PREALGEBRA

6TH EDITION

Career
Explorations

BLAIR   TOBEY   SLATER   CRAWFORD

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Prealgebra

Sixth Edition

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This book is dedicated to my husband, Jerry Blair,
and my two children, Joe and Wendy.
Their support and patience during the production
of the text are greatly appreciated.

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Preface

TO THE INSTRUCTOR

Developmental mathematics course structures, trends, and dynamics continue to evolve and change, as **course redesign trends** continue to evolve and change, including the introduction of **new pathways-type courses.** Developmental mathematics instructors are increasingly challenged with helping their students **navigate career-oriented math tracks (including non-STEM and STEM pathways),** plus helping students think about **selecting a major** and **work-force readiness.** To help instructors on this front, with this revision of *Prealgebra*, you'll find a **new emphasis on, and integration of, Career Explorations** throughout the text and MyMathLab course.

Additionally, the program retains its hallmark characteristics that have always made the text so easy to learn and teach from, including its building-block organization. Each section is written to stand on its own, and every homework set is completely self-testing. Exercises are paired and graded and are of varying levels and types to ensure that all skills and concepts are covered. As a result, the text offers students an effective and proven learning program suitable for a variety of course formats—including lecture-based classes; computer-lab based or hybrid classes; discussion-oriented, activity-driven classes; modular and/or self-paced programs; and distance-learning, online programs.

We have visited and listened to teachers across the country and have incorporated a number of suggestions into this edition to help you with the particular learning-delivery system at your school. The following pages describe the key changes in this sixth edition.

WHAT'S NEW IN THE SIXTH EDITION?

New Career Explorations Interactions for Students

Each chapter begins with a **Career Opportunities** feature that enables students to personally investigate possible future career options while putting the math into context. Students are asked simple, interactive questions prompting them to consider employment opportunities that perhaps they had never thought possible.

Then, the students are directed to the corresponding **Career Exploration Problems** where they can actually solve problems that help them visualize what work would be like in that career field. This feature opens up possibilities for personal success in future employment.

The Career Exploration Problems are also assignable in MyMathLab, allowing this feature to be seamlessly integrated with the technology. The problems help to foster active learning and better understanding of the math concepts.

New Guided Learning Videos GUIDED LEARNING VIDEO

Faculty have asked for specific interactive videos that will clearly show each step of the **key concepts** of each chapter. With this revision, you'll find a new series of **Guided Learning Videos** that show in a powerful, interactive way **how to solve the most important types of problems contained in each chapter**. For student ease, icons throughout the text indicate where the videos are available. The eText is clickable, opening the videos on the spot. Plus, a new *Video Workbook with the Math Coach* allows students to take notes and practice by studying and solving problems.

Expanded Video Program

In addition to the new Guided Learning Videos with icons throughout the text, objective-level video clips have also been added to the MyMathLab course, also with accompanying icons throughout the text. These video additions expand upon an already complete video lecture series available in MyMathLab. Students and instructors will also find complete Section Lecture Videos, Math Coach Videos, and Chapter Test Prep Videos.

- **The Math Coach** has been expanded within the MyMathLab course, with even more stepped-out, guided Math Coach problems assignable in MyMathLab. Within the text, following each Chapter Test, the **Math Coach** provides students with a personal office-hour experience by walking them through some helpful hints to keep them from making common errors on test problems. For additional help, students can also watch the authors work through these problems on the accompanying Math Coach videos in the MyMathLab course. Instructors can also assign the Math Coach problems in MyMathLab and use the companion *Video Workbook with the Math Coach* for additional practice and to serve as the foundation for a course notebook.

- Fifteen percent of the exercises throughout the text have been refreshed.

- Real-world application problems have been updated throughout the text.

- **New Use Math to Save Money Animations** have been added to the MyMathLab course. The animations expand upon a favorite feature from the text, allowing students to put the math they just learned into context. These newly created animations are set to music and depict real-life scenarios and real-life people using math to cut costs and spend less. To ensure that students watch and understand the animations, there are accompanying Use Math to Save Money homework assignments available in MyMathLab, which are prebuilt for instructor convenience.

Additionally, we've created an even stronger connection between the approach that is used to teach the concepts in the text, and the media assets and assignable exercises within the accompanying MyMathLab course.

To make sure you and your students are getting the most out of the text *and* the MyMathLab course, see the following MyMathLab feature descriptions.

Get the most out of
MyMathLab®
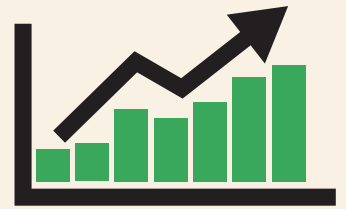
MyMathLab is the world's leading online resource for teaching and learning mathematics. MyMathLab helps students and instructors improve results and provides engaging experiences and personalized learning for each student so learning can happen in any environment. Plus, MyMathLab offers flexible and time-saving course-management features to allow instructors to easily manage their classes while remaining in complete control, regardless of course format.

Personalized Support for Students

- MyMathLab comes with many learning resources–eText, animations, videos, and more–all designed to support your students as they progress through their course.

- The Adaptive Study Plan acts as a personal tutor, updating in real time based on student performance to provide personalized recommendations on what to work on next. With the new Companion Study Plan assignments, instructors can now assign the Study Plan as a prerequisite to a test or quiz, helping to guide students through concepts they need to master.

- Personalized Homework allows instructors to create homework assignments tailored to each student's specific needs by focusing on just the topics students have not yet mastered.

Used by nearly 4 million students each year, the MyMathLab and MyStatLab family of products delivers consistent, measurable gains in student learning outcomes, retention, and subsequent course success.

Resources for Success

MyMathLab® Online Course

Prealgebra by Blair/Tobey/Slater/Crawford

(access code required)

MyMathLab is available to accompany Pearson's market-leading text offerings. To give students a consistent tone, voice, and teaching method, each text's tone and approach are tightly integrated throughout the accompanying MyMathLab course, making learning the material as seamless as possible.

New Career Explorations Interactions

A new integration of Career Explorations has been added throughout the text and MyMathLab course in an interactive format that engages students and gets them thinking about future career possibilities. Each chapter starts with a **Career Opportunities** feature that puts the math into context and ends with multiple **Career Exploration Problems** that are also assignable in MyMathLab!
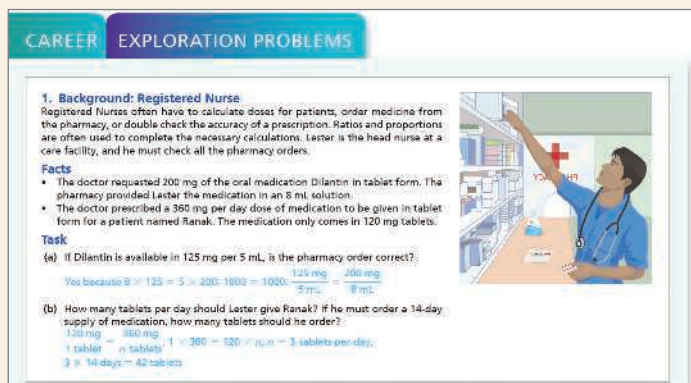
New Guided Learning Videos, Objective-Level Video Clips, and Video Workbook

New Guided Learning Videos show in a powerful, interactive way how to solve the most important types of problems in each chapter. Icons throughout the text indicate where videos are available. The eText is clickable, opening videos on the spot. Plus, a new *Video Workbook with the Math Coach* ties it all together and provides opportunity for extra practice.

New Use Math to Save Money Animations

These newly created animations, which have been added to the MyMathLab course, are set to music and depict real-life scenarios and real-life people using math to cut costs and spend less. Accompanying Use Math to Save Money homework assignments are available in MyMathLab to help further students' understanding.

Resources for Success

With MyMathLab, students and instructors get a robust course-delivery system, the full Blair/Tobey/Slater/Crawford eText, and many assignable exercises and media assets. Additionally, MyMathLab also houses these additional instructor and student resources, making the entire set of resources available in one easy-to-access online location.

Instructor Resources

Annotated Instructor's Edition

This version of the text includes answers to all exercises presented in the book, as well as helpful teaching tips. This resource is available as a hardcopy textbook that you can request through your Pearson sales representative.

Learning Catalytics™ Integration

Generate class discussion, guide your lecture, and promote peer-to-peer learning with real-time analytics. MyMathLab now provides Learning Catalytics—an interactive student-response tool that uses students' smartphones, tablets, or laptops to engage them in more sophisticated tasks and thinking.

Instructors can
- Pose a variety of open-ended questions that help students develop critical-thinking skills.
- Monitor responses to find out where students are struggling.
- Use real-time data to adjust instructional strategy and try other ways of engaging students during class.
- Manage student interactions by automatically grouping students for discussion, teamwork, and peer-to-peer learning.

Instructor's Solutions Manual

The *Instructor's Solutions Manual* is available for download from the Pearson Instructor's Resource Center, or within the MyMathLab course, and includes detailed step-by-step solutions to the even-numbered section exercises as well as solutions to every exercise (odd and even) in the Classroom Quiz, mid-chapter reviews, chapter reviews, chapter tests, cumulative tests, and practice final.

Instructor's Resource Manual with Tests and Mini Lectures

Also available for download from the Pearson Instructor's Resource Center, and within the MyMathLab course, the *Instructor's Resource Manual* includes a mini lecture for each text section, two short group activities per chapter, three forms of additional practice exercises, two pretests, six tests, and two final exams for every chapter, both free response and multiple choice, as well as two cumulative tests for every even numbered chapter. The *Instructor's Resource Manual* also contains the answers to all items.

PowerPoint Lecture Slides

Available through www.pearsonhighered.com and in MyMathLab, these fully editable lecture slides include definitions, key concepts, and examples for use in a lecture setting.

TestGen

TestGen® (www.pearsoned.com/testgen) enables instructors to build, edit, print, and administer tests using a computerized bank of questions developed to cover all the objectives of the text. TestGen is algorithmically based, allowing instructors to create multiple but equivalent versions of the same question or test with the click of a button. Instructors can also modify test bank questions or add new questions. The software and test bank are available for download from Pearson's Instructor Resource Center.

Student Resources

Student Solutions Manual

The *Student Solutions Manual* provides worked-out solutions to all odd-numbered section exercises, even and odd exercises in the Quick Quiz, mid-chapter reviews, chapter reviews, chapter tests, Math Coach, and cumulative reviews. Instructors have the option to make an electronic version available to students within the MyMathLab course, or students can purchase it separately in printed form.

New Video Workbook with the Math Coach

The new *Video Workbook with the Math Coach* expands upon the popular *Math Coach* workbook format and is correlated with the videos to serve as a video note-taking and practice guide for students. It is available to students in electronic form within the MyMathLab course, and students can also purchase it separately in printed form.

Student Success Module in MyMathLab

This new interactive module is available in the left-hand navigation of MyMathLab and includes videos, activities, and post-tests for these three student-success areas:

- **Math-Reading Connections,** including topics such as "Using Word Clues" and "Looking for Patterns."
- **Study Skills,** including topics such as "Time Management" and "Preparing for and Taking Exams."
- **College Success,** including topics such as "College Transition" and "Online Learning."

Instructors can assign these videos and/or activities as media assignments, along with prebuilt post-tests to make sure students learn and understand how to improve their skills in these areas. Instructors can integrate these assignments with their traditional MyMathLab homework assignments to incorporate student success topics into their course, as they deem appropriate.

Whole Numbers and Introduction to Algebra

CAREER OPPORTUNITIES
Energy Consultant, Entertainment and Travel Advisor

Have you ever wanted to work in the travel industry, planning trips and excursions? Are you interested in energy conservation? An energy consultant is one of the many jobs in this field. With the cost of energy on the rise, energy consultants can come up with plans to lower home and business energy bills, thus saving a lot of money.

1.1 Understanding Whole Numbers ▶

Often we learn a new concept in stages. First comes learning the new *terms* and basic assumptions. Then we have to master the *reasoning*, or logic, behind the new concept. This often goes hand in hand with learning a *method* for using the idea. Finally, we can move quickly with a *shortcut*.

For example, in the study of stock investments, before tackling the question "What is my profit from this stock transaction?" you must learn the meaning of such terms as *stock, profit, loss*, and *commission*. Next, you must understand how stocks work (reasoning/logic) so that you can learn the method for calculating your profit. After you master this concept, you can quickly answer many similar questions using shortcuts.

In this book, watch your understanding of mathematics grow through this same process. In the first chapter we review the whole numbers, emphasizing *concepts,* not shortcuts. Do not skip this review even if you feel you have mastered the material since understanding each stage of the concepts is crucial to learning algebra. With a little patience in looking at the terms, reasoning, and step-by-step methods, you'll find that your understanding of whole numbers has deepened, preparing you to learn algebra.

1 Understanding Place Values of Whole Numbers ▶

We use a set of numbers called **whole numbers** to count a number of objects.

> The whole numbers are as follows:
> 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, . . .

There is no largest whole number. The three dots … indicate that the set of whole numbers goes on forever. The numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are called **digits.** The *position* or *placement* of the digit in a number tells the *value* of the digit. For this reason, our number system is called a **place-value system.** For example, look at the following three numbers.

632   The "6" means 6 hundreds (600).
61   The "6" means 6 tens (60).
6   The "6" means 6 ones (6).

To illustrate the values of the digits in a number, we can use the following place-value chart. Consider the number 847,632, which is entered on the chart.
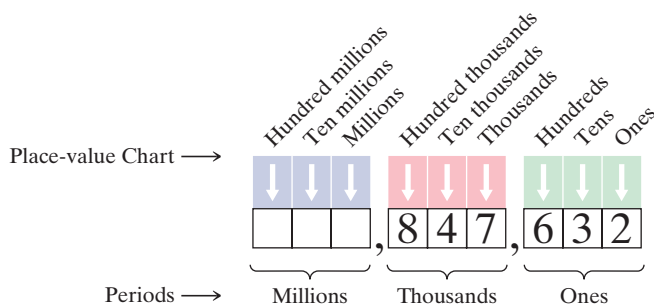
The digit 8 is in the hundred thousands place.
The digit 4 is in the ten thousands place.
The digit 7 is in the thousands place.
The digit 6 is in the hundreds place.
The digit 3 is in the tens place.
The digit 2 is in the ones place.

When we write very large numbers, we place a comma after every group of three digits, moving from right to left. These three-digit groups are called **periods.** It is usually agreed that four-digit numbers do not have a comma, but numbers with five or more digits do.

Example 1 In the number 573,025:

(a) In what place is the digit 7?   **(b)** In what place is the digit 0?

Solution

(a) 5 7 3,025   **(b)** 573, 0 25

    ↑   ↑
    ten thousands   hundreds   □

▶ **Student Practice 1**   In the number 3,502,781:

(a) In what place is the digit 5?

(b) In what place is the digit 0?

2 Writing Whole Numbers in Expanded Notation ▶

We sometimes write numbers in **expanded notation** to emphasize place value. The number 47,632 can be written in expanded notation as follows:

40,000	+	7000	+	600	+	30	+	2
4 ten thousands	+	7 thousands	+	6 hundreds	+	3 tens	+	2 ones

Example 2 Write 1,340,765 in expanded notation.

Solution

We write 1 followed by a zero for each of the remaining digits.
        ↓
We write 1 ,340,765 as 1 ,000,000 + 3 00,000 + 4 0,000 + 7 00 + 6 0 + 5

                    We continue in this manner for each digit.

Since there is a zero in the thousands place, we do not write it as part of the sum. □

▶ **Student Practice 2**   Write 2,507,235 in expanded notation.

Example 3 Jon withdraws $493 from his account. He requests the minimum number of bills in one-, ten-, and hundred-dollar bills. Describe the quantity of each denomination of bills the teller must give Jon.

Solution   If we write $493 in expanded notation, we can easily describe the denominations needed.

400	+	90	+	3
4		**9**		**3**
hundred-dollar bills		ten-dollar bills		one-dollar bills	□

▶ **Student Practice 3**   Christina withdraws $582 from her account. She requests the minimum number of bills in one-, ten-, and hundred-dollar bills. Describe the quantity of each denomination of bills the teller must give Christina.

Understanding the Concept

The Number Zero   Not all number systems have a zero. The Roman numeral system does not. In our place-value system the zero is necessary so that we can write a number such as 308. By putting a zero in the tens place, we indicate that there are zero tens. Without a zero symbol we would not be able to indicate this. For example, 38 has a different value than 308. The number 38 means three *tens* and eight ones, while 308 means three *hundreds* and eight ones. In this case, we use *zero* as a **place-holder.** It holds a position and shows that there is no other digit in that place.

3 Writing Word Names for Whole Numbers ▶

Sixteen, twenty-one, and *four hundred five* are **word names** for the numbers 16, 21, and 405. We use a hyphen between words when we write a two-digit number greater than twenty. To write a word name, start from the left. Name the number in each period, followed by the name of the period, and a comma. The last period name, "ones," is not used.

Example 4 Write the word name for each number.

(a) 2135   **(b)** 300,460

Solution   Look at the place-value chart on page 2 if you need help identifying the period.

(a) 2135   The number begins with 2 in the *thousands* place. The word name is
      two *thousand*, one hundred thirty-five.

                                    ↑
                        We use a hyphen here.

(b) 300,460   The number begins with 3 in the *hundred thousands* place.
          Three *hundred thousand*, four hundred sixty

                              ↑
      We place a comma here to match the comma in the number.   □

> **Student Practice 4**   Write the word name for each number.
>
> **(a)** 4006   **(b)** 1,220,032

CAUTION: We should not use the word *and* in the word names for whole numbers. Although we may hear the phrase "three hundred and two" for the number 302, it is not technically correct. As we will see later in the book, we use the word *and* for the decimal point when using decimal notation.

4 Using Inequality Symbols with Whole Numbers ▶

It is often helpful to draw pictures and graphs to help us visualize a mathematical concept. A **number line** is often used for whole numbers. The following number line has a point matched with zero and with each whole number. Each number is equally spaced, and the "→" arrow at the right end indicates that the numbers go on forever. The numbers on the line increase from left to right.

$$\begin{array}{ccccccccc} | & | & | & | & | & | & | & | \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \end{array}\rightarrow$$
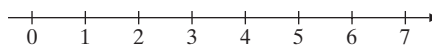
If one number lies to the *right* of a second number on the number line, it *is greater than* that number.

4 lies to the *right* of 2 on the number line because 4 *is greater than* 2.

$$\begin{array}{ccccccc} | & | & | & | & | & | & | \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 \end{array}\rightarrow$$
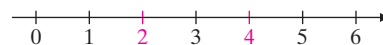
A number *is less than* a given number if it lies to the *left* of that number on the number line.

3 lies to the *left* of 5 on the number line because 3 *is less than* 5.

$$\begin{array}{ccccccc} | & | & | & | & | & | & | \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 \end{array}\rightarrow$$

The symbol $>$ means *is greater than*, and the symbol $<$ means *is less than*. Thus we can write

$$4 > 2 \qquad\qquad 3 < 5$$
          ↓   ↓
  4 is greater than 2.   *3 is less than 5.*

The symbols $<$ and $>$ are called **inequality symbols.** The statements $4 > 2$ and $2 < 4$ are both correct. Note that the inequality symbol always points to the smaller number.

Example 5 Replace each question mark with the inequality symbol $<$ or $>$.

(a) 1 ? 6   **(b)** 8 ? 7   **(c)** 4 ? 9   **(d)** 9 ? 4

Solution

(a) $1 < 6$ **(b)** $8 > 7$ **(c)** $4 < 9$ **(d)** $9 > 4$

     ↓   ↓   ↓   ↓

1 is less than 6.   8 is greater than 7.   4 is less than 9.   9 is greater than 4. ☐

▐➡ Student Practice 5 Replace each question mark with the inequality symbol $<$ or $>$.

(a) 3 ? 2   **(b)** 6 ? 8   **(c)** 1 ? 7   **(d)** 7 ? 1

Example 6 Rewrite using numbers and an inequality symbol.

(a) Five is less than eight.   **(b)** Nine is greater than four.

Solution

(a) Five *is less than* eight.   **(b)** Nine *is greater than* four.

    ↓   ↓   ↓   ↓   ↓   ↓

    5    $<$ 8   9 $>$ 4

Remember, the inequality symbol always points to the smaller number. ☐

▐➡ Student Practice 6 Rewrite using numbers and an inequality symbol.

(a) Seven is greater than two.   **(b)** Three is less than four.

5 Rounding Whole Numbers ▶ ▶ GUIDED LEARNING VIDEO

We often approximate the values of numbers when it is not necessary to know the exact values. These approximations are easier to use and remember. For example, if our hotel bill was $82.00, we might say that we spent about $80. If a car cost $14,792, we would probably say that it cost approximately $15,000.

Why did we approximate the price of the car at $15,000 and not $14,000? To understand why, let's look at the number line.
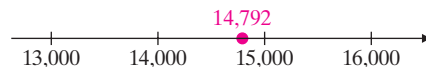
The number 14,792 is closer to 15,000 than to 14,000, so we approximate the cost of the car at $15,000.

It would also be correct to approximate the cost at $14,800 or $14,790, since each of these values is close to 14,792 on the number line. How do we know which approximation to use? We specify how accurate we would like our approximation to be. **Rounding** is a process that approximates a number to a specific **round-off place** (ones, tens, hundreds, . . .). *Thus the value obtained when rounding depends on how accurate we would like our approximation to be.* To illustrate, we round the price of the car discussed above to the thousands and to the hundreds place.

14,792 rounded to the nearest *thousand* is 15,000.   The *round-off place* is thousands.
14,792 rounded to the nearest *hundred* is 14,800.   The *round-off place* is hundreds.

We can use the following set of rules instead of a number line to round whole numbers.

> **PROCEDURE TO ROUND A WHOLE NUMBER**
> 1. Identify the round-off place digit.
> 2. If the digit to the *right* of the round-off place digit is:
>   (a) *Less than* 5, do not change the round-off place digit.
>   (b) 5 *or more,* increase the round-off place digit by 1.
> 3. Replace all digits to the *right* of the round-off place digit with zeros.

Example 7 Round 57,441 to the nearest thousand.

Solution The round-off place digit is in the thousands place.

$$5\,⑦\,,\,4\,4\,1$$

1. Identify the round-off place digit 7.
2. The digit to the right is less than 5.

Do not change the round-off place digit.

$$57,\mathbf{000}$$

3. Replace all digits to the right with zeros.
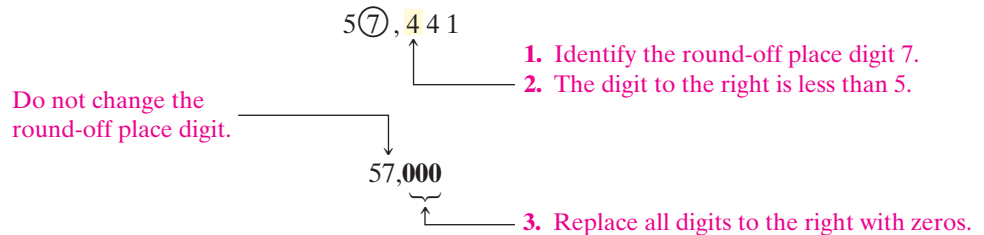
We have rounded 57,441 to the nearest thousand: **57,000.** This means that 57,441 is closer to 57,000 than to 58,000.

Student Practice 7 Round 34,627 to the nearest hundred.

Example 8 Round 4,254,423 to the nearest hundred thousand.

Solution The round-off place digit is in the hundred thousands place.

$$4,②\,5\,4,\,4\,2\,3$$

1. Identify the round-off place digit 2.
2. The digit to the right is 5 or more.

CAUTION: The round-off place digit either stays the same or increases by 1. It never decreases.

Increase the round-off place digit by 1.

$$4,300,000$$

3. Replace all digits to the right with zeros.
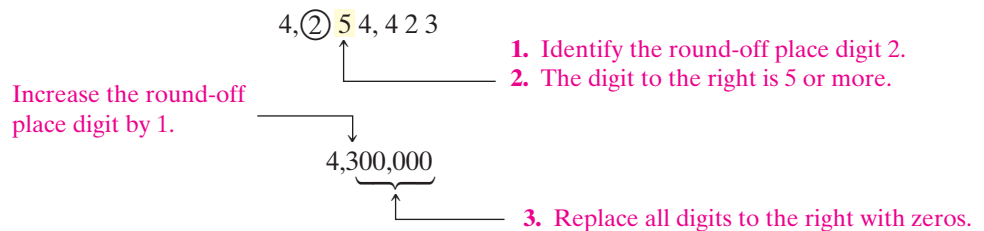
We have rounded 4,254,423 to the nearest hundred thousand: **4,300,000.**

Student Practice 8 Round 1,335,627 to the nearest ten thousand.

STEPS TO SUCCESS Finding a Study Partner

Attempt to make a friend in your class and become study partners. You may find that you enjoy sitting together and drawing support and encouragement from each other. You must not depend on a friend or fellow student to tutor you, do your work for you, or in any way be responsible for your learning. However, you will learn from each other as you seek to master the course. Studying with a friend and comparing notes, methods, and solutions can be very helpful. And it makes learning mathematics a lot more fun!

Making it personal:

1. Exchange contact information with someone in class so you can contact each other whenever you are having difficulty with your studying.

Name of study partner: _____

Phone number: _____

E-mail address: _____

2. Set up convenient times to study together on a regular basis, to do homework, and to review for exams.
   Day and time you and your partner will meet:

   Day _____   Time _____

Verbal and Writing Skills, Exercises 1–8

1. Write the word name for
  (a) 76.
  (b) 706.
  (c) 7006.
  (d) What is the place value of the digit 0 in the number seven hundred sixty?

2. Write in words.
  (a) $6 > 3$
  (b) $3 < 6$
  (c) What can you say about parts **(a)** and **(b)**?

3. In the number 9865:
  (a) In what place is the digit 8?
  (b) In what place is the digit 5?

4. In the number 46,362:
  (a) In what place is the digit 4?
  (b) In what place is the digit 3?

5. In the number 754,310:
  (a) In what place is the digit 4?
  (b) In what place is the digit 7?

6. In the number 839,400:
  (a) In what place is the digit 8?
  (b) In what place is the digit 3?

7. In the number 1,284,073:
  (a) In what place is the digit 1?
  (b) In what place is the digit 0?

8. In the number 3,098,269:
  (a) In what place is the digit 0?
  (b) In what place is the digit 8?

Write in expanded notation.

9. 5876

10. 7632

11. 4921

12. 3562

13. 867,301

14. 913,045

15. Damian withdraws $562 from his account. He requests the minimum number of bills in one-, ten-, and hundred-dollar bills. Describe the quantity of each denomination of bills the teller must give Damian.

16. Erin withdraws $274 from her account. She requests the minimum number of bills in one-, ten-, and hundred-dollar bills. Describe the quantity of each denomination of bills the teller must give Erin.

17. Describe the denominations of bills for $46:
  (a) Using only ten- and one-dollar bills.
  (b) Using tens, fives, and only 1 one-dollar bill.

18. Describe the denominations of bills for $96:
  (a) Using only ten- and one-dollar bills.
  (b) Using tens, fives, and only 1 one-dollar bill.

Write a word name for each number.

19. 6079

20. 4032

21. 86,491

22. 33,224

23. Fill in the check with the amount $672.

```
James Hunt                                    2824
4 Platt St.
Mapleville, RI  02839
                         DATE _____ 20 ____
PAY to the
ORDER of  Hampton Apartments          $ [        ]
_____ DOLLARS
Mason Bank
Rhode Island
MEMO _____  _____
⑆580052⑆ 55202205⑈ 2824
```

24. Fill in the check with the amount $379.

```
Ellen Font                                    2520
22 Rose Place
Garden Grove, CA  92641
                         DATE _____ 20 ____
PAY to the
ORDER of  Atlas Insurance             $ [        ]
_____ DOLLARS
Mason Bank
California
MEMO _____  _____
⑆580052⑆ 55202205⑈ 2520
```

Replace each question mark with the inequality symbol < or >.

25. 5 ? 7	**26.** 3 ? 1	**27.** 6 ? 8	**28.** 9 ? 6
29. 13 ? 10	**30.** 9 ? 11	**31.** 9 ? 0	**32.** 0 ? 9
33. 2131 ? 1909	**34.** 3010 ? 3210	**35.** 52,647 ? 616,000	**36.** 101,351 ? 101,251

Rewrite using numbers and an inequality symbol.

37. Five is greater than two.

38. Seven is less than ten.

39. Two is less than five.

40. Ten is greater than seven.

Round to the nearest ten.

41. 45	**42.** 85	**43.** 661	**44.** 123

Round to the nearest hundred.

45. 63,854	**46.** 12,790	**47.** 823,042	**48.** 701,529

Round to the nearest thousand.

49. 38,431	**50.** 56,212	**51.** 143,526	**52.** 312,540

Round to the nearest hundred thousand.

53. 5,254,423	**54.** 1,395,999	**55.** 9,007,601	**56.** 3,116,201

57. ***The Moon*** The average distance from the moon to the earth is 238,900 miles. Round this number to the nearest ten thousand.

58. ***Profit*** Larson Construction calculated an end-of-year profit of $212,875. Round $212,875 to the nearest ten thousand.

Mixed Practice *Automobile Prices* *The table lists the 2015 sticker prices on some popular vehicles. Use this table to answer exercises 59–62.*

Type of Automobile	2015 MSRP
Ford Expedition XLT	$47,295
Ford Supercab XLT	$34,775
Dodge Charger	$32,106
Dodge Grand Caravan	$32,732

Replace the question mark with an inequality symbol to indicate the relationship between the prices of the vehicles.

59. Ford Expedition XLT ? Ford Supercab XLT

60. Dodge Grand Caravan ? Dodge Charger

Round each vehicle's MSRP to the nearest thousand.

61. Dodge Charger

62. Ford Supercab XLT

One Step Further *Round to the nearest hundred.*

63. 16,962

64. 44,972

Very large numbers are used in some disciplines to measure quantities, such as distance in astronomy and the national debt in macroeconomics. We can extend the place-value chart to include these large numbers.

65. Write 5,311,192,809,000 using the word name.

66. Round 5,311,192,809,000 to the nearest million.

Hundred trillions	Ten trillions	**Trillions**	Hundred billions	Ten billions	**Billions**	Hundred millions	Ten millions	**Millions**	Hundred thousands	Ten thousands	**Thousands**	Hundreds	Tens	**Ones**
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
		5	, 3	1	1	, 1	9	2	, 8	0	9	, 0	0	0

To Think About *Sometimes to get an approximation we must round to the nearest unit, such as a foot, yard, hour, or minute.*

67. *Train Travel Time* A train takes 3 hours and 50 minutes to reach its destination. Approximately how many hours does the trip take?

68. *Automobile Travel Time* An automobile trip takes 5 hours and 40 minutes. Approximately how many hours does the drive take?

69. *Fence Measurements* The Nguyens' backyard has a fence around it that measures 123 feet 5 inches. Approximately how many feet of fencing do the Nguyens have?

70. *Yardage Measurements* Jessica has 15 yards 4 inches of material. Approximately how many yards of material does Jessica have?

Quick Quiz 1.1

1. Write 6402 in expanded notation.

2. Replace each question mark with the appropriate symbol $<$ or $>$.
  (a) 0 ? 10   **(b)** 15 ? 10

3. Round 154,572 to
  (a) the nearest ten thousand
  (b) the nearest hundred

4. Concept Check Explain how to round 8937 to the nearest hundred.

STEPS TO SUCCESS Preparing to Learn Algebra

People often learn arithmetic by memorizing facts and properties without understanding why the facts are true or what the properties mean. **Learning strictly by memorization can cause problems.** For example:

- Many of the shortcuts in arithmetic do not work in algebra.
- Memorizing does not help one develop reasoning and logic skills, which are essential to understanding algebra concepts.
- Memorization can eventually cause *memory overload*. Trying to remember a collection of unrelated facts can cause you to become *anxious* and *discouraged*.

Helpful Hints to Learn Concepts and Avoid Memory Overload

Do not skip familiar arithmetic topics. The explanation may be different because it emphasizes teaching *why*, not *memorization*.

Be patient and keep trying. If you don't understand a concept the first time, you may see why it works once you work through the exercises.

Read all the Understanding the Concept boxes in the book. The information and exercises will help you learn concepts and avoid memory overload.

Making it personal: Write in words why the commutative property of addition reduces the amount of memorization necessary to learn addition facts.