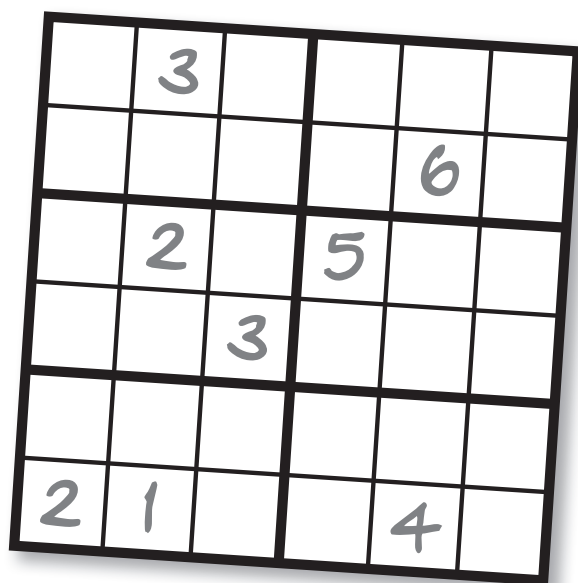


*Dedicated to my parents, Jean and Grady, who are retired math teachers, and to my wife Sharon and our triplets TLC (Tony, Leah, and Christina)*

*Also, to my brilliant Uncle Charles, and my siblings, Cheryl and Bruce, two committed math educators*

## TABLE OF CONTENTS

Introduction .....	4
How It All Works .....	5
Suggested Strategies .....	6
Pencil Marks.....	7
Unit I: Systems of Equations .....	10
Unit II: Polynomials .....	18
Unit III: Factoring .....	25
Unit IV: Radicals.....	33
Unit V: Quadratic Equations.....	39
Answer Key .....	43



# HOW IT ALL WORKS

This book is divided into three units, with each unit divided into various content areas. For each Sudoku puzzle, there is a specific content area that often includes a mini-lesson that describes the concept and provides an example(s).

## The Basics

For each lesson, students must first complete the assigned algebra problems. They will then be asked to either place their answers directly into the Sudoku puzzle, or match their answers and place the corresponding numbers in the Sudoku puzzle. From their efforts, students will be given enough numbers to begin working on the Sudoku puzzle. It is then up to the students to solve the remaining cells of the puzzle.

A system has been devised to easily identify specific cells of a puzzle, using alphabets horizontally across the top and numbers vertically along the left side. Here are some examples:

	A	B	C	D	E	F
1						
2						
3			C3			
4						
5						F5
6						

	A	B	C	D	E	F	G	H	I
1									
2		B2							
3									
4								H4	
5				D5					
6									
7									I7
8						F8			
9									

Solutions are provided for each Sudoku puzzle. Whenever possible, classroom discussion should be held to address any remaining questions and to provide further clarification.

## Negative Numbers

It is important to note that the cells in these Sudoku puzzles may have negative numbers. Answers with incorrect signs are considered wrong. However, for the purpose of completing the entire grid, a negative number represents a positive number in the counting sequence. For example, a "-2" represents "2". In other words, it is okay to have a sequence such as "-1, 2, -3, 4 -5, 6, -7, -8, 9", provided that these numbers are the correct solutions to the problems presented in the lesson.

# GRAPHING METHOD OF SOLVING A SYSTEM OF EQUATIONS

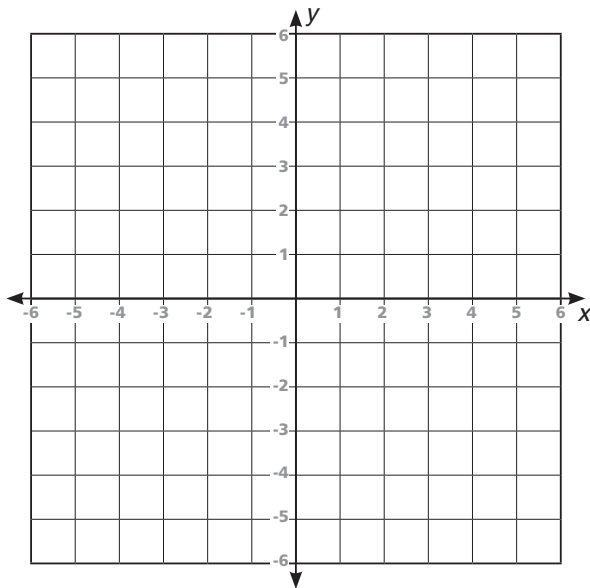
A system of equations consists of two or more equations on a graph. The point of intersection is the solution to the system. Generally, there are three methods of solving a system of equations: (1) graphing method; (2) substitution method; and (3) addition/subtraction. The graphing method involves graphing both equations, and then determining the point of intersection.

**Directions:** Solve the two systems using the graphing method. Place the coordinates of the solutions in the corresponding cells of the Sudoku grid, and then solve the puzzle.

**(B3, A3)**

$$y = x - 1$$

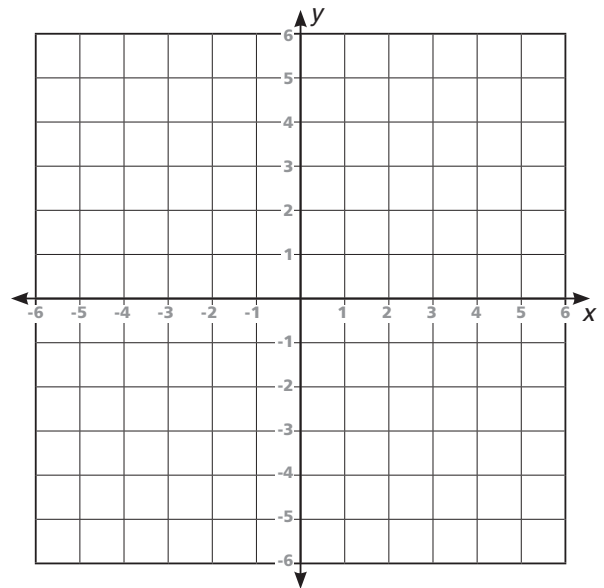
$$y = \frac{1}{3}x + 1$$



**(C2, D2)**

$$-2x + 2y = -12$$

$$y + 4 = \frac{1}{2}x$$



	A	B	C	D
1				
2				
3				
4				

# OTHER ROOTS AND NEGATIVE EXPONENTS

$\sqrt{25}$  asks the question: what number multiplied by itself equals 25? The answer is  $\sqrt{25} = 5$ .

$\sqrt[3]{8}$  asks the question: what number times itself three times equals 8? The answer is  $\sqrt[3]{8} = 2$ , or  $2 \cdot 2 \cdot 2 = 8$ .

Also, a negative exponent implies a fraction. By definition,  $x^{-a} = \frac{1}{x^a}$ .

For example,  $2^{-2} = \frac{1}{2^2} = \frac{1}{4}$ .

**Directions:** Simplify the following. Find your answer in the box on the right. Place the numbers in the appropriate cells of the Sudoku grid, and then solve the puzzle.

(A3)  $\sqrt[3]{125}$

(A6)  $3^{-3}$

(B2)  $\sqrt[3]{1000}$

(B3)  $4^{-2}$

(C4)  $\sqrt[3]{64x^6}$

(D1)  $(xy)^{-3}$

(D3)  $\sqrt[4]{16}$

(E4)  $5^{-3}$

(F1)  $\sqrt[5]{32x^5}$

(F4)  $(-7x^2)^{-3}$

(1) 10

(1) 2

(2)  $4x^2$

(3)  $\frac{1}{16}$

(3)  $\frac{1}{27}$

(3)  $\frac{1}{125}$

(4)  $2x$

(5)  $\frac{1}{-343x^6}$

(5)  $\frac{1}{x^3y^3}$

(6) 5

	A	B	C	D	E	F
1						
2						
3						
4						
5					5	
6			1			