

Contents

<i>Introduction</i>	<i>vii</i>
---------------------------	------------

Chapter 1: Getting Started

1. Order of Operations	3
2. Basic Exponents I	5
3. Basic Exponents II	7
4. Exponents and Calculators	8
5. Algebraic Expressions	9
6. Something of Interest	11
7. The Compound Interest Formula	12
8. Formula Review	13
9. Basic Properties	15

Chapter 2: Solving Basic Equations

10. Introduction to Equations	21
11. An Equation Model	25
12. Using a Model to Solve Equations (Addition and Subtraction) ...	26
13. Solving Equations (Multiplication and Division)	28
14. Solving Equations with Whole Numbers (One Inverse Operation)	30
15. Solving Equations (Several Inverse Operations)	31
16. Solving Equations with Whole Numbers (Several Inverse Operations)	33
17. Solving Equations with Like Terms	34
18. Solving Equations (Variables on Both Sides)	36
19. Equation Review	37

Chapter 3: Working with Rational Numbers

20. Introduction to Integers	43
21. Addition of Integers	44
22. Addition Patterns	46
23. A Magic Circle (Addition of Integers)	47
24. Addition of Integers	48
25. Subtraction of Integers	49
26. Subtraction Patterns	50
27. Addition and Subtraction of Integers	51

28. Multiplication Patterns (Integers)	52
29. A Division Pattern	55
30. Working with Rational Numbers	56
31. Rational Number Review	58
32. Exponents and Integers	59
33. An Exponent Cartoon (Zero and Negative Exponents)	60

Chapter 4: Equations and Inequalities with Rational Numbers

Tips on Solving Equations with Negative Numbers	63
Tips on Solving Equations with Fractions	65
34. Equations with Rational Numbers (One Inverse Operation)	67
35. Equations with Rational Numbers (Several Inverse Operations)	68
36. An Equation Code (Like Terms)	69
37. Solving Equations (Variables on Both Sides of the Equal Sign)	70
38. Solving Inequalities	71

Chapter 5: Polynomials

39. Addition of Polynomials	77
40. Addition and Subtraction of Polynomials	79
41. Multiplication of Monomials	81
42. Advanced Exponent Patterns	82
43. An Exponent Cross-Number Puzzle	84
44. Multiplying a Polynomial by a Monomial	85
45. A Polynomial Code (Monomial \times Polynomial)	86
46. Multiplying Binomials	87
47. $(a + b)(a - b)$ —Multiplication of Binomials (A Special Pattern) ...	89
48. $(a + b)^2$, $(a - b)^2$	90
49. $(a + b)^3$ —An Extra Project	92
50. Polynomial \times Polynomial (Magic Square)	93
51. Dividing a Polynomial by a Monomial	94
52. Dividing a Polynomial by a Binomial	97
53. Division of Polynomials	100

Chapter 6: Factoring

54. Finding the GCF	103
55. Monomial Factors	105
56. A Polynomial Pattern (Factoring $x^2 + bx + c$)	107

57. Factoring $x^2 + bx + c$ 109
 58. Factoring $ax^2 + bx + c$ 110
 59. An Equation Code (Solving Quadratic Equations
 by Factoring) 112

Chapter 7: Using Fractions in Algebra

60. Rational Expressions 117
 61. Simplifying Rational Expressions 119
 62. Multiplication and Division of Fractions 121
 63. Outdoor Math (Similar Triangles) 123
 64. Percent Equations (Review) 124
 65. Addition and Subtraction of Like Fractions 125
 66. Addition and Subtraction of Fractions
 with Different Denominators 127

Chapter 8: Graphing and Systems of Linear Equations

67. Ordered Pairs 133
 68. Graphing Equations 135
 69. Solving Systems of Equations Graphically 138
 70. Solving Systems of Equations
 (Addition and Multiplication Method) 140
 71. Solving Systems of Equations (Substitution Method) 142
 72. Finding the Slope of a Line 144

Chapter 9: Rational and Irrational Numbers

73. Square Root (Perfect Squares) 150
 74. Square Root (Irrational Numbers) 153
 75. An Introduction to the Pythagorean Theorem 155
 76. Square Root Approximation (Pythagorean Theorem) 158
 77. A Pattern for Completing the Square 159
 78. The Quadratic Formula 161
 79. A Pythagorean Experiment 164
 80. Finding the Distance Between Two Points on a Graph 166

Answer Key 169

ACTIVITY 15

Solving Equations (Several Inverse Operations)

By this time, you should be ready to solve equations that involve two or more inverse operations.

Example: Solve $2y + 3 = 9$.

Using the symbols from previous activities, we can represent the equation this way:

$$\begin{array}{c} \square \\ \square \end{array} + \begin{array}{c} \bullet \\ \bullet \\ \bullet \end{array} = \begin{array}{ccc} \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \end{array}$$

Subtract 3 from each side:

$$\begin{array}{c} \square \\ \square \end{array} + \begin{array}{c} \cancel{\bullet} \\ \cancel{\bullet} \\ \cancel{\bullet} \end{array} = \begin{array}{ccc} \cancel{\bullet} & \bullet & \bullet \\ \cancel{\bullet} & \bullet & \bullet \\ \cancel{\bullet} & \bullet & \bullet \end{array} \text{ or } 2y = 6$$

Divide by 2:

$$\begin{array}{c} \boxed{\square} \bullet \bullet \bullet \\ \boxed{\square} \bullet \bullet \bullet \end{array} \text{ or } y = 3$$

Directions

See if you can solve the following equations in the same way. Remember to show what you do to *both* sides.

1. $2y + 4 = 8$

Hint: Subtract first.

$$\begin{array}{c} \square \\ \square \end{array} + \begin{array}{c} \bullet \bullet \\ \bullet \bullet \end{array} = \begin{array}{ccc} \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \end{array}$$

2. $2n - 4 = 2$

$$\begin{array}{c} \square \\ \square \end{array} - \begin{array}{c} \bullet \bullet \\ \bullet \bullet \end{array} = \begin{array}{c} \bullet \\ \bullet \end{array} \quad \text{Hint: Add first.}$$

3. $3x + 2 = 5$

Hint: Subtract first.

$$\begin{array}{c} \square \\ \square \\ \square \end{array} + \begin{array}{c} \bullet \\ \bullet \end{array} = \begin{array}{ccc} & \bullet & \\ \bullet & \bullet & \\ \bullet & \bullet & \end{array}$$

4. $3y - 2 = 1$

$$\begin{array}{c} \square \\ \square \\ \square \end{array} - \begin{array}{c} \bullet \\ \bullet \end{array} = \begin{array}{c} \bullet \end{array} \quad \text{Hint: Add first.}$$

5. $3y + 1 = 13$

$$\begin{array}{c} \square \\ \square \\ \square \end{array} + \bullet = \begin{array}{ccc} \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \end{array} \quad \text{Hint: Subtract first.}$$

(continued)



ACTIVITY 15

Solving Equations
(Several Inverse Operations) *(continued)*

Solving equations with several inverse operations can be done more quickly if you remember this basic idea:

When performing inverse operations with equations, do any addition or subtraction *first*, and multiplication or division next.

Example: Solve $3y - 2 = 10$
 $3y - 2 + 2 = 10 + 2$ (*add 2 to each side*)
 $\frac{3y}{3} = \frac{12}{3}$ (*divide both sides by 3*)
 $y = 4$

Check: $(3 \times 4) - 2 = 10$

Directions Solve the following equations using the method shown in the example above. Be sure and show what you do to *both* sides of the equation.

6. $2y + 4 = 8$

9. $5n - 12 = 103$

7. $2n - 4 = 6$

10. $24a + 16 = 208$

8. $3x + 8 = 35$

11. $15c - 28 = 152$



ACTIVITY 36

An Equation Code (Like Terms)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Directions

Solve the following equations; show your work. Replace each answer with the appropriate letter from the table above. Then write the letter above the problem number at the bottom of the page. (The first one is done for you.)

1. $5x - 3x = 46$

$2x = 46$

$\frac{2x}{2} = \frac{46}{2}$

$x = 23$ (W)

9. $3n + 2(n + 4) = 68$

17. $\frac{2}{3}y + \frac{1}{3}y = 19$

2. $2y + 3y = 75$

10. $3y + (-2y) = 9$

18. $-2(n + 3) = -24$

3. $2n + n = 54$

11. $3a - 5a = -22$

19. $2b + 4(b - 5) = 94$

4. $4a - a = 33$

12. $.02x + .03x = .25$

20. $5y - 3y - 10 = 0$

5. $3y - 2y + 4 = 27$

13. $\frac{1}{2}y + \frac{3}{4}y = 25$

21. $.03x + 1.2x = 1.23$

6. $6a + 3a - 2a = 63$

14. $2(x - 3) = 4$

22. $2(n - 20) = -2$

7. $60 = 7y - 4y$

15. $\frac{2}{3}n - \frac{1}{3}n = 6$

23. $3y - 5y = -50$

8. $-3n - n = -32$

16. $3(y + 2) = 45$

List the letters below:

W																									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)														
(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)															

