

Algebra Made Easy is a maths program designed to help you develop your problem-solving skills with algebra problems. Many of the lessons will ask you to use objects or draw pictures to solve the problems. We think that this will help you better understand how to work with algebra. Each time you solve a problem in this book, try to think of another problem that you could solve the same way. As you work in *Algebra Made Easy*, you will find that problem solving can be enjoyable.

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INTRODUCTION

'Algebra for all' is being heard across the country and yet many students enter secondary school without the necessary basic prerequisite skills to complete Algebra 1 successfully. One solution many have suggested is to develop these algebra readiness skills in years 4-9. This series is designed to accomplish that goal. The authors believe that algebra readiness should begin in the early years and then develop over a number of years. Likewise, we believe that the learning of new skills and concepts should begin at the concrete level, move to the pictorial or representational level, and finally to the verbalisation level. We have been careful to maintain the mathematical integrity of the skills and concepts covered while trying to create a series that will be interesting to and challenging for your students.

ORGANISATION

This book is made up of ten lessons. Six of the lessons are instructional and three are mixed review. A review lesson follows Lesson 2 and provides mixed practice of the skills in Lessons 1 and 2. A review lesson follows Lesson 4 and provides mixed practice for Lessons 1-4. A review lesson follows Lesson 6 and provides mixed practice for Lessons 1-6. This method ensures that, by the end of the book, students are using all the skills introduced in each lesson. The last lesson is an extension lesson, which incorporates many of the concepts developed in the book and provides additional opportunities for students to work more challenging problems.

INSTRUCTIONAL LESSON DESIGN

Each of the six instructional lessons focuses on a key concept in algebra. Each lesson has three major parts and can easily be covered in three or four class periods. Some students may move more quickly through the lessons, but be sure to provide enough time so that concept development can occur.

Part A of each lesson uses manipulatives to introduce the skill or skills. The manipulatives are items that are commonly found in classrooms. Take time beforehand to be sure that these manipulatives are available.

Part B of each lesson helps the student make the transition from the concrete, manipulative level to a pictorial, representational level. Students are asked for a pictorial application of the previous manipulative activity, which helps them internalise the process.

Part C of the lesson is the verbalisation, application level. Here students work on problems and may use manipulatives or pictorials if necessary.

HOW SHOULD ALGEBRA MADE EASY BE USED?

There are many ways to use this book, all of which should be considered supplemental to your existing program.

1. You may choose to use the lessons in place of similar lessons in your maths program.
2. You may choose to present one lesson each month as a change of pace in your approach.
3. You may choose to select a six-week period to have students concentrate on critical prealgebra skills.

What *is* important is that you integrate this book into your mathematics program in a way in which you are comfortable and from which your students will benefit.

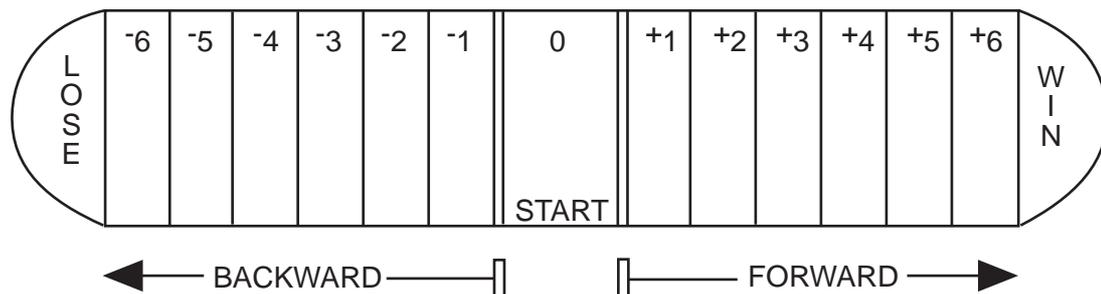
LESSON 1

Identifying Integers on a Number Line and Adding Integers

PART A

MATERIALS:

- blank die marked with a red 1, 2, 3 (which represent negative numbers) and a black 1, 2, 3 (which represent positive numbers)
- 2 game markers
- game board on page 6 of this book



Instructions for playing Forward or Backward

STEP 1 Use the game board on the back cover to play.

STEP 2 Place both markers on the start space.

STEP 3 After deciding which player will begin, both players take turns rolling the die. If a player rolls a red number, the player moves his/her marker backward. If a player rolls a black number, the player moves his/her marker forward.

STEP 4 After each move, each player records the number landed on. The numbers on the left side of the game board are marked with a negative sign. For example, -4 is the space 4 moves to the left of the start space. The numbers on the right side of the start space are positive numbers. For example, 4 or +4 is the space 4 moves to the right of the start space.

STEP 5 The winner is the player who has moved the marker closest to the win end of the game board after both players have had 5 turns. If either player has moved off the board before the end of 5 turns, the game is over. If a player moves off the win end, that player wins; if a player moves off the lose end, his/her opponent wins.

LESSON 1 Identifying Integers on a Number Line and Adding Integers Pages 1-6

PART A, page 1

The game board on page six can be constructed on cardboard so that students can continue to play during centre time or free time in the classroom. A regular die may be used by placing masking tape over the 4, 5 and 6 and marking a red 1, 2 and 3 on those faces of the die. As an alternative to a die, mark pieces of construction paper with the appropriate numbers and have students draw from a cup or bag.

Having students record their results is an important part of using manipulatives or playing mathematics games. If students record their position after each turn, they will begin to understand the objective of the lesson more clearly.

Players may choose to make the games longer by playing the best 2 out of 3 or the best 3 out of 5 games.

EXTENSION

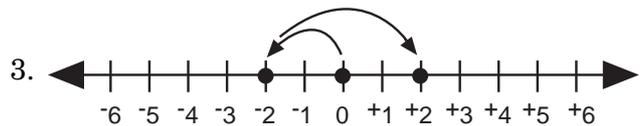
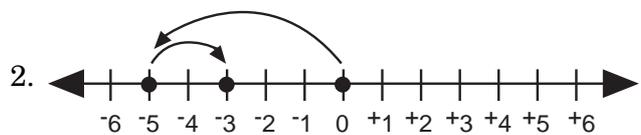
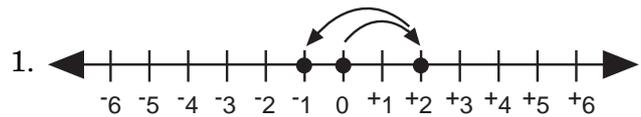
Have students use the game board to write addition problems.

1. Have students solve this problem. Bill is playing Forward or Backward, and his marker is on -2. He rolls a black 3. What addition problem could Bill write to show his move?
2. Players may use two dice of different colours. One die would indicate moves forward (positive numbers), and one die would indicate moves backward (negative numbers). On each turn, a player would roll both dice and move the marker each of the numbers indicated. For a longer game, extend the game board to include more numbers. Have the students write an addition problem to show the moves.

PART B, page 2

1. $2 + -3 = -1$
2. $-1 + 3 = 2$
3. $3 + 2 = 5$
4. $1 + 2 + -3 = 0$

PART B, page 3



4. $-1 + 5 = 4$

PART B, page 4

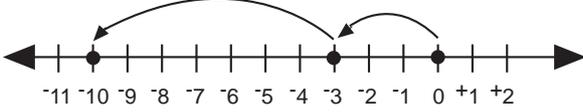
1. $-8^{\circ}\text{C} + 15^{\circ}\text{C} = 7^{\circ}\text{C}$
2. $12^{\circ}\text{C} + -15^{\circ}\text{C} = -3^{\circ}\text{C}$
3. $-15^{\circ}\text{C} + 35^{\circ}\text{C} = 20^{\circ}\text{C}$
4. $-9^{\circ}\text{C} + 22^{\circ}\text{C} = 13^{\circ}\text{C}$

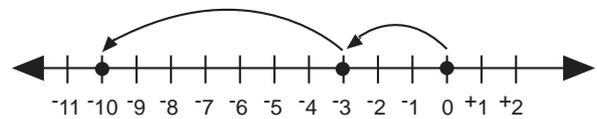
PART C, page 5

1. d
2. c
3. b
4. a
5. Sample answer: The temperature was -8°C at 10:00 A.M. The temperature rose 5°C by noon. What was the temperature at noon?

Solve each problem. Circle the letter of the correct answer.

- The temperature at 3:00 P.M. was 8°C . By 9:00 P.M., the temperature had dropped 21 degrees. What was the temperature at 9:00 P.M.?
 - -13°C
 - 28°C
 - -15°C
 - -8°C
- In July, the Fast-Food Company stock fell 11 points but regained 7 of these points. Which equation shows how to determine the overall change in the value of the stock?
 - $11 + 7 = 18$
 - $-11 + -4 = -15$
 - $-11 + 7 = -4$
 - $-4 + 11 = 7$
- In 6 days, Adrienne delivered all the boxes of popcorn she had sold for her school. The first day, she delivered 32 boxes; the second day, 29 boxes; the third day, 25 boxes; and the fourth day, 20 boxes. If Adrienne continued this delivery pattern, how many boxes of popcorn had she sold?
 - 116
 - 127
 - 120
 - 141

- Which of the following equations is shown by the arrows on the number line?
 



- $3 + 7 = 10$
 - $10 - 3 = 7$
 - $-3 + -7 = -10$
 - $10 - 7 = 3$
- Cathy rode her bike every second day for exercise. Marsha rode her bike every third day. If they both started riding their bikes on the first day of the month, what are the dates of the next 3 days that they would ride their bikes together?
 - 4, 7, and 10
 - 6, 12, and 18
 - 2, 4, and 6
 - 7, 13, and 19
 - Margo watched an aeroplane land at an airfield near her home each day. On the first day, she saw 1 passenger leave the plane. On the second day, she saw 4 passengers leave; and on the third day, she saw 9 passengers leave. If this pattern continues, how many passengers will leave the aeroplane on the sixth day?
 - 16
 - 25
 - 36
 - 49