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Descriptions of Resources

This Chapter Resource Book is organized by lessons within the chapter in order to make your planning easier. The following materials are provided:

Tips for New Teachers These teaching notes provide both new and experienced teachers with useful teaching tips for each lesson, including tips about common errors and inclusion.

Parent Guide for Student Success This guide helps parents contribute to student success by providing an overview of the chapter along with questions and activities for parents and students to work on together.

Prerequisite Skills Review Worked-out examples are provided to review the prerequisite skills highlighted on the Study Guide page at the beginning of the chapter. Additional practice is included with each worked-out example.

Strategies for Reading Mathematics The first page teaches reading strategies to be applied to the current chapter and to later chapters. The second page is a visual glossary of key vocabulary.

Lesson Plans and Lesson Plans for Block Scheduling This planning template helps teachers select the materials they will use to teach each lesson from among the variety of materials available for the lesson. The block-scheduling version provides additional information about pacing.

Warm-Up Exercises and Daily Homework Quiz The warm-ups cover prerequisite skills that help prepare students for a given lesson. The quiz assesses students on the content of the previous lesson. (Transparencies also available)

Activity Support Masters These blackline masters make it easier for students to record their work on selected activities in the Student Edition.

Alternative Lesson Openers An engaging alternative for starting each lesson is provided from among these four types: *Application*, *Activity*, *Graphing Calculator*, or *Visual Approach*. (Color transparencies also available)

Graphing Calculator Activities with Keystrokes Keystrokes for four models of calculators are provided for each Technology Activity in the Student Edition, along with alternative Graphing Calculator Activities to begin selected lessons.

Practice A, B, and C These exercises offer additional practice for the material in each lesson, including application problems. There are three levels of practice for each lesson: A (basic), B (average), and C (advanced).

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Reteaching with Practice These two pages provide additional instruction, worked-out examples, and practice exercises covering the key concepts and vocabulary in each lesson.

Quick Catch-Up for Absent Students This handy form makes it easy for teachers to let students who have been absent know what to do for homework and which activities or examples were covered in class.

Cooperative Learning Activities These enrichment activities apply the math taught in the lesson in an interesting way that lends itself to group work.

Interdisciplinary Applications/Real-Life Applications Students apply the mathematics covered in each lesson to solve an interesting interdisciplinary or real-life problem.

Math and History Applications This worksheet expands upon the Math and History feature in the Student Edition.

Challenge: Skills and Applications Teachers can use these exercises to enrich or extend each lesson.

Quizzes The quizzes can be used to assess student progress on two or three lessons.

Chapter Review Games and Activities This worksheet offers fun practice at the end of the chapter and provides an alternative way to review the chapter content in preparation for the Chapter Test.

Chapter Tests A, B, and C These are tests that cover the most important skills taught in the chapter. There are three levels of test: A (basic), B (average), and C (advanced).

SAT/ACT Chapter Test This test also covers the most important skills taught in the chapter, but questions are in multiple-choice and quantitative-comparison format. (See *Alternative Assessment* for multi-step problems.)

Alternative Assessment with Rubrics and Math Journal A journal exercise has students write about the mathematics in the chapter. A multi-step problem has students apply a variety of skills from the chapter and explain their reasoning. Solutions and a 4-point rubric are included.

Project with Rubric The project allows students to delve more deeply into a problem that applies the mathematics of the chapter. Teacher's notes and a 4-point rubric are included.

Cumulative Review These practice pages help students maintain skills from the current chapter and preceding chapters.

Tips for New Teachers

For use with Chapter 1

LESSON 1.1

COMMON ERROR A student might recognize a number such as 2 as a whole number but not as a rational number because “it is not a fraction.” Use either a Venn diagram or a tree diagram to illustrate which sets of numbers are included in other sets, as well as those sets that have no elements in common.

TEACHING TIP To help students see the significance of the closure property, give them an example where the property does not hold true. For example, the set of whole numbers under the operation of subtraction is not a closed set. Ask your students to come up with other examples where the closure property does not work.

TEACHING TIP Ask your students which of the properties on page 5 are true for *subtraction* or *division*. Remind students that if they think that a property is false they need to come up with a counterexample. Emphasize that the order in which students subtract or divide will alter the result—in other words, subtraction and division are neither commutative nor associative.

TEACHING TIP Have your students analyze their answers to word problems to check whether they make sense. By doing so, they might find errors they made while solving the problem. For instance, in Example 7 on page 6, students know that the exchange rate is 8.5 pesos per dollar. If you exchange \$400, should you get more or less than 400 pesos? Students who incorrectly divided by the exchange rate rather than multiplying will be able to see that something is wrong with their solution.

LESSON 1.2

INCLUSION You might need to spend some time reviewing how to combine like terms, to avoid errors such as $3x^2 + 4x^2 = 7x^4$. If necessary, you can use algebra tiles to demonstrate how to combine like terms.

COMMON ERROR Many students still incorrectly use the Distributive Property when the expression inside the parentheses is being subtracted from another expression. For example, they might write $5x - (4x + y) = x + y$. Remind students that the

symbol in front of the parentheses affects every term inside them.

COMMON ERROR Students might evaluate expressions incorrectly, always doing multiplication before division and addition before subtraction. Remind students that dividing is just multiplying by the reciprocal and subtracting is really adding the opposite, as defined in Lesson 1.1. Since these operations are really the same thing, they are *at the same level* in order of operations.

LESSON 1.3

COMMON ERROR Students typically forget to multiply those terms without fractions when they use the LCD to eliminate the fractions in the equation. Ask students to protect both sides of the equation with parentheses and remind them to use the Distributive Property with every term of the equation.

TEACHING TIP After students are confident solving linear equations, give them examples of equations where the variables are eliminated. These equations always result in either identities such as $8 = 8$ or false statements such as $4 = 1$. Make sure to show students how to use these results to distinguish an equation with infinite solutions from an equation with no solutions.

LESSON 1.4

INCLUSION Breaking down a long task into smaller steps can be very helpful to some students. This could be the case for combining formulas as shown in Example 6 on page 28. Students must first find a formula that relates area and width. Then they have to identify what variables must be replaced in that formula so that only area and length are in it. The next step is to find *another* formula relating width and one of the specified quantities. They must then solve this formula for width and plug it into the original formula. After that, they have to simplify the resulting formula. You might need to write down these steps to help some students.

TEACHING TIP Although the slope-intercept equation of a line has not been taught in this course yet, students should have seen it in Algebra 1.

Tips for New Teachers

For use with Chapter 1

Therefore, you can ask them if they know of any reason to solve for y in a linear equation. You can even take it one step further and ask them if they know what the coefficient of the x and the constant term represent in this equation.

LESSON 1.5

INCLUSION Students' difficulties with word problems are often due to poor reading skills and, therefore, their lack of comprehension. Students can underline or circle any relevant information in the problem. Ask your students to tell you what the problem says in their own words to force them to think about the situation. Then apply consistently the sequence *verbal model-labels-algebraic model* as shown in the textbook so that students get used to using that sequence in every problem.

COMMON ERROR Once you show your students how to use the *guess, check, and revise* strategy they might try to use it for every problem they solve. Ask your students to save this strategy for problems where the equation they need to solve is nonlinear.

LESSON 1.6

COMMON ERROR Some students graph inequalities based on the direction in which the inequality symbol is pointing. The problem with this trick is that it only works if the variable is solved for on the left side of the inequality. You can show your students that the trick does not work for an inequality such as $4 < x$.

TEACHING TIP Compound inequalities are based on the mathematical ideas of *union*, for *or* statements, and *intersection*, for *and* statements. Discuss these two concepts with your students using nonmathematical examples to make sure that they understand them. Then you can show your students that the final solution for a compound inequality is always either the *union* or the *intersection* of two separate inequalities.

TEACHING TIP Test how much your students understood about compound inequalities by asking them to solve some unusual ones, such as the following ones:

$$3x - 4 > -1 \text{ and } 2x > 10$$

$$-4x + 1 > -7 \text{ or } x + 5 > 2$$

LESSON 1.7

TEACHING TIP An alternative method for solving absolute value inequalities is to first rewrite the inequality as an absolute value equation and find its two solutions. These two numbers will split the number line into three intervals. Now find what intervals belong to the solution. To do so, remember that absolute value inequalities such as $|ax + b| < c$ and $|ax + b| \leq c$ yield solutions in the interval between the two numbers, whereas those such as $|ax + b| > c$ and $|ax + b| \geq c$ result in solutions outside that same interval. Another option to determine what intervals are in the solution is to test numbers from each possible interval in the original inequality.

Outside Resources

BOOKS/PERIODICALS

Algebraic Thinking, Grades K–12: Readings from NCTM's School-Based Journals and Other Publications. Helps teachers understand the development of and activities that foster algebraic thinking. Reston, VA: NCTM, 1999.

ACTIVITIES/MANIPULATIVES

Coughlin, Robert S. Jr. "Sharing Teaching Ideas: Graphing Vertical and Horizontal Lines." *Mathematics Teacher* (March 1999), pp. 222–223.

SOFTWARE

Dugdale, Sharon, and David Kibbey. *Interpreting Graphs.* Interpret changes in a quantity through graphs. Pleasantville, NY: Sunburst Communications.

VIDEOS

Mathematics: Making the Connection. How mathematics is used in several professions. Reston, VA: NCTM, 1996.

Parent Guide for Student Success

For use with Chapter 1

Chapter Overview One way that you can help your student succeed in Chapter 1 is by discussing the lesson goals in the chart below. When a lesson is completed, ask your student to interpret the lesson goals for you and to explain how the mathematics of the lesson relates to one of the key applications listed in the chart.

<i>Lesson Title</i>	<i>Lesson Goals</i>	<i>Key Applications</i>
1.1: Real Numbers and Number Operations	Use a number line to graph and order real numbers. Identify properties and use operations with real numbers.	<ul style="list-style-type: none"> • Money Exchange • Masters Golf • Bar Codes
1.2: Algebraic Expressions and Models	Evaluate algebraic expressions and simplify algebraic expressions by combining like terms.	<ul style="list-style-type: none"> • Music • Average Salaries • Physical Therapy
1.3: Solving Linear Equations	Solve linear equations and use linear equations to answer questions about real-life situations.	<ul style="list-style-type: none"> • Real Estate • Photo Framing • Stockbroker
1.4: Rewriting Equations and Formulas	Solve an equation for one of its variables and rewrite common formulas.	<ul style="list-style-type: none"> • Benefit Concert • Honeybees • Baseball
1.5: Problem Solving Using Algebraic Models	Follow a general plan to solve a real-life problem and incorporate other strategies into the plan.	<ul style="list-style-type: none"> • Water Conservation • Railroads • The Chunnel
1.6: Solving Linear Inequalities	Solve simple and compound inequalities.	<ul style="list-style-type: none"> • Traffic Enforcement • Mars • Winter
1.7: Solving Absolute Value Equations and Inequalities	Solve absolute value equations and inequalities. Use absolute value equations and inequalities in real-life situations.	<ul style="list-style-type: none"> • Quality Control • Palm Widths • Sports Equipment

Study Strategy

Making a Vocabulary File is the study strategy featured in Chapter 1 (see page 2). Be sure your student has index cards and a box or envelope to store them. Encourage your student to make cards each day for any new terms and to use these cards to review regularly at home. You can “quiz” your student by reading the term and asking for the definition or vice versa.

Parent Guide for Student Success

For use with Chapter 1

Key Ideas Your student can demonstrate understanding of key concepts by working through the following exercises with you.

Lesson	Exercise
1.1	How much lower is Alamorio at -135 feet than Orita at -92 feet? Both are in Imperial Valley, California.
1.2	Evaluate $\frac{(x-4)^2}{xy}$ when $x = 3$ and $y = -2$.
1.3	Pants are on sale for \$36, which is 25% off the regular price. What is the regular price?
1.4	The formula for the volume of a rectangular prism is $V = lwh$, where l is the length, w is the width, and h is the height of the prism. Solve this formula for h .
1.5	The education support group has raised \$20,500 so far. How many raffle tickets priced at \$5 each must be sold in order to meet the \$22,000 goal?
1.6	Solve $4x - 9 > 2x + 11$.
1.7	The healthy weight of an adult who is 5 feet 7 inches tall is between 121 pounds and 159 pounds, inclusive. Write an absolute value inequality describing the healthy weights.

Home Involvement Activity

Directions: Write and solve an equation to find how many minutes you can talk long distance for \$20 using your current long distance service. If rates vary for different times and places, describe when and where you would like to call. Write and solve an inequality to find how long you can talk and spend no more than \$35.

$$1.1: 43 \text{ ft} \quad 1.2: -\frac{6}{1} \quad 1.3: \$48 \quad 1.4: h = \frac{lw}{V} \quad 1.5: 300 \quad 1.6: x > 10 \quad 1.7: |x - 140| \leq 19$$

ANSWERS

Prerequisite Skills Review

For use before Chapter 1

EXAMPLE 1 *Operations with Real Numbers*

Perform the operation.

a. $16 - (-8)$ b. $(-9)(7)$ c. $(-75) \div (-5)$ d. $15 + (-23)$

SOLUTION

a. $16 - (-8) = 16 + 8$
 $= 24$

Add 8, the opposite of -8 .

Simplify.

b. $(-9)(7) = -63$

Multiplying a negative number by a positive number is negative.

c. $-75 \div (-5) = 15$

Dividing a negative number by a negative number is positive.

d. $15 + (-23) = 15 - 23$
 $= -8$

Subtract 23, the opposite of -23 .

Simplify.

Exercises for Example 1

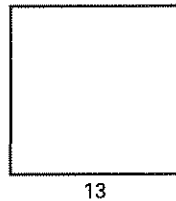
Perform the operation.

1. $(-7) + 10$ 2. $24 - (-5)$ 3. $(11)(-4)$ 4. $-24 \div (-6)$

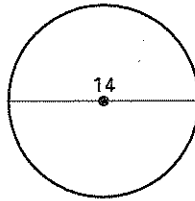
EXAMPLE 2 *Using Formulas to Find Area*

Find the area of the figure.

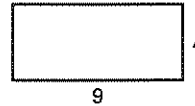
a. square



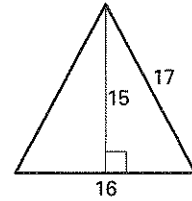
b. circle



c. rectangle



d. triangle

**SOLUTION**

Use the proper formula for finding areas and write your answer in terms of square units.

a. Use the formula for finding the area of a square, $A = s^2$.

$$A = 13^2$$

$$= 169 \text{ square units}$$

Prerequisite Skills Review

For use before Chapter 1

SOLUTION (continued)

- b. Use the formula for finding the area of a circle, $A = \pi r^2$. This formula requires using the radius of the circle. The radius of a circle is one-half the length of the diameter.

$$\begin{aligned} A &= \pi(7)^2 \\ &= 49\pi \text{ square units} \approx 153.9 \text{ square units} \quad \pi \approx 3.14 \end{aligned}$$

- c. Use the formula for finding the area of a rectangle, $A = lw$.

$$\begin{aligned} A &= (9)(4) \\ &= 36 \text{ square units} \end{aligned}$$

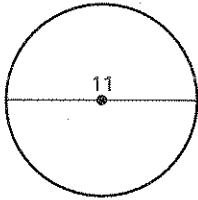
- d. Use the formula for finding the area of a triangle, $A = \frac{1}{2}bh$.

$$\begin{aligned} A &= \frac{1}{2}(16)(15) \\ &= 120 \text{ square units} \end{aligned}$$

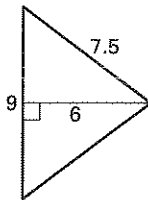
Exercises for Example 2

Find the area of the figure.

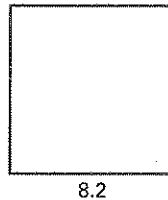
5. circle



6. triangle



7. square



8. rectangle

