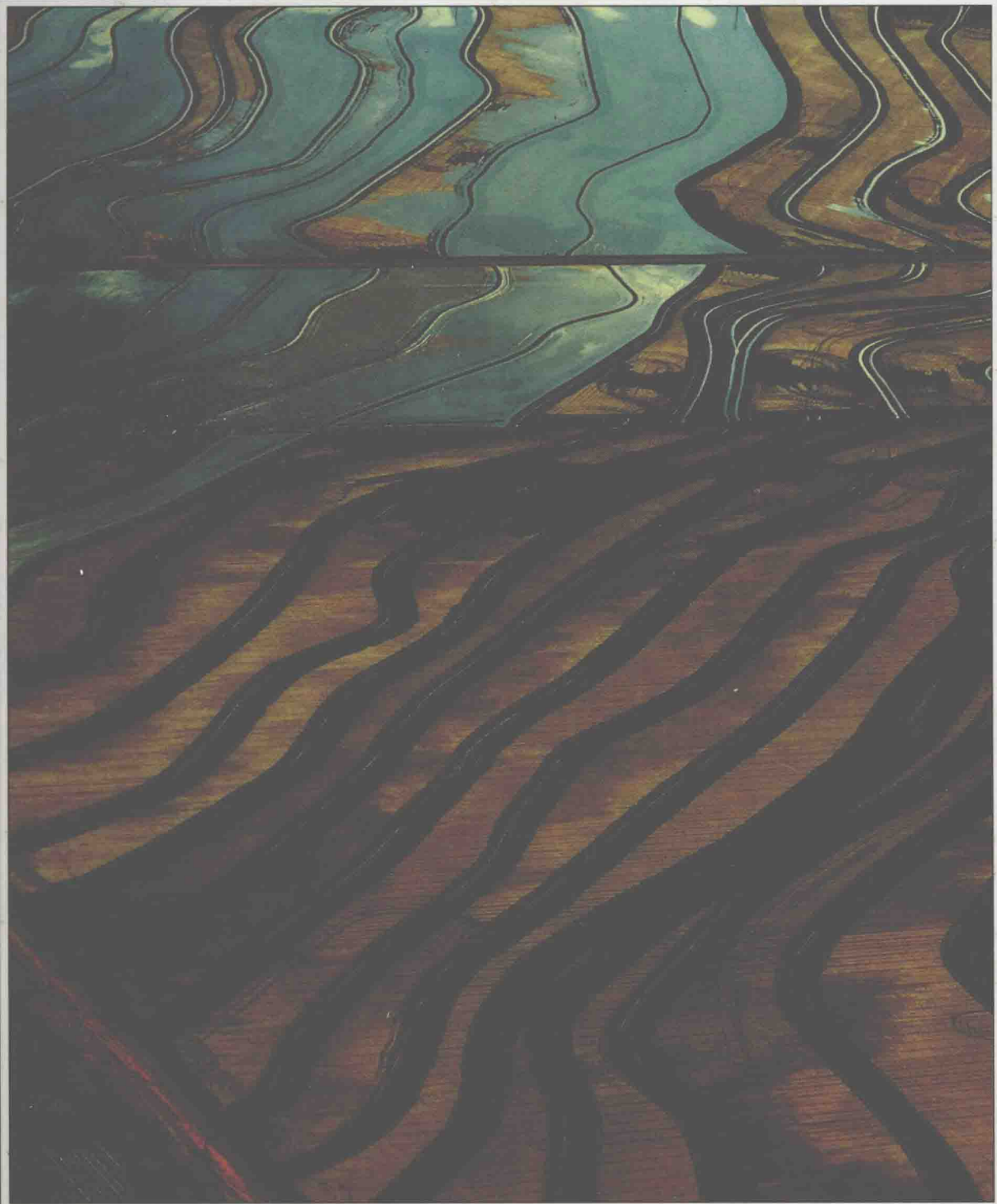


SIXTH EDITION

LIAL • MILLER • HORNSBY



ANNOTATED
INSTRUCTOR'S
EDITION

BEGINNING

ALGEBRA

BEGINNING ALGEBRA

SIXTH EDITION

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HarperCollins Publishers

ANNOTATED
INSTRUCTOR'S
EDITION

TO THE STUDENT

If you need further help with algebra, you may want to obtain a copy of the *Student's Solutions Manual* that goes with this book. It contains solutions to all the odd-numbered exercises and all the chapter test exercises. You also may want the *Student's Study Guide*. It has extra examples and exercises to complete, corresponding to each learning objective of the book. In addition, there is a practice test for each chapter. Your college bookstore either has these books or can order them for you.

On the cover: Flushing salts from contoured fields in California's Coachella Valley, farmers flood fallow land with from one to five acre-feet of water, sometimes more than they use to irrigate crops. Soluble salts leach through the soil into buried drains. Caused mainly by use of saline Colorado River water for irrigation, salt buildup can significantly reduce soil productivity.

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Beginning Algebra, Sixth Edition

Annotated Instructor's Edition

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Focus on Problem Solving

An application from the exercise set will be featured at the beginning of selected sections. Each application is chosen from among the most interesting in the exercise set and is intended to help motivate the study of the section.

The winner of the 1988 Indianapolis 500 (mile) race was Rick Mears, who drove his Penske-Chevy V8 at an average speed of 144.8 miles per hour. What was Mears' driving time?

The relationship between distance, rate, and time is one that is used quite frequently in everyday life. In order to solve this problem, we need to know how to find time if we are given distance and rate. In this section we look at some applications of the distance, rate, and time relationship.

This problem is Exercise 1 in the exercises for this section. After working through this section, you should be able to solve this problem.

FOCUS ON

PROBLEM SOLVING

Problem-Solving Strategies

In special paragraphs clearly distinguished by the heading "Problem Solving," we have expanded our discussion of strategies to include connections to techniques learned earlier.

PROBLEM SOLVING

A common sight in supermarkets is shoppers carrying hand-held calculators to assist them in their job of budgeting. While the most common use is to make sure that the shopper does not go over budget, another use is to see which size of an item offered in different sizes produces the best price per unit. In order to do this, simply divide the price of the item by the unit of measure in which the item is labelled. The next example illustrates this idea. ■

Quick Review

A Quick Review at the end of each chapter provides a capsule summary of key ideas and is set in tabular form to enable students to find the important concepts easily and review them more effectively. In addition, worked-out examples accompany each section-referenced key idea.

CHAPTER 3 QUICK REVIEW

SECTION	CONCEPTS	EXAMPLES
3.1 POLYNOMIALS	<p>Addition: Add like terms.</p> <p>Subtraction: Change the signs of the terms in the second polynomial and add to the first polynomial.</p>	<p>Add: $2x^2 + 5x - 3$ $5x^2 - 2x + 7$ $7x^2 + 3x + 4$</p> <p>Subtract: $(2x^2 + 5x - 3) - (5x^2 - 2x + 7)$ $= (2x^2 + 5x - 3) + (-5x^2 + 2x - 7)$ $= -3x^2 + 7x - 10$</p>
3.2 EXPONENTS	<p>For any integers m and n with no denominators zero:</p> <p>Product rule $a^m \cdot a^n = a^{m+n}$</p>	$2^4 \cdot 2^5 = 2^9$

P R E F A C E

In the sixth edition of *Beginning Algebra*, we have maintained the strengths of past editions, while enhancing the pedagogy, readability, and attractiveness of the text. Many features have been added to make the text easier and more enjoyable for students and teachers to use, including new exercises, Quick Reviews, and the use of full color. We continue to provide an extensive supplemental package. For students, we offer a solutions manual, a study guide, interactive tutorial software, videotapes, and audiotapes. For instructors, we present the Annotated Instructor's Edition with conveniently placed answers and teaching tips. Further, for the instructor, we provide alternative forms of tests and additional exercises, computer-generated tests, complete solutions to all exercises, and transparencies.

All the successful features of the previous edition are carried over in the new edition: learning objectives for each section, careful exposition, fully developed examples with comments printed at the side (almost 700 examples), and carefully graded section, chapter review, and chapter test exercises (more than 5000 exercises, with more than 50 percent of the applications exercises new to this edition). Screened boxes set off important definitions, formulas, rules, and procedures to further aid in learning and reviewing the course material.

NEW FEATURES

Conceptual and Writing Exercises

To complement the drill exercises, several exercises requiring an understanding of the concepts introduced in a section are included in almost every exercise set. There are almost 300 of these conceptual exercises. Also, more than 130 exercises require the student to respond by writing a few sentences. (Note that some of these writing exercises are also labeled as conceptual exercises.) Directions to conceptual and writing exercises include references to specific learning objectives to help students achieve a broader perspective should they need to turn back to the explanations and examples.

- Design** Use of full color and changes in format help to create a fresh look. We have enhanced the book's appeal and increased its usefulness.
- Cautionary Remarks** Common student errors and difficulties are now highlighted graphically and identified with the heading "Caution." **Notes** have a similar graphic treatment.
- CAUTION** Remember that a sum or difference of radicals can be simplified only if the radicals are *like radicals*. For example, $\sqrt{5} + 3\sqrt{5} = 4\sqrt{5}$, but $\sqrt{5} + 5\sqrt{3}$ cannot be simplified further. Also, $2\sqrt{3} + 5\sqrt[3]{3}$ cannot be simplified further.
- NOTE** In the next section we will learn to add and subtract rational expressions, and this will often require the skill illustrated in Example 5. While it will often be beneficial to leave the denominator in factored form, we have multiplied the factors in the denominator in Example 5 to give the answer in the form the original problem was presented.
- Geometry Exercises** Review of geometry is a thread that runs through the text. We have increased the number of exercises that relate geometric concepts to the new algebraic concepts. A brief review of geometry is included in Appendix A, expanded from the fifth edition to include a greater number of basic definitions and relationships.
- Applications** These exercises have been extensively rewritten and updated to more closely reflect the student's world. More than 50 percent are new to the sixth edition.
- Glossary** A glossary of key terms, followed by a description of new symbols, is provided at the end of each chapter. A comprehensive glossary is placed at the end of the book. Each term in the glossary is defined and then cross-referenced to the appropriate section, where students may find a more detailed explanation of the term.

CHAPTER 9 GLOSSARY

KEY TERMS

- 9.3 standard form (of a quadratic equation)** A quadratic equation written as $ax^2 + bx + c = 0$ ($a \neq 0$) is in standard form.
- 9.4 complex number** A complex number is a number of the form $a + bi$, where a and b are real numbers.
- imaginary number** The complex number $a + bi$ is imaginary if $b \neq 0$.
- real part** The real part of $a + bi$ is a .
- imaginary part** The imaginary part of $a + bi$ is b .
- standard form (of a complex number)** A complex number written in the form $a + bi$ (or $a + ib$) is in standard form.
- conjugate** The conjugate of $a + bi$ is $a - bi$.
- 9.5 parabola** The graph of a quadratic equation of the form $y = ax^2 + bx + c$ ($a \neq 0$) is called a parabola.
- vertex** The vertex of a parabola is the highest or lowest point on the graph.
- axis** The axis of a parabola is a vertical line through the vertex.
- quadratic function** A function of the form $f(x) = ax^2 + bx + c$ ($a \neq 0$) is called a quadratic function.

Example Titles Each example now has a title to help students see the purpose of the example. The titles also facilitate working the exercises and studying for examinations.

EXAMPLE 1**USING THE
ZERO-FACTOR
PROPERTY**

Solve the equation $(x + 3)(2x - 1) = 0$.

The product $(x + 3)(2x - 1)$ is equal to zero. By the zero-factor property, the only way that the product of these two factors can be zero is if at least one of the factors is zero. Therefore, either $x + 3 = 0$ or $2x - 1 = 0$. Solve each of these two linear equations as in Chapter 2.

$$\begin{array}{rclcl} x + 3 = 0 & \text{or} & 2x - 1 = 0 & & \\ x = -3 & \text{or} & 2x = 1 & \text{Add to both sides.} & \\ & & x = \frac{1}{2} & \text{Divide by 2.} & \end{array}$$

Calculator Usage The use of a scientific calculator is explained and referred to at appropriate points in the text.

Success in Algebra This foreword to the student provides additional support by offering suggestions for studying the course material.

Preview Exercises Formerly called Review Exercises, these are intended to sharpen the basic skills needed to do the work in the next section. Students need to review material presented earlier, even though it seems very basic. These exercises also help to show how earlier material connects with and is needed for later topics.

**NEW CONTENT
HIGHLIGHTS**

We have endeavored to stress throughout the text the difference between an expression and an equation. This emphasis begins in Chapter 1. We have expanded the introduction of the operations with real numbers, working in interpretation of words and phrases indicating these operations. Each of the properties of real numbers is preceded by an intuitive explanation.

Chapter 2 has been rewritten to present applied problems in a more effective way, grouping them by type and keeping these first ones simpler. More examples are given and the exercises are carefully cross-referenced to the examples. A number of applications from geometry are included here.

The topics in Chapter 3 have been reorganized to help improve students' work with exponents. We begin with addition, subtraction, and multiplication of polynomials. Then the laws of exponents are discussed in two sections, followed by polynomial division, which reinforces the product and quotient rules for exponents. The chapter ends with scientific notation.

In Chapter 4, the discussion of factoring trinomials has been expanded. Factoring general trinomials by grouping now precedes the trial-and-error method.

Working with rational expressions is difficult for students, so we have added many cautions and notes throughout Chapter 5 to help them avoid common errors. New examples and exercises have been added, including some that point out the distinction between expressions and equations.


Chapter 9 now includes more applications. The derivation of the quadratic formula is given in a parallel development with an equation having numerical coefficients. The presentation of graphing parabolas has been rewritten to make it more appropriate for students at this level.

Throughout the book, summaries of procedures have been moved earlier in the section, so students can refer to the summary while working through the examples.

SUPPLEMENTS

Our extensive supplemental package includes an annotated instructor's edition, testing materials, solutions, software, videotapes, and audiotapes.

Annotated Instructor's Edition

With this, instructors have immediate access to the answers to every drill and conceptual exercise in the text: each answer is printed in color next to the corresponding text exercise or in the margin. In addition, challenging exercises, which will require most students to stretch beyond the concepts discussed in the text, are marked with the symbol ▲. The conceptual (◎) and writing (✍) exercises are also marked in this edition so instructors may use discretion in assigning these problems. (Calculator exercises will be marked by  in both the student's and instructor's editions.) This edition also includes Teaching Tips that point out rough spots or give additional hints and warnings for students. Further, the instructor's edition includes Byways, which provide additional information, interesting sidelights, historical notes, and other material that an instructor can use to introduce concepts or provoke classroom conversation. Resources, a set of cross-references to all the supplements, appears at the head of each section. The student's edition does not contain the on-page answers; conceptual, writing, and challenging exercise symbols; Teaching Tips; Byways; or Resources references.

Instructor's Test Manual

Included are two versions of a pretest—one open-response and one multiple-choice; six versions of a chapter test for each chapter—four open-response and two multiple-choice; three versions of a final examination—two open-response and one multiple-choice; and an extensive set of additional exercises, providing ten to twenty exercises for each textbook objective, which can be used as an additional source of questions for tests, quizzes, or student review of difficult topics. Answers to all tests and additional exercises are provided.

Instructor's Solutions Manual

This manual includes solutions to all exercises and a list of all conceptual, writing, and challenging exercises.

HarperCollins Test Generator for Mathematics

The *HarperCollins Test Generator* is one of the top testing programs on the market for IBM and Macintosh computers. It enables instructors to select questions for any section in the text or to use a ready-made test for each chapter. Instructors may generate tests in multiple-choice or open-response formats, scramble the order of questions while printing, and produce twenty-five versions of each test. The system features printed graphics and accurate mathematical symbols. The program also allows instructors to choose problems randomly from a section or problem type or to choose questions manually while viewing them on the screen, with the option to regenerate

variables if desired. The editing feature allows instructors to customize the chapter data disks by adding their own problems.

- Transparencies** Nearly 100 color overhead transparencies of figures, examples, definitions, procedures, properties, and problem-solving methods will help instructors present important points during lecture.
- Student's Solutions Manual** Solutions are given for odd-numbered exercises and chapter test questions.
- Student's Study Guide** Written in a semiprogrammed format, the *Study Guide* provides additional practice problems and reinforcement for each learning objective in the textbook. A self-test is given at the end of each chapter.
- Computer-Assisted Tutorials** The tutorials offer self-paced, interactive review in IBM, Apple, and Macintosh formats. Solutions are given for all examples and exercises, as needed.
- Videotapes** A new videotape series has been developed to accompany *Beginning Algebra*, Sixth Edition. The tapes cover all objectives, topics, and problem-solving techniques within the text.
- Audiotapes** A set of audiotapes, one tape per chapter, guides students through each topic, allowing individualized study and additional practice for troublesome areas. These tapes are especially helpful for visually impaired students.

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Margaret L. Lial
E. John Hornsby, Jr.

- 6.1 Linear Equations in Two Variables
- 6.2 Graphing Linear Equations in Two Variables
- 6.3 The Slope of a Line
- 6.4 Equations of a Line
- 6.5 Graphing Linear Inequalities in Two Variables
- 6.6 Functions

Truckloads of red and green tomatoes, orange and yellow squash—"graded out" because they failed to meet standards of size, shape, or color or other criteria of perfection—decompose at a disposal site near Homestead, Florida.



Each chapter includes a **DESCRIPTION** of the photograph and a **MAP** showing the geographic location of the site depicted.

CHAPTER SIX



GRAPHI

A list of all the **SECTIONS** in the chapter is provided for easy reference.

A complete list of **SUPPLEMENT RESOURCES** available to help teach the course creates an integrated learning package. Page references are given for material pertaining to the section at hand.

3.5 THE QUOTIENT RULE AND INTEGER EXPONENTS

OBJECTIVES

- 1 USE ZERO AS AN EXPONENT.
- 2 USE NEGATIVE NUMBERS AS EXPONENTS.
- 3 USE THE QUOTIENT RULE FOR EXPONENTS.
- 4 USE COMBINATIONS OF RULES.
- 5 USE VARIABLES AS EXPONENTS.

1 In Section 3.2 we studied the product rule for exponents. The rule for division with exponents is similar to the product rule for exponents. For example,

$$\frac{6^5}{6^2} = \frac{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6}{6 \cdot 6} = 6 \cdot 6 \cdot 6 = 6^3.$$

The difference between the exponents, $5 - 2$, gives the exponent in the quotient, 3. Also,

$$\frac{m^4}{m^2} = \frac{m \cdot m \cdot m \cdot m}{m \cdot m} = m \cdot m = m^2,$$

and $4 - 2 = 2$. Generalizing from these examples, the difference between the exponents gives the exponent of the answer.

If the exponents in the numerator and denominator are equal, then, for example,

$$\frac{6^5}{6^5} = \frac{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6}{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6} = 1.$$

If, however, the exponents are subtracted as above,

$$\frac{6^5}{6^5} = 6^{5-5} = 6^0.$$

This means that 6^0 should equal 1. A zero exponent is defined as follows.

DEFINITION OF ZERO EXPONENT

For any nonzero real number a , $a^0 = 1$.
Example: $17^0 = 1$.

EXAMPLE 1 USING ZERO EXPONENTS

Evaluate each exponential expression.

(a) $60^0 = 1$

(c) $-(60^0) = -(1) = -1$

(e) $6y^0 = 6(1) = 6$, if $y \neq 0$

(b) $(-60)^0 = 1$

(d) $y^0 = 1$, if $y \neq 0$.

(f) $(6y)^0 = 1$, if $y \neq 0$ ■

3.5 RESOURCES

Instructor's Test Manual
Additional Exercises,
pages 296–99

Instructor's Solutions Manual
Pages 106–9, 496–99

Student's Solutions Manual
Pages 106–9

Student's Study Guide
Pages 120–23

Test Generator

IBM Disks

5.25" Disk B

3.5" Disk A

Mac Disk A

Tutorials

IBM Disks

5.25" Disk B

3.5" Disk A

Apple II Disk 3

Mac Disk A

Videotape: Tape 11

Audiocassette: Tape 3

Transparency: 2

TEACHING TIP

On some occasions, students may try to "reduce" $6^5/6^2 = 1^5/1^2$. Stress that the expression does not say "6 divided by 6."

TEACHING TIP

Cover several examples to clarify: 5^0 , $(-5)^0$, -5^0 , $-(-5)^0$, and so on.

BYWAYS contain engaging historical asides featuring people and events, interesting facts related to the topic discussed, and more.

EXAMPLE 1 SQUARING A BINOMIAL

Find $(m + 3)^2$.

Squaring $m + 3$ by the FOIL method gives

$$(m + 3)(m + 3) = m^2 + 6m + 9. \quad \blacksquare$$

The result has the square of both the first and the last terms of the binomial:

$$m^2 = m^2 \quad \text{and} \quad 3^2 = 9.$$

The middle term is twice the product of the two terms of the binomial, since both the outer and inner products are $(m)(3)$ and

$$(m)(3) + (m)(3) = 2(m)(3) = 6m.$$

This example suggests the following rule.

SQUARE OF A BINOMIAL

The square of a binomial is a trinomial consisting of the square of the first term, plus twice the product of the two terms, plus the square of the last term of the binomial. For x and y ,

$$(x + y)^2 = x^2 + 2xy + y^2$$

and

$$(x - y)^2 = x^2 - 2xy + y^2.$$

EXAMPLE 2 Use the rule to square each binomial.

$$= 25z^2 - 10z + 1$$

$$y^2 = 9b^2 + 30br + 25r^2$$

$$\left(\frac{1}{2}\right)^2 = 16m^2 + 4m + \frac{1}{4} \quad \blacksquare$$

ing a binomial is forgetting the middle term $a^2 + b^2$.

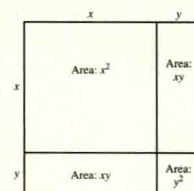
$(x - y)$ also occur frequently. In these products, and the other is the difference of the same of $a + 2$ and $a - 2$ is

$$-2a + 2a - 4 = a^2 - 4.$$

the product of $x + y$ and $x - y$ is the differ-

BYWAY

The algebra of the early Greek period was geometric in nature. For example, the special product $(x + y)^2 = x^2 + 2xy + y^2$ may be interpreted geometrically as in the figure. Since the large square has sides with length $x + y$, its area is $(x + y)^2$. But we can also interpret its area as the sum of the areas of the four rectangles forming it: $x^2 + xy + xy + y^2$. Since these two quantities must be equal, we have $(x + y)^2 = x^2 + 2xy + y^2$.



TEACHING TIP

Remind students that in the square of a sum, all of the terms are positive. In the square of a difference, the middle term is negative.

TEACHING TIPS provide effective teaching suggestions to use in class, offer appropriate analogies with previously covered material, and point out potential student errors and trouble spots.

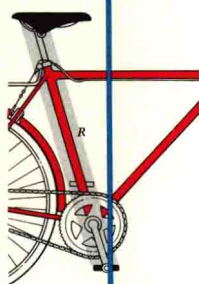
TEACHING TIP

Note the difference between x_2 and x^2 . These are sometimes confused.

BYWAY

Experiments done in England, using racing cyclists on stationary bicycles, show that the most efficient saddle height is 109% of a cyclist's inside-leg measurement. You can get the most mileage out of your leg work by following these directions:

1. Stand up straight, without shoes. Have someone measure your leg on the inside (from floor to crotch bone).
2. Multiply this length by 109% (that is, by 1.09) to get a measure R .
3. Adjust your saddle so that the measure R equals the distance between the top of the saddle and the pedal spindle when the pedals are positioned as in the diagram.



1 One way to measure the steepness of a line is to compare the vertical change in the line (the rise) to the horizontal change (the run) while moving along the line from one fixed point to another. This measure of steepness is called the *slope* of the line.

Figure 6.13 shows a line with the points (x_1, y_1) and (x_2, y_2) . (Read x_1 as "x-sub-one" and x_2 as "x-sub-two.") Moving along the line from the point (x_1, y_1) to the point (x_2, y_2) causes y to change by $y_2 - y_1$ units. This is the vertical change. Similarly, x changes by $x_2 - x_1$ units, the horizontal change. The ratio of the change in y to the change in x gives the slope of the line. We usually denote slope with the letter m . The slope of a line is defined as follows.

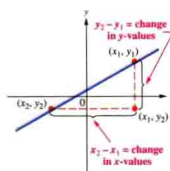


FIGURE 6.13

SLOPE FORMULA

The slope of the line through the points (x_1, y_1) and (x_2, y_2) is

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{if } x_1 \neq x_2.$$

The slope of a line tells how fast y changes for each unit of change in x ; that is, the slope gives the rate of change in y for each unit of change in x .

The idea of slope is useful in many everyday situations. For example, a highway with a 10% grade (or slope) rises 1 meter for every 10 meters horizontally. Architects specify the pitch of a roof by indicating the slope: a $5/12$ roof means that the roof rises 5 feet for every 12 feet in the horizontal direction. The slope of a stairwell also indicates the ratio of the vertical rise to the horizontal run. See Figure 6.14.

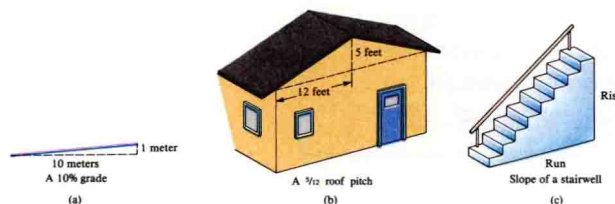


FIGURE 6.14

ADDITIONAL ANSWERS

52. $11x^2 - 3x + 1$
 65. $-6x^2 + 6x - 7$
 66. $3x^3 - 4x^2 - 2x - 2$
 67. $10x^4 - 6x^3 + 10x - 1$
 68. $-x^4 - 2x^3 - 3x^2 + x - 6$

ANSWERS to exercises are inserted next to the exercises in most cases and in the margin where necessary.

CALCULATOR SYMBOLS

highlight exercises that are especially appropriate to calculator use or sections of the text where the use of a calculator has been integrated. (When such symbols appear in the exercises, they are included in both the student text and the instructor's edition.)

45. Add. $12m^3 + m^2 + 12m - 14$

$$\begin{array}{r} 9m^3 - 5m^2 + 4m - 8 \\ 3m^3 + 6m^2 + 8m - 6 \\ \hline \end{array}$$

47. Subtract. $5a^4 - 4a^3 + 3a^2 - a + 1$

$$\begin{array}{r} 5a^4 - 3a^3 + 2a^2 \\ a^3 - a^2 + a - 1 \\ \hline \end{array}$$

46. Add. $4r^5 + r^4 - 4r^3 - 10r + 4$

$$\begin{array}{r} 12r^5 + 11r^4 - 7r^3 - 2r^2 - 5r - 3 \\ - 8r^5 - 10r^4 + 3r^3 + 2r^2 - 5r + 7 \\ \hline \end{array}$$

48. Add. $15w^3 + 8w - 5$

$$\begin{array}{r} 3w^2 - 5w + 2 \\ 4w^2 + 6w - 5 \\ 8w^2 + 7w - 2 \\ \hline \end{array}$$

Perform the indicated operations. See Examples 6–8.

49. $(3r^2 + 5r - 6) + (2r - 5r^2) - 2r^2 + 7r - 6$

51. $(x^2 + x) - (3x^2 + 2x - 1) - 2x^2 - x + 1$

53. $(16x^3 - x^2 + 3x) + (-12x^3 + 3x^2 + 2x) - 4x^3 + 2x^2 + 5x$

54. $(-2b^6 + 3b^4 - b^2) - (-b^6 + 2b^4 + 2b^2) - b^6 + b^4 - 3b^2$

55. $(7y^4 + 3y^2 + 2y) - (-18y^4 - 5y^2 - y) - 25y^4 + 8y^2 + 3y$

56. $(3x^2 + 2x + 5) - (-7x^2 - 8x + 2) + (3x^2 - 4x + 7) - 13x^2 + 6x + 10$

Find the perimeter of the geometric figures with sides of the following lengths.

57. rectangle; length: $3x^2 + 5x + 13$; width: $2x^2 - 6x + 10$ $10x^2 - 2x + 46$

58. rectangle; length: $5k^2 + 8x$; width: $2k^2 + 4x$ $14k^2 + 24x$

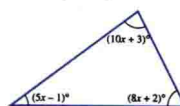
59. triangle; sides: $3r^2 + 2r$, $r^3 + r^2 + 4$, $9r + 6$ $r^3 + 4r^2 + 11r + 10$

60. triangle; sides: $4p^3 - 2p^2 + 3p$, $p^3 + 2p$, $5p^2 - p - 4$ $5p^3 + 3p^2 + 4p - 4$

The sum of the three angles in any triangle is 180° . Use this fact to find the value of the variables in the following exercises.

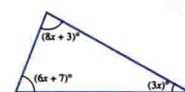
61.

$$\begin{array}{c} 7.652 \\ \hline \end{array}$$



62.

$$\begin{array}{c} 10 \\ \hline \end{array}$$



Perform the indicated operations in Exercises 63–66.

63. $[(8m^2 + 4m - 7) - (2m^2 - 5m + 2)] - (m^2 + m + 1) - 5m^2 + 8m - 10$

64. $[(9b^3 - 4b^2 + 3b + 2) - (-2b^3 - 3b^2 + b)] - (8b^3 + 6b + 4) - 3b^3 - b^2 - 4b - 2$

▲ 65. Subtract $9x^2 - 6x + 5$ from $3x^2 - 2$.

▲ 66. Add $x^3 + 4x^2 - 2x + 3$ to $2x^3 - 8x^2 - 5$.

▲ 67. Find the sum of $10x^4 - 3x^3 + 2x + 1$ and $3x^3 - 6x^2 + 8x - 2$.

▲ 68. Find the difference when $9x^4 + 3x^2 + 5$ is subtracted from $8x^4 - 2x^3 + x - 1$.

🔍 69. Why is the term 3^4 not degree 4?

🔍 70. Can a polynomial in more than one variable be written in descending powers? Explain your answer and give examples.

CONCEPTUAL

WRITING

CHALLENGE

To help identify the most appropriate exercises to cover, **SYMBOLS** with a corresponding **KEY** identify certain exercise types: writing, conceptual, and

The main reason students have difficulty with mathematics is that they don't know how to study it. Studying mathematics *is* different from studying subjects like English or history. The key to success is regular practice.

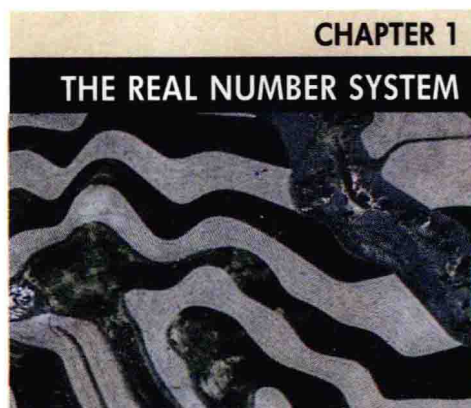
This should not be surprising. After all, can you learn to play the piano or to ski well without a lot of regular practice? The same thing is true for learning mathematics. Working problems nearly every day is the key to becoming successful. Here is a list of things you can do to help you succeed in studying algebra.

1. *Attend class regularly.* Pay attention in class to what your teacher says and does, and make careful notes. In particular, note the problems the teacher works on the board and copy the complete solutions. Keep these notes separate from your homework to avoid confusion when you read them over later.
2. Don't hesitate to ask questions in class. It is not a sign of weakness, but of strength. There are always other students with the same question who are too shy to ask.
3. *Read your text carefully.* Many students read only enough to get by, usually only the examples. Reading the complete section will help you to be successful with the homework problems. Most exercises are keyed to specific examples or objectives that will explain the procedures for working them.
4. Before you start on your homework assignment, rework the problems the teacher worked in class. This will reinforce what you have learned. Many students say, "I understand it perfectly when you do it, but I get stuck when I try to work the problem myself."
5. Do your homework assignment only *after* reading the text and reviewing your notes from class. Check your work with the answers in the back of the book. If you get a problem wrong and are unable to see why, mark that problem and ask your instructor about it. Then practice working additional problems of the same type to reinforce what you have learned.
6. Work as neatly as you can. Write your symbols clearly, and make sure the problems are clearly separated from each other. Working neatly will help you to think clearly and also make it easier to review the homework before a test.

7. After you have completed a homework assignment, look over the text again. Try to decide what the main ideas are in the lesson. Often they are clearly highlighted or boxed in the text.
8. Use the chapter test at the end of each chapter as a practice test. Work through the problems under test conditions, without referring to the text or the answers until you are finished. You may want to time yourself to see how long it takes you. When you have finished, check your answers against those in the back of the book and study those problems that you missed. Answers are referenced to the appropriate sections of the text.
9. Keep any quizzes and tests that are returned to you and use them when you study for future tests and the final exam. These quizzes and tests indicate what your instructor considers most important. Be sure to correct any problems on these tests that you missed, so you will have the corrected work to study.
10. Don't worry if you do not understand a new topic right away. As you read more about it and work through the problems, you will gain understanding. Each time you look back at a topic you will understand it a little better. No one understands each topic completely right from the start.

C O N T E N T S

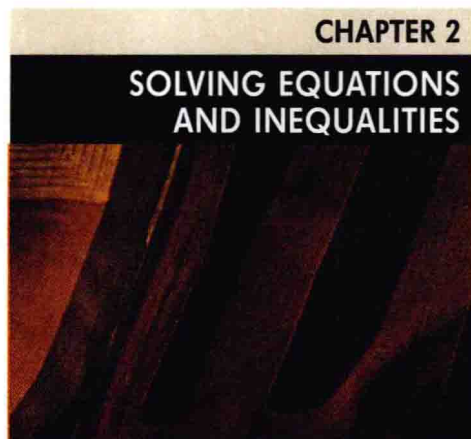
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