

## Chapter Audio Summary for McDougal Littell *Algebra 1*

### Chapter 1 Connections to Algebra

In Chapter 1 you learned how to write and evaluate expressions using exponents and the order of operations. You checked solutions of equations and inequalities and used verbal and algebraic models to represent real-life situations. You also used tables and graphs to organize data and to represent functions.

***Turn to the lesson-by-lesson Chapter Review that starts on p. 54 of the textbook.***

### Lesson 1.1 Variables in Algebra

Important words to know are: *variable, value, variable expression, evaluating the expression, unit analysis, and verbal model.*

The first goal of Lesson 1.1 is to evaluate a variable expression. A variable is a letter that is used to represent one or more numbers. To evaluate the expression  $10 - y$  when  $y = 4$ , substitute 4 for  $y$  to get  $10 - 4$ . Then simplify to get 6.

The second goal of Lesson 1.1 is to use what you've learned to write a variable expression that models a real-life situation.

***Now try Exercises 1 through 7. If you need help, go to the worked-out Examples on pages 3 through 5.***

### Lesson 1.2 Exponents and Powers

Important words to know are: *power, exponent, base, and grouping symbols.*

The first goal of Lesson 1.2 is to evaluate expressions containing exponents. An expression like  $4^6$  is called a power. The exponent 6 represents the number of times the base 4 is used as a factor. To evaluate the second expression,  $(10 - b)^3$  when  $b = 3$ , substitute 3 for  $b$  to get  $(10 - 3)^3$ . Perform the operation in the parentheses first:  $10 - 3 = 7$ . Then raise 7 to the third power:  $7 \cdot 7 \cdot 7 = 343$ .

The second goal of Lesson 1.2 is to use exponents in real-life problems, such as finding the volume of an aquarium.

***Now try Exercises 8 through 13. If you need help, go to the worked-out Examples on pages 9 through 11.***

### Lesson 1.3 Order of Operations

An important term to know is: *order of operations.*

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The first goal of Lesson 1.3 is to use the order of operations to evaluate algebraic expressions. Start with operations within grouping symbols. Then evaluate powers. Then do multiplications and divisions from left to right. Finally, do additions and subtractions from left to right. To evaluate  $550 - 4(3 + 5)^2$ , first evaluate within grouping symbols: add  $3 + 5$  to get 8. Next, evaluate powers:  $8^2 = 64$ . Then multiply or divide:  $550 - 4 \cdot 64 = 550 - 256$ . Finally, add or subtract:  $550 - 256 = 294$ . When evaluating the expressions in exercises 16 and 17, remember that the fraction bar is a grouping symbol, so you should simplify the numerator and the denominator separately before dividing.

The second goal of Lesson 1.3 is to use a calculator to evaluate real-life expressions, such as calculating sales tax.

***Now try Exercises 14 through 17. If you need help, go to the worked-out Examples on pages 16 through 18.***

### **Lesson 1.4 Equations and Inequalities**

Important words to know are: *equation, open sentence, solution of an equation, solving an equation, inequality, and solution of an inequality.*

The first goal of Lesson 1.4 is to check solutions and solve equations using mental math. Substituting a number for a variable in an equation to see if the resulting statement is true or false is called checking a possible solution. To check whether 4 is a solution of the equation  $5x + 3 = 18$ , substitute 4 for  $x$  and see if  $5(4) + 3$  is equal to 18.  $5(4) + 3$  does not equal 18, so 4 is not a solution. You can use the same substitution process to check solutions of inequalities.

The second goal of Lesson 1.4 is to check solutions of inequalities in a real-life problem, such as regulating your cat's caloric intake.

***Now try Exercises 18 through 21. If you need help, go to the worked-out Examples on pages 24 through 26.***

### **Lesson 1.5 A Problem Solving Plan Using Models**

Important words to know are: *modeling and mathematical model.*

The first goal of Lesson 1.5 is to translate verbal phrases into algebraic expressions. To translate do this, look for words that indicate operations. Order is important for subtraction and division, but not for addition and multiplication. Remember that *less than* refers to subtraction and that *is less than* refers to the inequality symbol.

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The second goal of Lesson 1.5 is to use a verbal model to write an algebraic equation or inequality to solve a real-life problem. To model and solve the problem in the example, first write a verbal model: number of weeks = cost of CD / amount saved per week. Then assign labels: number of weeks =  $w$  (weeks); cost of CD = 15.75 in dollars; amount saved per week = 5.25 in dollars per week. Now write an algebraic model:  $w = 15.75/5.25$ . Use mental math to solve the equation:  $w = 3$ . You must save for three weeks.

***Now try Exercise 22. If you need help, go to the worked-out Examples on pages 32 through 34.***

### Lesson 1.6 Tables and Graphs

Important words to know are: *data*, *bar graph*, and *line graph*.

The first goal of Lesson 1.6 is to use tables to organize data. Often it helps to put numbers in either increasing or decreasing order. It also helps to group numbers so that patterns or trends are more apparent.

The second goal of Lesson 1.6 is to use graphs to organize real-life data. One way to organize data is with a bar graph. Look at the bar graph in the Examples. The graph shows the number of tennis titles that United States men and women have won in the Australian Open, French Open, and Wimbledon tennis tournaments.

You can see that male and female tennis players from the United States both have won the Australian Open 14 times. You can also see from the dark green bar that United States men have won the French Open 10 times, while the United States women, from the light green bar, have won 25 times. So United States women have won 15 more French Open titles than United States men.

***Now try Exercises 23 through 26. If you need help, go to the worked-out Examples on pages 40 through 42.***

### Lesson 1.7 An Introduction to Functions

Important words to know are: *function*, *input*, *output*, *input-output table*, *domain*, and *range*.

The first goal of Lesson 1.7 is to identify a function and make an input-output table for a function. A function is a rule that establishes a relationship between two quantities, called the input and the output. For each input, there is *exactly* one output.

Consider the examples. You know that line for your fishing reel costs two cents per yard. One lure costs \$3.50. You want to make an input/output table that shows the total cost of

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buying one lure and 100, 200, 300, or 400 yards of line. The top row of the table contains the inputs, or the number of yards of fishing line. The bottom row contains the outputs, or the total cost. You know that the total cost  $C$  is equal to the cost per yard (\$.02) times the number of yards ( $n$ ) + 3.50. So for an input of 100 yards of fishing line, the output is  $.02(100) + 3.50$  or 5.50.

The second goal of Lesson 1.7 is to write an equation for a real-life function, such as the relationship between water pressure and depth.

*Now try Exercises 27 through 29. If you need help, go to the worked-out Examples on pages 46 through 48.*