

## MEET THE AUTHORS

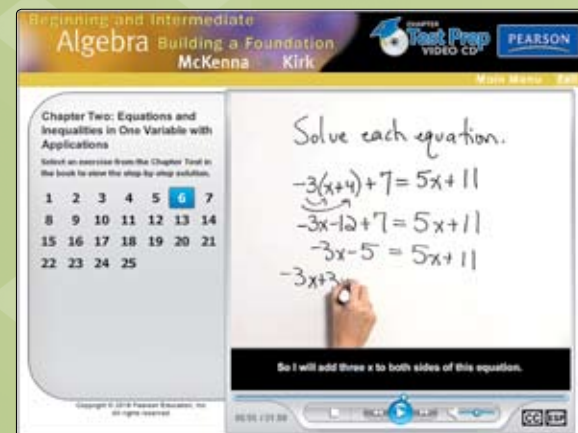
Authors Paula McKenna and Honey Kirk hail from the state of Texas, where they teach students of all ages, skill sets, and backgrounds. They have been friends for many years, and they wrote this book in the same room, on “dueling laptops,” ensuring that every statement is accurate and student-friendly!



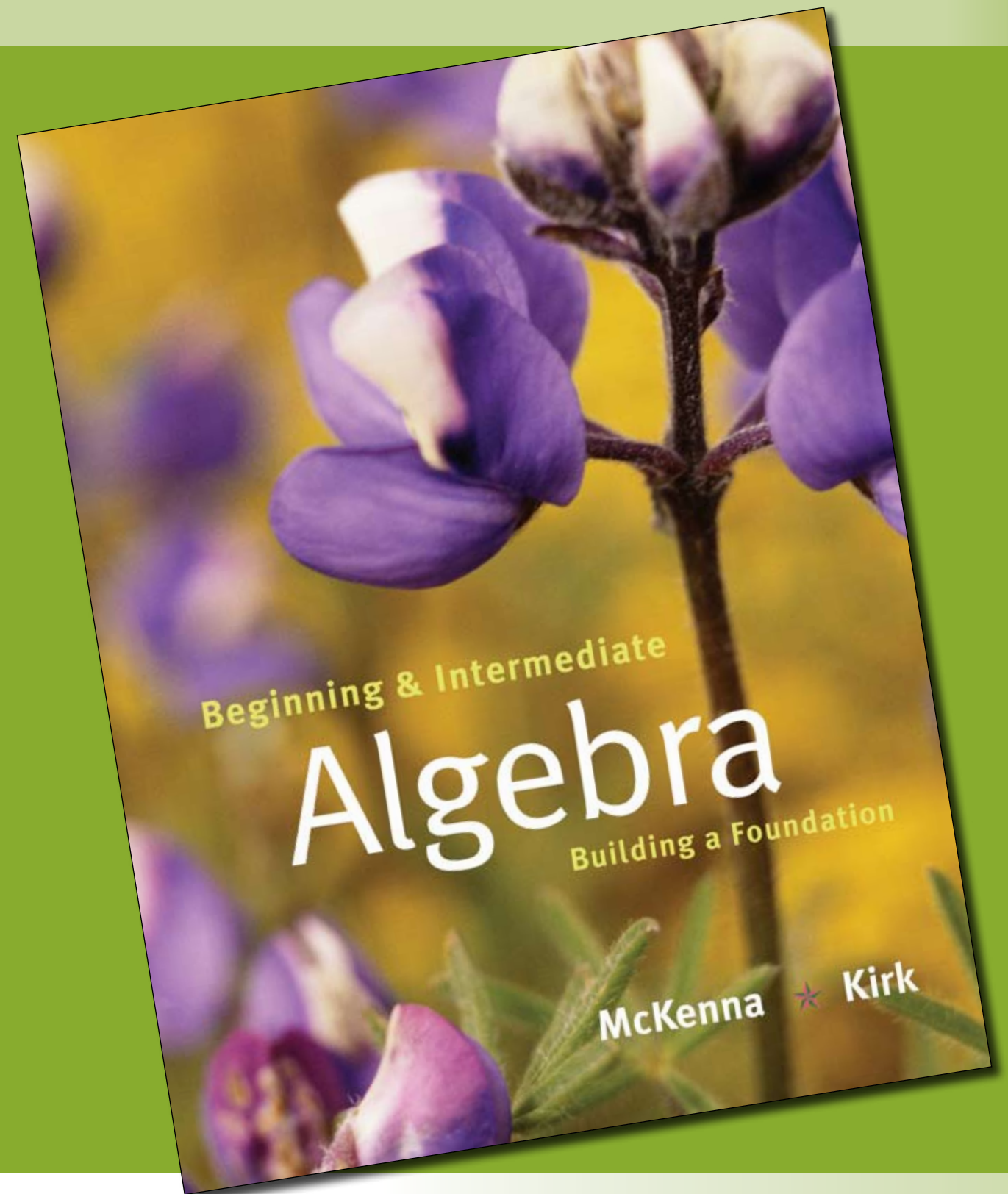
## VIDEO RESOURCES

All video resources are presented by the authors themselves, providing additional support for students outside of the classroom in a voice that is consistent with the text.

- Complete lectures for every section of the text, along with additional examples, are available on the Videos on DVD and in MyMathLab.
- The Chapter Test Prep Video CD shows the authors working through step-by-step solutions to every problem in the Chapter Test, and is included with every copy of the book. These videos provide guidance and support when students need the most help: the night before an exam.
- Optional subtitles in English and Spanish are available for all McKenna/Kirk video resources.



## TEACHING ALGEBRA AS A STORY



For an online walkthrough of this book, go to [www.pearsonhighered.com/showtell/mckennakirk\\_0201787377](http://www.pearsonhighered.com/showtell/mckennakirk_0201787377)

Beginning and Intermediate Algebra: Building a Foundation • © 2010 • McKenna • Kirk

ISBN-13: 978-0-201-78737-5 • ISBN-10: 0-201-78737-7

© 2008 Pearson Education, Inc., publishing as Addison-Wesley. All rights reserved. Printed in the U.S.A. A09\_222/1208



COUNT ON US  
PEARSON MATHEMATICS



McKenna and Kirk teach algebra as a story, emphasizing applications, problem solving, and language to help students understand how topics relate to one another and to the world around them.

[www.pearsonhighered.com/mckennakirk1einfo](http://www.pearsonhighered.com/mckennakirk1einfo)

# APPLICATIONS AND PROBLEM SOLVING

This book's emphasis on applications and problem solving shows students how algebra topics relate to one another and to the world around them.

Every chapter opens with an application, which then serves as a running theme throughout the chapter, expanding to illustrate new concepts as they are presented. The authors use the 4 P's problem-solving approach (described below) to solve applications throughout the book.


## CHAPTER 2

# Equations and Inequalities in One Variable with Applications

**OBJECTIVES**

**By the end of this chapter, you should be able to**

1. Define an equation, explain what is meant by a solution to an equation, and determine if a given value is or is not a solution to a given equation.
2. Define and solve linear equations in one variable using the Addition and/or Multiplication Properties of Equality.
3. Define a literal equation or formula and solve each for an indicated variable.
4. Define what is meant by inequality, both numerically and algebraically, solve linear inequalities, write the solution sets as inequalities involving a variable, graph solutions to linear inequalities, and state the solution sets using interval notation.
5. Differentiate between compound inequalities and double inequalities, graph the solution sets, and state the solutions using interval notation.
6. Solve absolute value equations and inequalities in one variable.
7. Utilize the 4P's in solving uniform motion, simple interest, and mixture applications.



**4P's Application**

**L&C Electronics Superstore**  
L&C Electronics Superstore, a chain of electronics and appliance specialty stores, prides itself on having a strong commitment to customers and loyalty to community. Marketing trends show that holiday sales, such as Father's Day sales, prove to increase store profits. LCES, a financial corporation, has an agreement with L&C to provide 0% financing during such sales. We will revisit L&C Electronics Superstore throughout this chapter using linear equations and inequalities to solve everyday business problems, from wage and finance calculation to delivery and installation charges.

**4P's Application L&C Electronics Superstore**

Colter Brown is a new sales associate for L&C Electronics Superstore. After a probationary period, his manager, Sarah McGee, offers him the opportunity to go from an hourly wage of \$6 to a weekly salary of \$198 plus a 3% commission on his sales. Solve the equation,  $0.03s + 198 = 240$ , where  $s$  represents Colter's weekly sales, to determine how much Colter will have to sell in a week, for a 40-hour workweek, to make the same as his current hourly wage.

**Prepare** We are asked to solve the linear equation for  $s$  to determine how much Colter Brown must sell at L&C Electronics so that he earns as much as his current \$6 per hour wage.

**Plan** Solve the linear equation for  $s$  by using the strategy for solving linear equations.

**Process**

$$\begin{array}{r} 0.03s + 198 = 240 \\ 0.03s + 198 - 198 = 240 - 198 \quad \text{Isolate the variable quantity on the LHS.} \\ 0.03s = 42 \\ \frac{0.03s}{0.03} = \frac{42}{0.03} \quad \text{Solve for } s. \\ s = 1,400 \quad \text{Obtain the goal of } 1 \cdot s = ? \end{array}$$

Therefore, Colter would have to sell \$1,400 worth of electronics per week to make the same salary he makes earning \$6 per hour based on a 40-hour week.

**Ponder Question:** Does our answer seem reasonable?

**Answer:** We can check our answer.

The hourly wage for one week would be  $\$6(40) = \$240$ .

The commission plus \$198 would be  $(0.03)(1,400) + 198 = 42 + 198 = \$240$ .

Both answers are equal.

The 4 P's problem-solving strategy (Prepare, Plan, Process, and Ponder) gives students a consistent structure for solving a variety of applications, while reminding them to check their work in thoughtful and meaningful ways.

# TEACHING THE LANGUAGE OF MATH

The authors aim to give students a firm foundation of mathematical vocabulary and skills along with an understanding of the interconnected nature of mathematics so that they can apply their knowledge to future courses.


## THE LANGUAGE OF MATH

**Definition** A **compound inequality** occurs when two or more inequalities are considered together and are connected using either *and* or *or*.


A focus on math terminology requires students to acquire a working mathematical vocabulary, which is tested within each section's exercise set and used consistently throughout the book.

Caution and Note boxes help students avoid stumbling blocks and clear up common misconceptions. Drawing on years of teaching experience, these boxes warn about common mistakes before they become a major issue.

**Caution** Just as in the English language, when a word may have more than one meaning, there are times in mathematics when a notation may represent two different mathematical items. Take, for example,  $(2, 5)$ . In the context of our discussion involving the solution to inequalities,  $(2, 5)$  represents the interval of all those real numbers between 2 and 5 exclusive of the endpoints. But, when graphing on a coordinate plane,  $(2, 5)$  is an ordered pair that represents a point with an  $x$  value of 2 and a  $y$  value of 5. Be careful to derive the meaning of a notation through the context of the situation in which it appears.



### 3.6 EXERCISES



**Building the Foundation**

Fill in the blanks with the appropriate vocabulary terms or answers.

1. A(n) \_\_\_\_\_ may be written in the form  $f(x) = mx + b$ .
2. A rule of correspondence from a set  $A$  to another set  $B$  is called a(n) \_\_\_\_\_.
3. A special type of relation in which every element of the \_\_\_\_\_ is paired to a unique element of the \_\_\_\_\_, is called a \_\_\_\_\_.
4. The set of ordered pairs  $\{(1, 1), (2, 1), (3, 1)\}$  represents a(n) \_\_\_\_\_ and a(n) \_\_\_\_\_.
5. The set that the independent variable comes from is called the \_\_\_\_\_.
6. The \_\_\_\_\_ is the set that the dependent variable belongs to.

Write a statement that describes the relation. Indicate if the relation is a function. If it is a function, state the domain and range.

7.  $\{(Texas, bluebonnet), (Iowa, wild\ rose), (California, golden\ poppy), (Florida, orange\ blossom)\}$
8.  $\{(horse, colt), (cat, kitten), (dog, puppy), (cow, calf)\}$
9.  $\{(Dallas, Cowboys), (Boston, Celtics), (Dallas, Mavericks), (New\ York, Mets), (New\ York, Yankees)\}$
10.  $\{(Columbus, Georgia), (Columbus, Ohio), (Lincoln, Nebraska), (Princeton, New\ Jersey), (Princeton, Ohio)\}$

Building the Foundation exercises build vocabulary and prerequisite skills.

## THE INTERCONNECTED NATURE OF MATH

**LOOKING AHEAD** The procedure of finding the  $x$ - and  $y$ -intercepts is the same, whether you are graphing a linear or a nonlinear equation. In Chapter 9, we will find intercepts of quadratic equations such as  $y = x^2 - 4$  using this same process.

Looking Ahead boxes ensure that students are aware of how a current topic may be used later in this course or in their future studies.

Recall boxes ask students to remember previously discussed definitions and problem-solving strategies that they will need to master the current topic.

**RECALL** In Section 2.1, we learned that linear equations in one variable are characterized by the understood exponent of positive 1 on the variable, and that they can be expressed in the form  $ax + b = 0$ . In addition, variables cannot appear in the denominator. The same restrictions apply to linear equations in two variables. Both  $x$  and  $y$  carry an exponent of positive 1, and linear equations in two variables must fit the standard form  $Ax + By = C$ , without any variables appearing in the denominators.