

Algebra 2, Semester 1

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Welcome to Algebra 2! The primary textbook source for this course is *College Algebra*, which you can download from the Algebra 2 lessons page on SchoolhouseTeachers.com. Don't let the title scare you. The text covers the topics typically taught in Algebra 2 in a way that is clear and easy to follow. Use the weekly lesson guide as you work through the material. There will be one or more sections to complete each week. You will need to read the text, review the examples, and complete the "Try It" exercises after each example. At the end of each section, there are "Section Exercises" to practice what you have learned. Check your answers as you complete the exercises to make sure you understand the material. The answers to all of the "Try It" exercises and the odd-numbered "Section Exercises" are available in the *Solution Manual*. **Note: The number of pages in the PDFs are not always the same as the numbers printed on the pages. Both page numbers are noted when different.**

Week 1

Textbook:

1.1 Real Numbers: Algebra Essentials, pp. 9–31 (PDF pp. 3–25)

Key Terms:

natural numbers	whole numbers	integers	rational numbers	irrational numbers
real numbers	real number line	exponential notation	base	exponent
order of operations	commutative property of addition	commutative property of multiplication	associative property of addition	associative property of multiplication
distributive property	identity property of addition	identity property of multiplication	inverse property of addition	inverse property of multiplication
constant	variable	algebraic expression	equation	formula

Directions:

1. *Read pp. 9–11 (PDF pp. 3–5).*

Notice in Example 1 that each integer can be written as a rational number by writing it as a fraction with a denominator of 1.

Complete Exercise 1.1.

2. Review Example 1.2.

To express the fraction as a decimal, the numerator is divided by the denominator. Notice in part (a) a horizontal line is used to show which numbers in the decimal repeat.

Complete Exercise 1.2.

3. Read pp. 12–14 (PDF pp. 6–8).

An irrational number cannot be written as a fraction. Pi (π) is one example of an irrational number. Some square roots are also irrational, such as $\sqrt{2}$.

Review Example 1.3 and complete Exercise 1.3.

Now that you know the difference between a rational and irrational number, you can classify real numbers. The real number line can be used to visualize whether a number is negative (to the left of zero on the number line) or positive (to the right of zero on the number line).

Review Example 1.4 and complete Exercise 1.4.

4. Read pp. 14–15 (PDF pp. 8–9).

Figure 1.3 shows how the sets of numbers relate to each other. Notice that each smaller set is a subset of the larger sets. For instance, natural numbers are a subset of the whole numbers, integers, and rational numbers. In this text, the abbreviations N, W, I, Q, and Q' are used to represent the different sets of numbers. (The straight apostrophe in Q' is read aloud as “Q prime.”) You can see these abbreviations in the column headings of the table in Example 1.5. Notice in this example how some sets of numbers belong to more than one other set.

Complete Exercise 1.5.

5. Read pp. 16–18 (PDF pp. 10–12).

Recall that an exponent is used to show how many times a number is multiplied by itself. For example, $3^4 = 3 \cdot 3 \cdot 3 \cdot 3$. In Example 1.6, notice that the absolute value bars are treated as

grouping symbols. Remember that absolute value is the distance of a number on a number line from zero. For instance, the absolute value of 2 is 2 and the absolute value of -2 is also 2.

Complete Exercise 1.6. (Make sure to follow the order of operations.)

6. **Read pp. 19–23 (PDF pp. 13–17)** to review the properties of real numbers.

Review Example 1.7 and complete Exercise 1.7.

The next part of this section covers evaluating and simplifying algebraic expressions. Algebraic expressions are numbers (constants) and letters (variables) joined together by addition, subtraction, multiplication, and division.

Read pp. 23–26 (PDF pp. 17–20).

Complete Exercises 1.8–1.10 as you review each corresponding example. In Example 1.8, notice that the exponents of the variables are not constants. Example 1.9 shows how to evaluate an expression at different values. To evaluate an expression for a given value, substitute that value for the variable wherever it appears in the expression, then simplify. In Exercise 1.10, remember to follow the order of operations as you evaluate the expression.

7. **Read pp. 26–29 (PDF pp. 20–23).**

In Example 1.11, the formula for the surface area of a right circular cylinder is shown. Think of this formula as just an expression that is being evaluated for the given values. In Exercise 1.11, substitute the given values in the given formula then simply the expression. In Example 1.12, notice how the properties of real numbers are used to rearrange the constants and variables in the expressions to make them easier to simplify. Remember that you can only add and subtract variables that are the same letter.

Complete Exercise 1.12.

In Example 1.13, notice how the distributive property is used in the last step.

Complete Exercise 1.13.

8. **Complete the odd-numbered exercises on pp. 30–31 (PDF pp. 24–25).**