition and subtraction of whole numbers. The second book (Level 2) focuses on multiplication and division of whole numbers and a few fractions. The third book (Level 3) involves addition, subtraction, division, and multiplication of whole numbers, fractions, and decimals. The increasing difficulty level within each book is designed to scaffold students' conceptual understanding of the targeted operations from beginning to advanced achievement. Try one of these intriguing puzzles — and then try to stop!

### Teaching Suggestions

*Balance Math™ and More!* activities are unique because their solutions require mathematical reasoning, critical thinking, and computational skills, making them fun, but challenging. Teachers should review the directions with students on all three types of puzzles (Inside-Out Math, Tic Tac Math, and Balance Math™) and cooperatively work through some of them with students until they can demonstrate how to correctly solve the problems independently. If students become stumped, first encourage perseverance and patience by reminding them that people do puzzles because they enjoy being puzzled. Like all puzzlers, students may occasionally need a hint. For Inside-Out Math or Tic Tac Math puzzles, use the answer pages to provide them with the correct number needed next. You can jumpstart their thinking for Balance Math™ puzzles by using the hints provided on page 40.

**Balance Math™:** Students should examine the balanced scales to deduce and calculate the value of any one shape which can then be substituted on another balance and so on, until the solution is found. These puzzles are also great stepping-stones to showing students the basics of balancing and solving algebraic equations.

**Inside-Out Math:** Students need to reverse their thinking, using the inverse relationships between addition and subtraction and multiplication with division to solve the puzzles.

**Tic Tac Math:** Three in a row wins, but can you figure out the correct order to complete all rows, columns, and diagonals?

### About the Author

A longtime puzzle fan, Robert Femiano is a Seattle public school elementary educator who has been for most of his 35-year teaching career. For more than a decade of this time, he was also adjunct faculty at Seattle Pacific University, conducting math methods courses. His publications include *Algebraic Problem Solving in the Primary Grades* in the National Council for Teachers of Mathematics peer-reviewed journal and *Balance Benders™* by The Critical Thinking Co.™. In 2002, he won the highest honor in education, the Presidential Award for Excellence in Mathematics and Science Teaching.

# Tic Tac Math

All rows, columns, and three numeral diagonals must add up to the same sum. Write the total and then fill in the empty spaces.

**Problem 1**

45		
	55	
	75	65

Total: .....

**Problem 2**

111		124
136		
122		

Total: .....

**Problem 3**

	80	
40	120	140

Total: .....

**Problem 4**

51	9	39
	33	

Total: .....

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# INSIDE-OUT MATH

Use the clues to find the missing values.

**Problem 1**

a	a-c	a-d
110	80	.....
b	b-c	b-d
.....	50	30
c	d	
.....	.....	

**Problem 2**

a	a-c	a-d
.....	590	370
b	b-c	b-d
810	650	.....
c	d	
.....	.....	

**Problem 3**

a	a-c	a-d
.....	.....	57
b	b-c	b-d
.....	54	45
c	d	
27	.....	

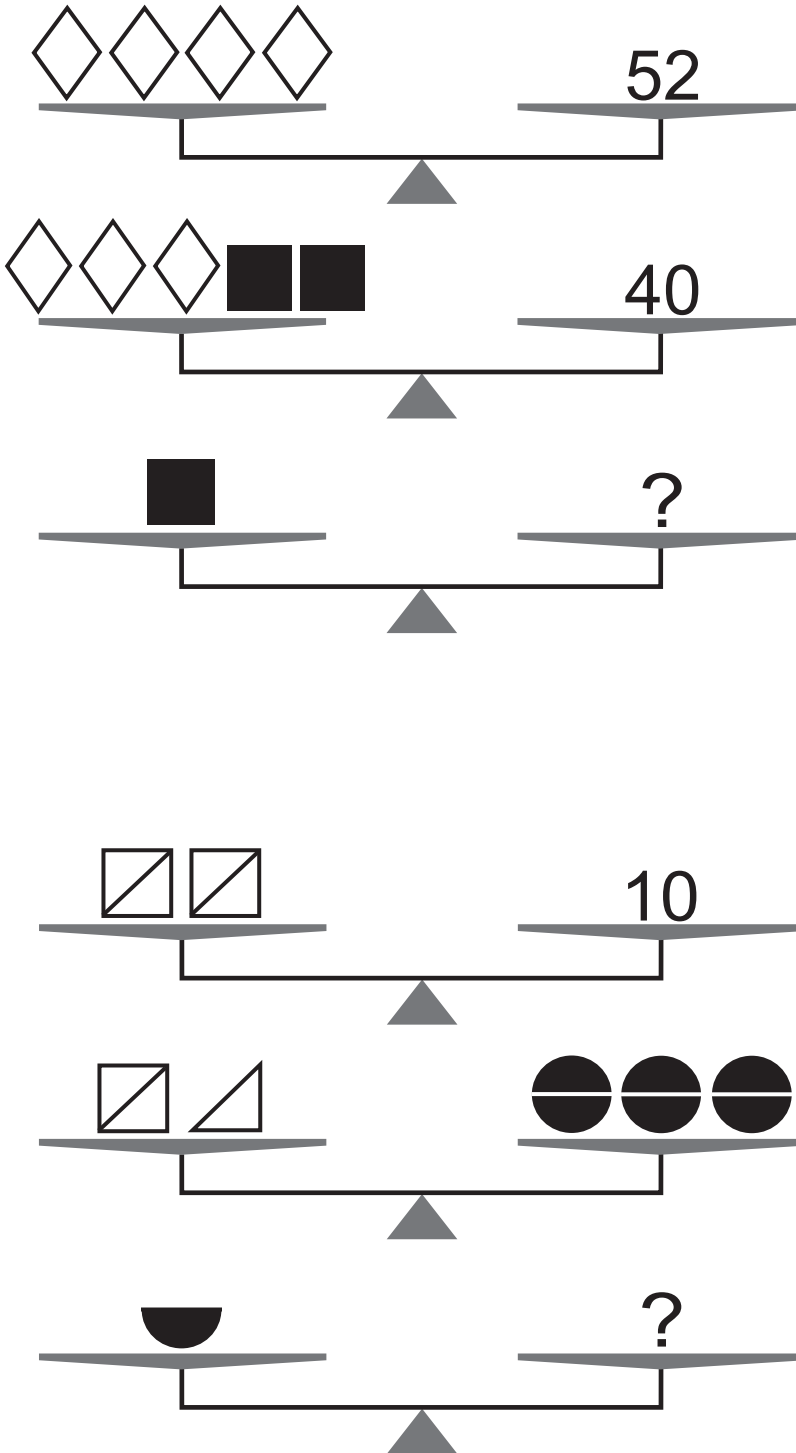
**Problem 4**

a	a-c	a-d
.....	86	66
b	b-c	b-d
.....	133	.....
c	d	
.....	101	

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# Balance Math

Use the balanced scales to find the missing numbers.



**Problem 1**

? = .....

**Problem 2**

? = .....

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