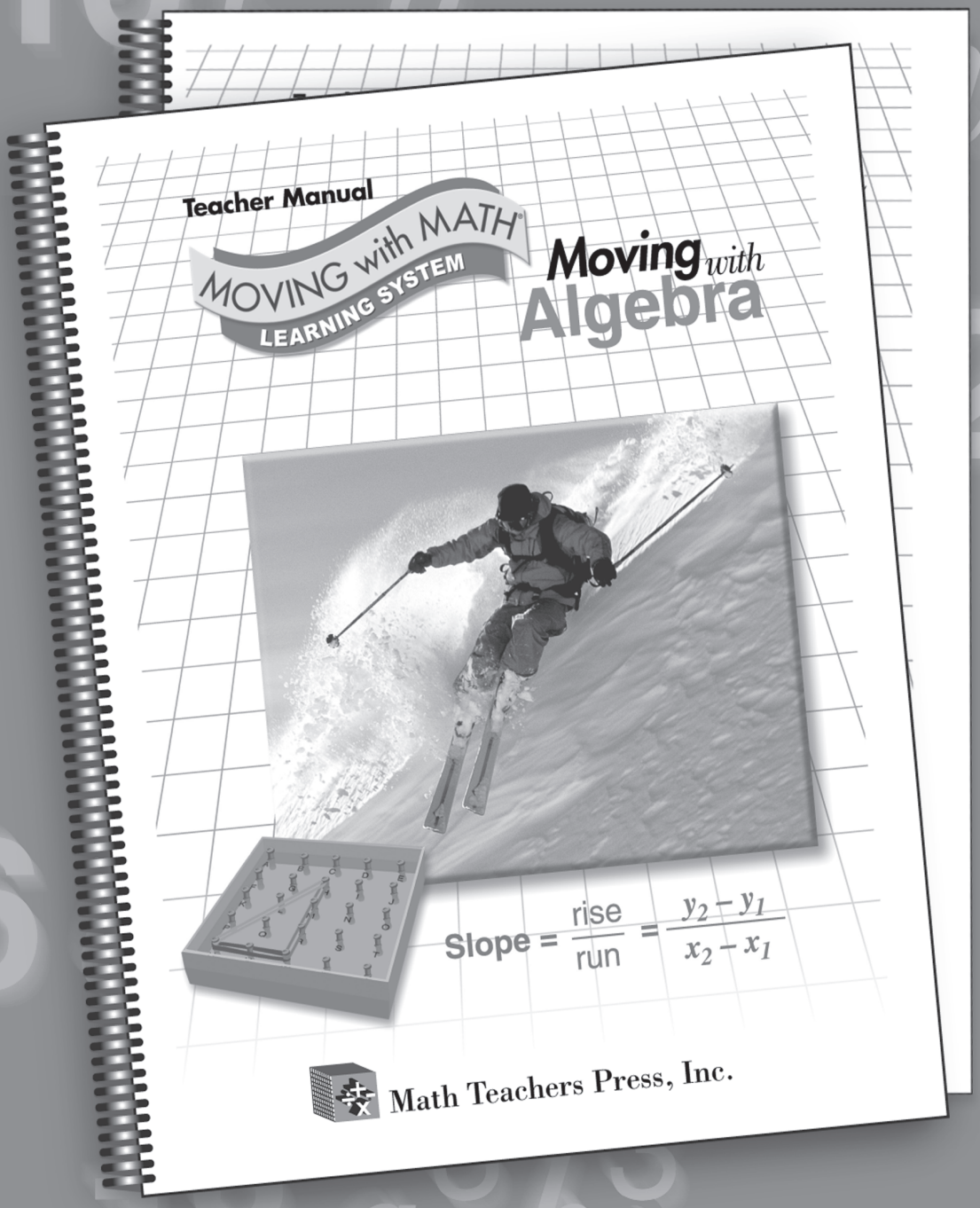
Moving with Algebra®

BUILDING THE FOUNDATIONS OF ALGEBRA

Moving with ***Algebra***® *Curriculum Guide*



Math Teachers Press, Inc.
(800) 852-2435

What is Moving with Algebra?

*Moving with **Algebra*** is an **algebra readiness program** that provides underprepared middle- and high-school students with the skills they will need to succeed in a formal algebra class. The program **focuses on content areas critical to success in algebra** and is designed around three principal features:

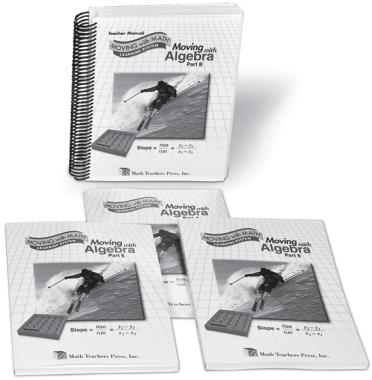
- **a standards-based** assessment and learning system
- **a conceptually based, hands-on** instructional model
- **exceptional instructional support**

The program is divided into two parts—Part A and Part B—to provide flexibility in curriculum planning.

Part A

*Moving with **Algebra***

- ✔ Unit 1 **Number Sense—**
  - expanded notation, place value, and the concept of a number line
  - properties of numbers
- ✔ Unit 2 **Fractions—**
  - ordering natural numbers, integers, and rational numbers
  - adding, subtracting, multiplying, and dividing integers and fractions
  - estimating and problem solving with fractions
- ✔ Unit 3 **Decimals and Percents—**
  - ratios and proportions
  - ordering and relating fractions and decimals
  - equivalent fractions, decimals, and percents
  - estimating and problem solving with decimals and percents



Part B

*Moving with **Algebra***

- ✔ Unit 4 **Geometry and Measurement—**
  - naming and constructing points, lines, rays, angles, and common figures
  - measuring angles and naming angles and triangles
  - perimeter, circumference, area, and volume
  - exponents, roots, and the Pythagorean theorem
  - ratios and proportions of similar figures
  - measurement and precision in customary and metric units
- ✔ Units 5 & 6 **Algebra and Algebra Functions—**
  - understanding order of operations
  - understanding the concept of equivalence in algebraic expressions
  - using tables and graphs to describe functions
  - linear equations and inequalities
  - solving word problems using algebraic concepts
  - graphing equations on a coordinate grid
  - writing equations in slope-intercept form

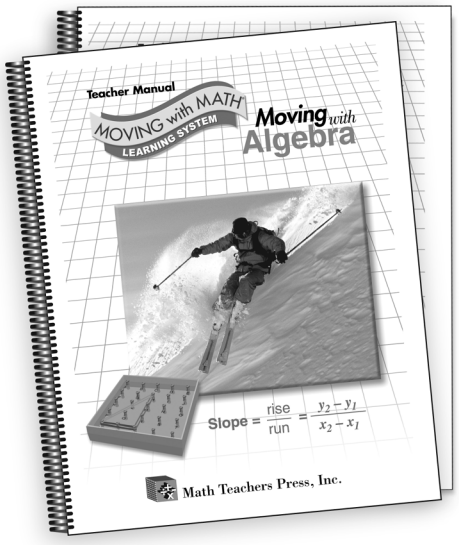
Organization of Materials

Program Components

Moving with ***Algebra*** is available in class sets for 20 or 30 students.

Student manipulatives and overhead manipulatives are sold separately.

Teacher Manual



Foreword

- Correlations to Objectives
- 90-lesson pacing plan for each Part

Lesson Plans Section

- Table of Contents
- Lightly scripted, manipulative-based lesson plans
- Instructions and answers for student book pages
- Follow-up activities: games, journal prompts, and suggested *Skill Builders* for reteaching

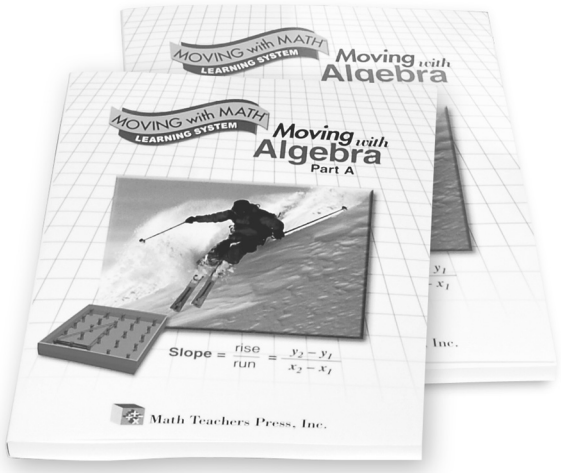
Assessment Section

- Student Progress Report
- Class Record Sheet
- Cumulative Pre- and Post-Tests for each Part (reproducible)
- Pre- and Post-Tests for each Unit (reproducible)
- Weekly Quizzes

Masters and Skill Builders Section (black-line reproducibles)

- Masters for lesson activities
- *Skill Builders* pages matched to standards for reteaching and extra practice
- Answer keys to *Skill Builders* pages
- Glossary

Student Activity Book



- 336 total student activity pages
- Blank Student Glossary
- 30 Weekly Quizzes (15 for Part A and 15 for Part B)
- Weekly Quiz Record Sheet results with *Skill Builders* recommended for reteaching

- Classroom manipulative kits and overhead manipulative kits—essential components of the curriculum. *Sold separately.*

The Problem with Algebra

"Algebra is the fork in the road where one direction leads to opportunity and the other to limited options for further education and promising careers."

–"Algebra for Everyone," Mathematics Education Trust, established by the National Council of Teachers of Mathematics

Algebra is widely (and correctly) viewed as the gateway to desirable career opportunities, including careers in engineering, medicine, and the sciences. Unfortunately, mastering algebra presents a serious challenge for many students. In response to this challenge, curriculum developers have broadened exposure to algebraic reasoning in early grades and made formal algebra courses available to a broader population of students. These increased expectations have, in turn, highlighted the need to prepare a more diverse student population for the rigors of a formal course in algebra. The *Moving with **Algebra*** program has been designed to address this need.

While important gains have been made in math proficiency among middle-school students (as measured by NAEP testing in 2007), less than one-third of eighth graders tested *Proficient* or higher in the most recent NAEP assessment. As has been seen in past testing, lack of conceptual understanding and weak problem-solving skills account for much of the problem, especially within the lowest quartile of test takers.

SAMPLE TEST QUESTION—NAEP 2007

Question: The sum of three numbers is 173. If the smallest number is 23, could the largest number be 62?
Explain your answer.

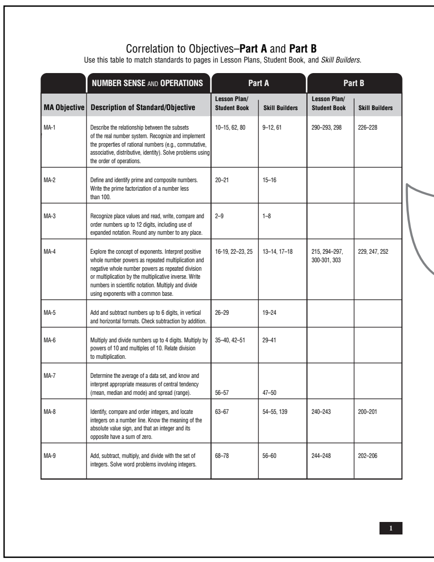
Correct: 42%

The arithmetic required to answer this question is not difficult but addressing the question correctly requires important problem-solving skills and a firm grasp of the concept of inequality. A student who cannot deal with a question like this is probably not ready for a formal course in algebra.

The Solution:
Moving with Algebra

Moving with ***Algebra*** tackles the challenge of algebra readiness in three important ways: **(1)** by employing a **standards-based assessment and learning system**, **(2)** by using **conceptually based instruction**, and **(3)** by providing **exceptional instructional support** in all aspects of the program.

Standards-based assessment and learning *differentiate instruction.*
See pages 9–19.



Correlation to Objectives–**Part A** and **Part B**
Use this table to match standards to pages in Lesson Plans, Student Book, and *Skill Builders.*

	NUMBER SENSE AND OPERATIONS	Part A		Part B	
MA Objective	Description of Standard/Objective	Lesson Plan/ Student Book	Skill Builders	Lesson Plan/ Student Book	Skill Builders
MA-1	Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.	10–15, 62, 80	9–12, 61	290–293, 298	226–228
MA-2	Define and identify prime and composite numbers. Write the prime factorization of a number less than 100.	20–21	15–16		
MA-3	Recognize place values and read, write, compare and order numbers up to 12 digits, including use of expanded notation. Round any number to any place.	2–9	1–8		
MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.	16-19, 22–23, 25	13–14, 17–18	215, 294–297, 300-301, 303	229, 247, 252
MA-5	Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.	26–29	19–24		
MA-6	Multiply and divide numbers up to 4 digits. Multiply by powers of 10 and multiples of 10. Relate division to multiplication.	35–40, 42–51	29–41		
MA-7	Determine the average of a data set, and know and interpret appropriate measures of central tendency (mean, median and mode) and spread (range).	56–57	47–50		
MA-8	Identify, compare and order integers, and locate integers on a number line. Know the meaning of the absolute value sign, and that an integer and its opposite have a sum of zero.	63–67	54–55, 139	240–243	200–201
MA-9	Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.	68–78	56–60	244–248	202–206

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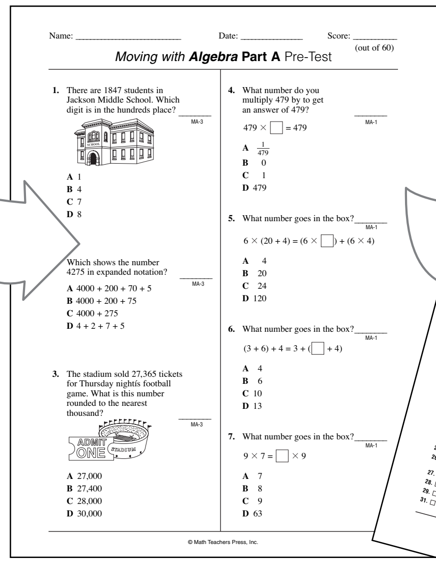


Name: ______________ Date: ______________ Score: __________ (out of 60)

Moving with ***Algebra*** **Part A** Pre-Test

1. There are 1847 students in Jackson Middle School. Which digit is in the hundreds place? ______ MA-3

A 1
B 4
C 7
D 8

Which shows the number 4275 in expanded notation? ______ MA-3

A 4000 + 200 + 70 + 5
B 4000 + 200 + 75
C 4000 + 275
D 4 + 2 + 7 + 5

3. The stadium sold 27,365 tickets for Thursday nightís football game. What is this number rounded to the nearest thousand? ______ MA-3

A 27,000
B 27,400
C 28,000
D 30,000

4. What number do you multiply 479 by to get an answer of 479? ______ MA-1

$479 \times \square = 479$

A $\frac{1}{479}$
B 0
C 1
D 479

5. What number goes in the box? ______ MA-1

$6 \times (20 + 4) = (6 \times \square) + (6 \times 4)$

A 4
B 20
C 24
D 120

6. What number goes in the box? ______ MA-1

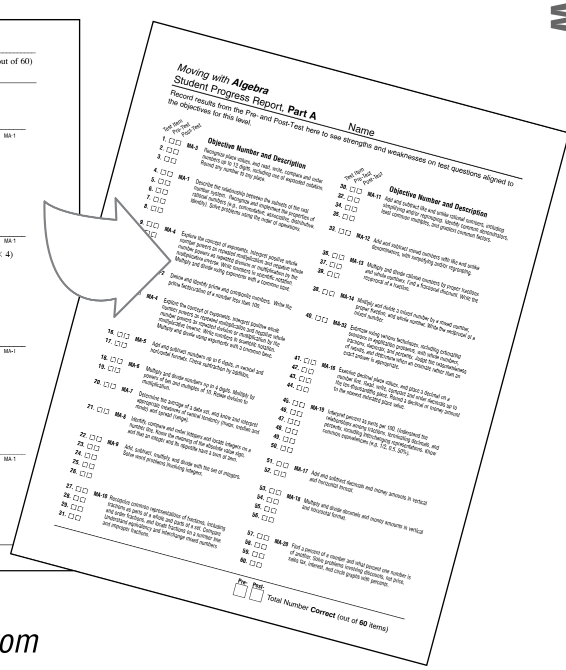
$(3 + 6) + 4 = 3 + (\square + 4)$

A 4
B 6
C 10
D 13

7. What number goes in the box? ______ MA-1

$9 \times 7 = \square \times 9$

A 7
B 8
C 9
D 63



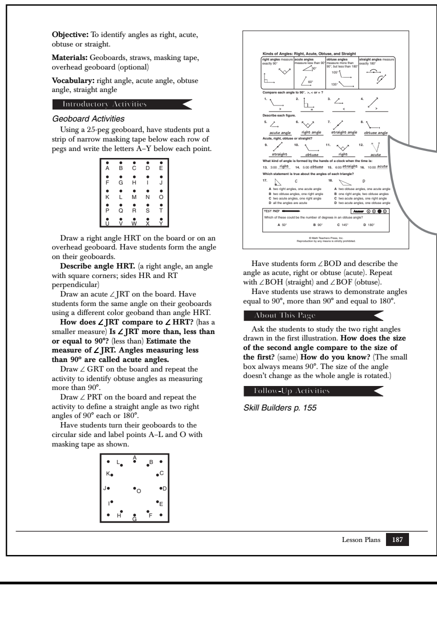
Moving with ***Algebra***
Student Progress Report, **Part A**
Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.
Name

Test Item / Pre-Test / Post-Test — **Objective Number and Description**

1.–3. **MA-3** Recognize place values, and read, write, compare and order numbers up to 12 digits, including use of expanded notation. Round any number to any place.
4.–8. **MA-1** Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.
9. **MA-4** Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
Define and identify prime and composite numbers. Write the prime factorization of a number less than 100.
MA-4 Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
16.–17. **MA-5** Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.
18.–19. **MA-6** Multiply and divide numbers up to 4 digits. Multiply by powers of ten and multiples of 10. Relate division to multiplication.
20. **MA-7** Determine the average of a data set, and know and interpret appropriate measures of central tendency (mean, median and mode) and spread (range).
21. **MA-8** Identify, compare and order integers and locate integers on a number line. Know the meaning of the absolute value sign, and that an integer and its opposite have a sum of zero.
22.–26. **MA-9** Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.
27.–31. **MA-10** Recognize common representations of fractions, including fractions as parts of a whole and parts of a set. Compare and order fractions, and locate fractions on a number line. Understand equivalency and interchange mixed numbers and improper fractions.
30., 32., 34., 35. **MA-11** Add and subtract like and unlike rational numbers, including simplifying and/or regrouping. Identify common denominators, least common multiples, and greatest common factors.
33. **MA-12** Add and subtract mixed numbers with like and unlike denominators, with simplifying and/or regrouping.
36., 37., 39. **MA-13** Multiply and divide rational numbers by proper fractions and whole numbers. Find a fractional discount. Write the reciprocal of a fraction.
38. **MA-14** Multiply and divide a mixed number by a mixed number, proper fraction, and whole number. Write the reciprocal of a mixed number.
40. **MA-33** Estimate using various techniques, including estimating solutions to application problems, with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.
41.–44. **MA-16** Examine decimal place values, and place a decimal on a number line. Read, write, compare and order decimals up to the ten-thousandths place. Round a decimal or money amount to the nearest indicated place value.
45.–50. **MA-19** Interpret percent as parts per 100. Understand the relationships among fractions, terminating decimals, and percents, including interchanging representations. Know common equivalencies (e.g. 1/2, 0.5, 50%).
51.–52. **MA-17** Add and subtract decimals and money amounts in vertical and horizontal format.
53.–56. **MA-18** Multiply and divide decimals and money amounts in vertical and horizontal format.
57.–60. **MA-20** Find a percent of a number and what percent one number is of another. Solve problems involving discounts, net price, sales tax, interest, and circle graphs with percents.

Pre- Post- Total Number **Correct** (out of **60** items)

Conceptually based instruction *guides teachers and students from hands-on activities to the abstract expression of concepts.*
See pages 7–8, 15.



Objective: To identify angles as right, acute, obtuse or straight.

Materials: Geoboards, straws, masking tape, overhead geoboard (optional)

Vocabulary: right angle, acute angle, obtuse angle, straight angle

Introductory Activities

Geoboard Activities

Using a 25-peg geoboard, have students put a strip of narrow masking tape below each row of pegs and write the letters A–Y below each point.

Draw a right angle HRT on the board or on an overhead geoboard. Have students form the angle on their geoboards.

Describe angle HRT. (a right angle, an angle with square corners; sides HR and RT perpendicular)

Draw an acute ∠JRT on the board. Have students form the same angle on their geoboards using a different color geoband than angle HRT.

How does ∠JRT compare to ∠HRT? (has a smaller measure) **Is ∠JRT more than, less than or equal to 90°?** (less than) **Estimate the measure of ∠JRT. Angles measuring less than 90° are called acute angles.**

Draw ∠GRT on the board and repeat the activity to identify obtuse angles as measuring more than 90°.

Draw ∠PRT on the board and repeat the activity to define a straight angle as two right angles of 90° each or 180°.

Have students turn their geoboards to the circular side and label points A–L and O with masking tape as shown.

Have students form ∠BOD and describe the angle as acute, right or obtuse (acute). Repeat with ∠BOH (straight) and ∠BOF (obtuse).

Have students use straws to demonstrate angles equal to 90°, more than 90° and equal to 180°.

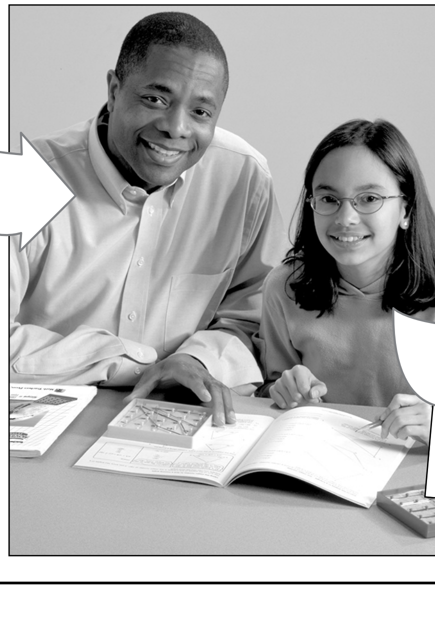
About This Page

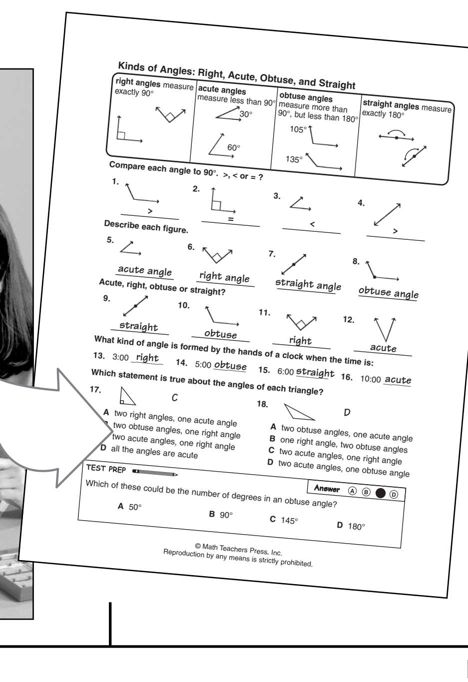
Ask the students to study the two right angles drawn in the first illustration. **How does the size of the second angle compare to the size of the first?** (same) **How do you know?** (The small box always means 90°. The size of the angle doesn't change as the whole angle is rotated.)

Follow-Up Activities

Skill Builders p. 155

Lesson Plans 187





Kinds of Angles: Right, Acute, Obtuse, and Straight

right angles measure exactly 90°
acute angles measure less than 90° (30°, 60°)
obtuse angles measure more than 90°, but less than 180° (105°, 135°)
straight angles measure exactly 180°

Compare each angle to 90°. >, < or = ?
1. > 2. = 3. < 4. >

Describe each figure.
5. acute angle 6. right angle 7. straight angle 8. obtuse angle

Acute, right, obtuse or straight?
9. straight 10. obtuse 11. right 12. acute

What kind of angle is formed by the hands of a clock when the time is:
13. 3:00 right 14. 5:00 obtuse 15. 6:00 straight 16. 10:00 acute

Which statement is true about the angles of each triangle?

17. C
A two right angles, one acute angle
B two obtuse angles, one right angle
C two acute angles, one right angle
D all the angles are acute

18. D
A two obtuse angles, one acute angle
B one right angle, two obtuse angles
C two acute angles, one right angle
D two acute angles, one obtuse angle

TEST PREP
Which of these could be the number of degrees in an obtuse angle?
A 50° B 90° C 145° D 180°
Answer: C

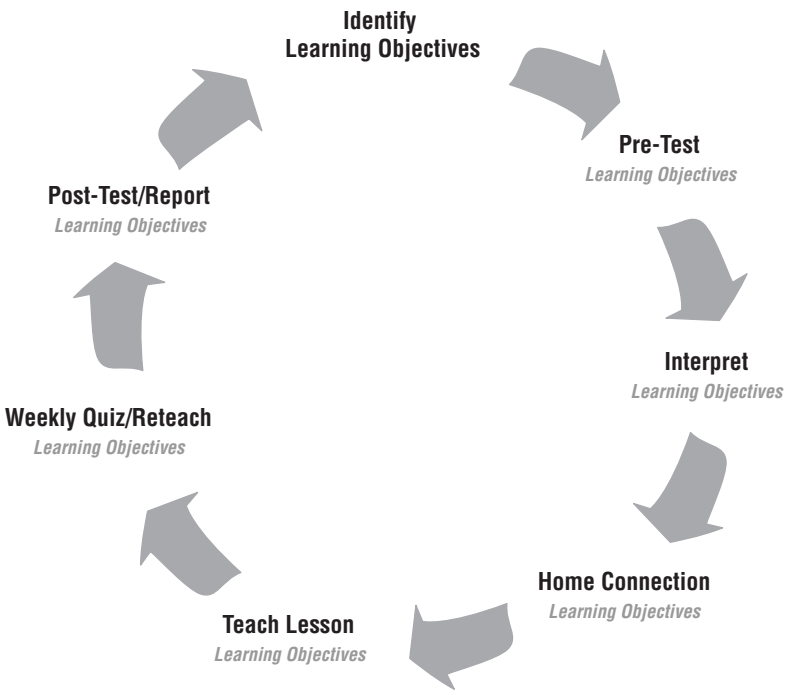
Moving with Algebra Solution: A Standards-Based Assessment and Learning System

All components of *Moving with* ***Algebra***—Pre-Tests, lesson plans, weekly quizzes, skill-building practice sheets, and Post-Tests (with matching record sheets)—are explicitly correlated to math content standards and learning objectives. By linking teaching, testing, and reteaching to clearly stated objectives, *Moving with* ***Algebra*** keeps both teacher and student on task and simplifies the job of diagnosing, tracking, and reporting student progress.

"All elements of the curriculum, instruction, materials, and assessment should be aligned to common learning goals."

–Adding It Up: Helping Children Learn Mathematics, National Research Council, J. Kilpatrick, J. Swafford, and B. Findell

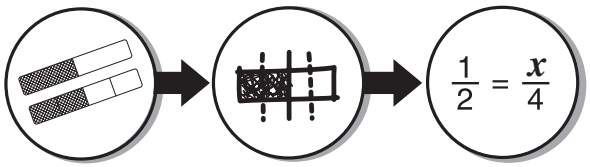
Moving with ***Algebra*** Assessment and Learning System



The Linking Wheel above illustrates how *Moving with* ***Algebra*** connects learning objectives (and state content standards) to all aspects of the program. This integrated linkage ensures that students, teachers, parents, and administrators remain focused on shared goals and informed about student progress toward reaching them.

Moving with **Algebra Solution: A Conceptually Based Instructional Model**

Every *Moving with* ***Algebra*** lesson starts with a hands-on activity that provides a solid, concrete basis for understanding the math concept presented in the lesson. Students develop conceptual understanding and acquire math vocabulary and skills through these manipulative-based activities and problem-solving situations. *Moving with* ***Algebra*** students are guided from this hands-on exploration of concepts through the transitional stage where those concepts are represented in drawings and communicated both orally and in writing and, finally, to the presentation of those same concepts using the formal (abstract) symbols of algebra.



Since algebra is the language of generalization, showing students how to move from a hands-on problem to a more general (and abstract) statement is especially crucial. The ability to do so prepares the way for restating the problem in the formal language of algebra.

The *Moving with* ***Algebra*** instructional model enables all students to be successful, regardless of their academic background, English language proficiency, or special learning needs. The guided, hands-on manipulations, written journal entries, games, and teacher-led and student-generated discussions also address the persistent *achievement gap* by fully acknowledging multiple intelligences and learning styles. The range of learning activities included in the curriculum opens the door to learning for every student.

"We remember 10% of what we hear, 30% of what we see, and 90% of what we do."

–Jean Piaget

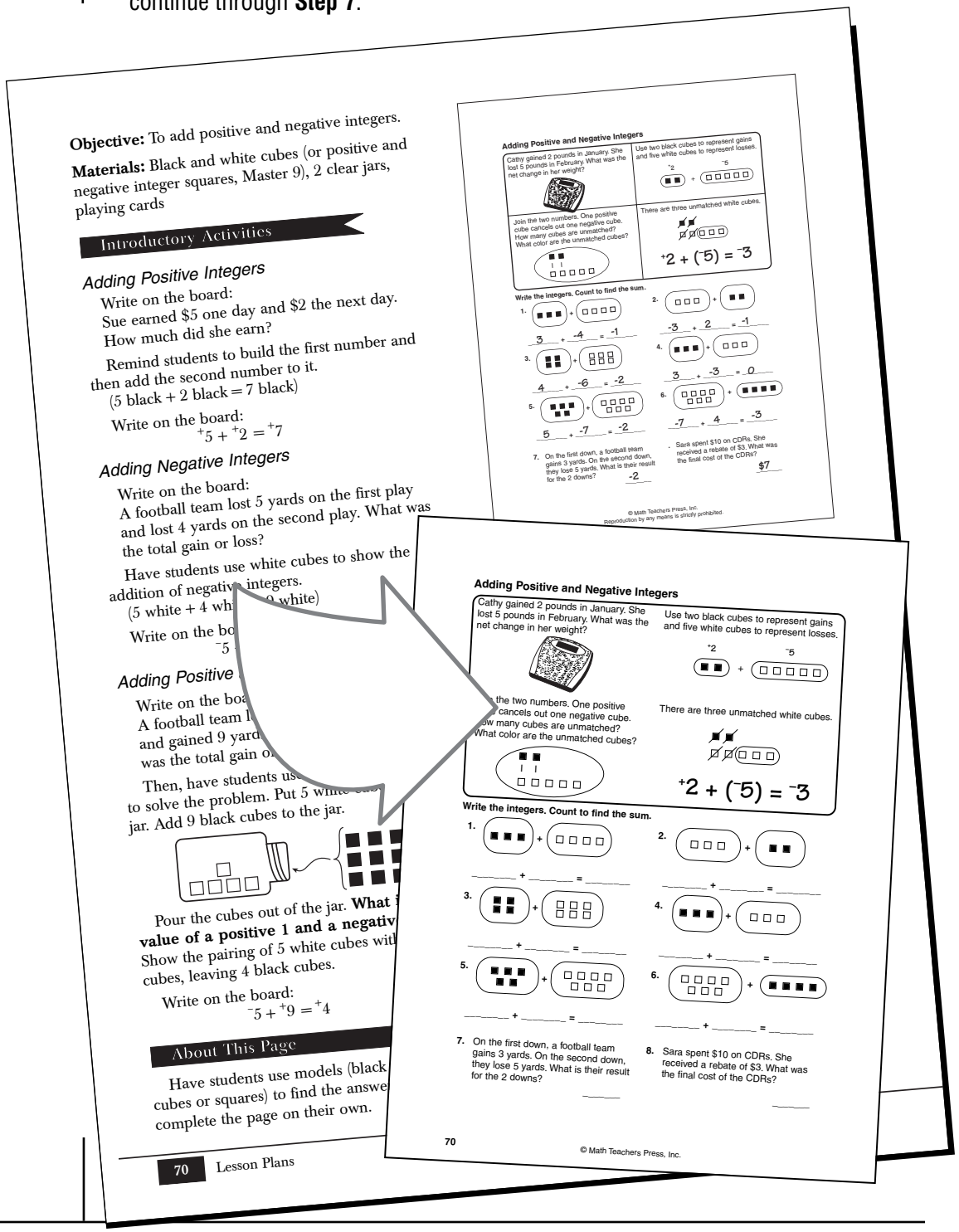
Moving with Algebra Solution: Exceptional Instructional Support

Moving with ***Algebra*** has been designed to guide and support teachers through all phases of planning, teaching, and assessment**.** Pages 9–19 will guide you through our teacher-friendly curriculum. Start at **Step 1** and continue through **Step 7**.

"I know how to teach algebra. I just don't know what to do when they don't get it."

–Math Teacher

LA Times, October 28, 2003



Objective: To add positive and negative integers.

Materials: Black and white cubes (or positive and negative integer squares, Master 9), 2 clear jars, playing cards

Introductory Activities

Adding Positive Integers

Write on the board:
Sue earned $5 one day and $2 the next day.
How much did she earn?

Remind students to build the first number and then add the second number to it.
(5 black + 2 black = 7 black)

Write on the board:
$^{+}5 + {}^{+}2 = {}^{+}7$

Adding Negative Integers

Write on the board:
A football team lost 5 yards on the first play and lost 4 yards on the second play. What was the total gain or loss?

Have students use white cubes to show the addition of negative integers.
(5 white + 4 wh… white)

Write on the bo…
$^{-}5$ …

Adding Positive

Write on the boa…
A football team l…
and gained 9 yard…
was the total gain o…

Then, have students us…
to solve the problem. Put 5 whi…
jar. Add 9 black cubes to the jar.

Pour the cubes out of the jar. **What i…**
value of a positive 1 and a negativ…
Show the pairing of 5 white cubes with… cubes, leaving 4 black cubes.

Write on the board:
$^{-}5 + {}^{+}9 = {}^{+}4$

About This Page

Have students use models (black… cubes or squares) to find the answe… complete the page on their own.

70 Lesson Plans

Adding Positive and Negative Integers

Cathy gained 2 pounds in January. She lost 5 pounds in February. What was the net change in her weight?

Use two black cubes to represent gains and five white cubes to represent losses.

$^{+}2$ + $^{-}5$

Join the two numbers. One positive cube cancels out one negative cube. How many cubes are unmatched? What color are the unmatched cubes?

There are three unmatched white cubes.

$^{+}2 + (^{-}5) = {}^{-}3$

Write the integers. Count to find the sum.

1. 3 + -4 = -1
2. -3 + 2 = -1
3. 4 + -6 = -2
4. 3 + -3 = 0
5. 5 + -7 = -2
6. -7 + 4 = -3
7. On the first down, a football team gains 3 yards. On the second down, they lose 5 yards. What is their result for the 2 downs? -2
8. Sara spent $10 on CDRs. She received a rebate of $3. What was the final cost of the CDRs? $7

Adding Positive and Negative Integers

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There are three unmatched white cubes.

$^{+}2 + (^{-}5) = {}^{-}3$

Write the integers. Count to find the sum.

1. _____ + _____ = _____
2. _____ + _____ = _____
3. _____ + _____ = _____
4. _____ + _____ = _____
5. _____ + _____ = _____
6. _____ + _____ = _____
7. On the first down, a football team gains 3 yards. On the second down, they lose 5 yards. What is their result for the 2 downs? _____
8. Sara spent $10 on CDRs. She received a rebate of $3. What was the final cost of the CDRs? _____

70

Math Content Standards and Learning Objectives. Learning objectives correlated to state and national math content standards are integrated into all components of *Moving with **Algebra.*** This integration simplifies the job of targeting instruction and provides accountability to districts, parents, and students.

Correlation to Objectives–**Part A** and **Part B**

Use this table to match standards to pages in Lesson Plans, Student Book, and *Skill Builders.*

	NUMBER SENSE AND OPERATIONS	Part A		Part B	
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MA-9	Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.	68–78	56–60	244–248	202–206

Learning Objectives drive the *Moving with **Algebra*** learning system.

Learning Objectives are linked to the Lesson Plans/Student Book and reproducible *Skill Builders.*

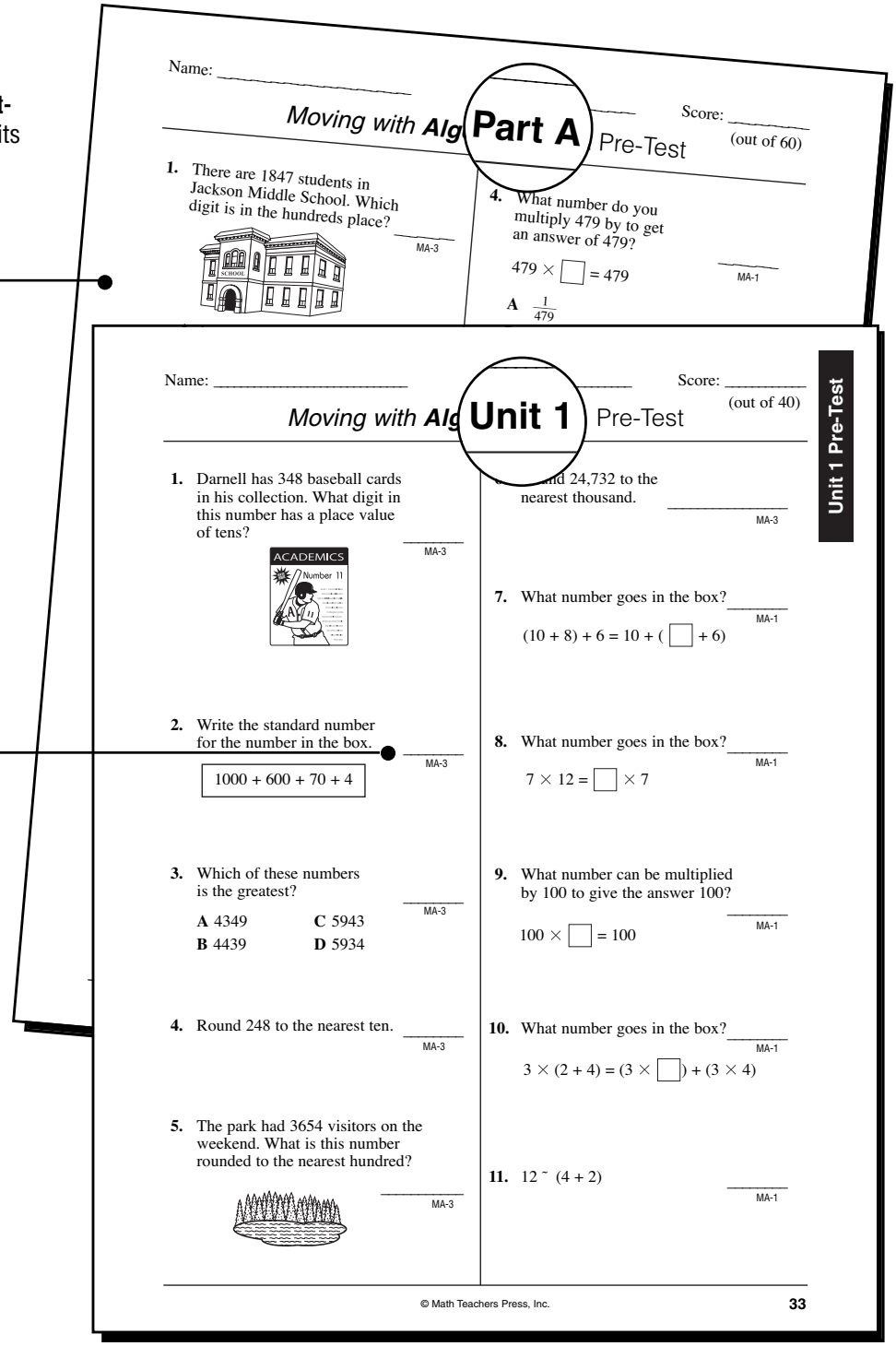
Step 2

Pre-Test Learning Objectives

Pre- and **Post-Tests** for Part A and Part B, as well as for each of the six units in the curriculum, identify learning needs and measure both student and class progress.

CUMULATIVE Pre- and **Post-Tests** covering the three Units of both Part A and Part B measure student growth over the entire program.

UNIT Pre- and Post-Tests provide data to differentiate instruction. Test questions are linked to **learning objectives,** so a teacher can precisely identify the objectives on which the student needs to focus.



Name: _____ Score: _____ (out of 60)

Moving with Alg **Part A** Pre-Test

1. There are 1847 students in Jackson Middle School. Which digit is in the hundreds place? _____ MA-3

4. What number do you multiply 479 by to get an answer of 479?

$479 \times \square = 479$ _____ MA-1

A $\frac{1}{479}$

Name: _____ Score: _____ (out of 40)

Moving with Alg **Unit 1** Pre-Test

Unit 1 Pre-Test

1. Darnell has 348 baseball cards in his collection. What digit in this number has a place value of tens? _____ MA-3

ACADEMICS Number 11

2. Write the standard number for the number in the box. _____ MA-3

1000 + 600 + 70 + 4

3. Which of these numbers is the greatest? _____ MA-3

A 4349 **C** 5943
B 4439 **D** 5934

4. Round 248 to the nearest ten. _____ MA-3

5. The park had 3654 visitors on the weekend. What is this number rounded to the nearest hundred? _____ MA-3

[illegible] 24,732 to the nearest thousand. _____ MA-3

7. What number goes in the box? _____ MA-1

$(10 + 8) + 6 = 10 + (\square + 6)$

8. What number goes in the box? _____ MA-1

$7 \times 12 = \square \times 7$

9. What number can be multiplied by 100 to give the answer 100? _____ MA-1

$100 \times \square = 100$

10. What number goes in the box? _____ MA-1

$3 \times (2 + 4) = (3 \times \square) + (3 \times 4)$

11. $12 \cdot (4 + 2)$ _____ MA-1

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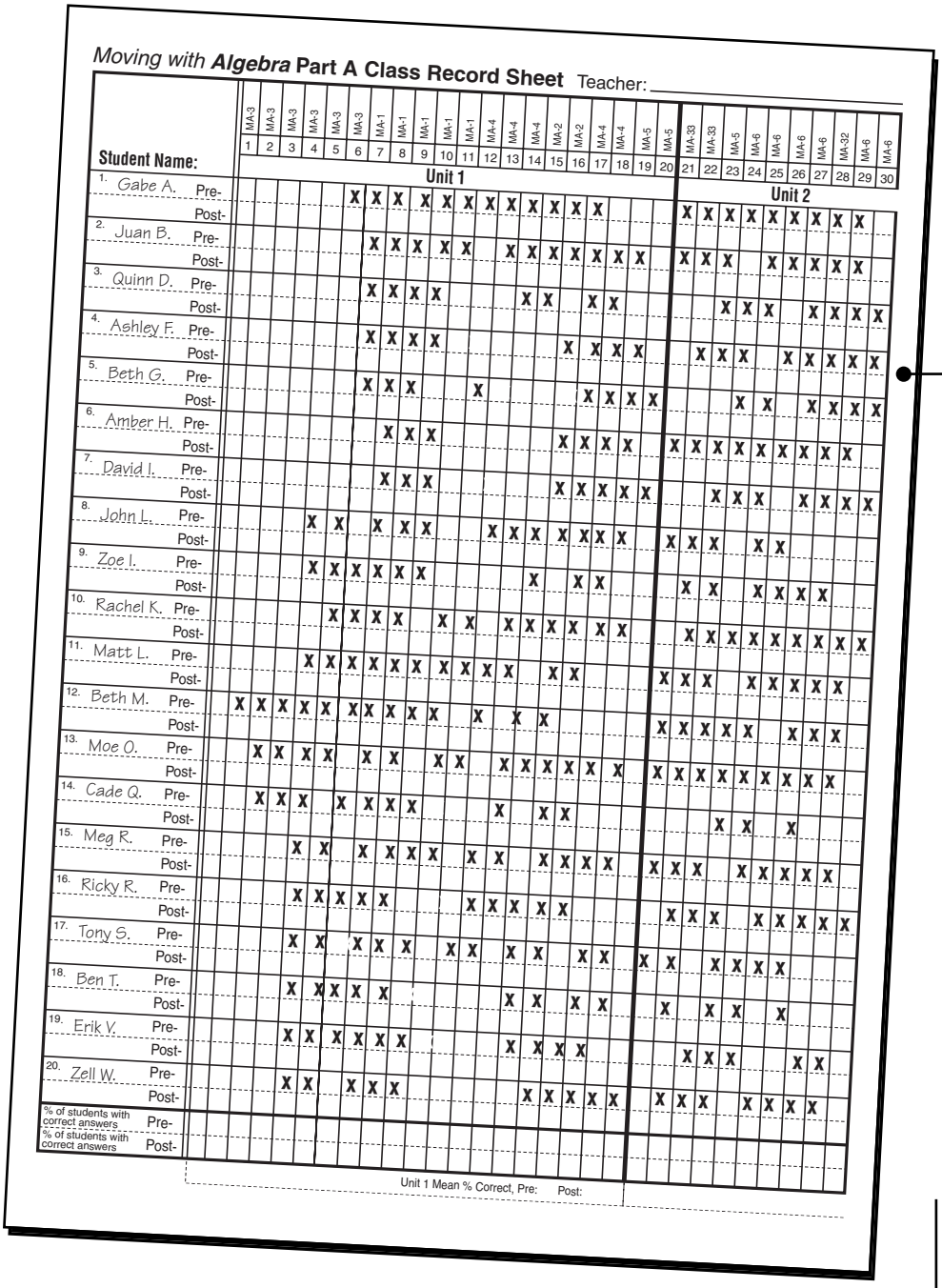
The **Class Record Sheet** is grouped by objective, so a teacher can identify class weaknesses for each learning objective/standard, and identify *individual* students who are at-risk. At a glance, teachers can also select students for differentiated instruction in small groups.



*Moving with **Algebra** Part A Class Record Sheet* Teacher: _____

Student Name:	MA-3 1	MA-3 2	MA-3 3	MA-3 4	MA-3 5	MA-3 6	MA-1 7	MA-1 8	MA-1 9	MA-1 10	MA-1 11	MA-4 12	MA-4 13	MA-4 14	MA-2 15	MA-2 16	MA-4 17	MA-4 18	MA-5 19	MA-5 20	MA-33 21	MA-33 22	MA-5 23	MA-6 24	MA-6 25	MA-6 26	MA-6 27	MA-32 28	MA-6 29	MA-6 30
	Unit 1																				Unit 2									
1. Gabe A. Pre-							X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	
Post-																														
2. Juan B. Pre-							X	X	X	X	X		X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	
Post-																														
3. Quinn D. Pre-							X	X	X	X				X	X		X	X					X	X	X		X	X	X	X
Post-																														
4. Ashley F. Pre-							X	X	X	X						X	X	X	X			X	X	X		X	X	X	X	
Post-																														
5. Beth G. Pre-							X	X	X			X					X	X	X	X				X	X		X	X	X	X
Post-																														
6. Amber H. Pre-								X	X	X						X	X	X	X		X	X	X	X	X	X	X	X	X	
Post-																														
7. David I. Pre-								X	X	X						X	X	X	X	X		X	X	X		X	X	X	X	X
Post-																														
8. John L. Pre-					X	X		X	X	X			X	X	X	X	X	X	X		X	X	X		X	X				
Post-																														
9. Zoe I. Pre-					X	X	X	X	X	X					X		X	X				X	X		X	X	X	X		
Post-																														
10. Rachel K. Pre-						X	X	X	X		X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	
Post-																														
11. Matt L. Pre-					X	X	X	X	X	X	X	X	X	X		X	X				X	X	X		X	X	X	X	X	
Post-																														
12. Beth M. Pre-	X	X	X	X	X	X	X	X	X	X		X		X	X						X	X	X	X		X	X	X		
Post-																														
13. Moe O. Pre-		X	X	X	X		X	X		X	X		X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	
Post-																														
14. Cade Q. Pre-		X	X	X		X	X	X	X				X		X	X							X	X		X				
Post-																														
15. Meg R. Pre-				X	X		X	X	X	X		X	X		X	X	X	X			X	X	X		X	X	X	X	X	
Post-																														
16. Ricky R. Pre-				X	X	X	X	X				X	X	X	X	X						X	X	X		X	X	X	X	X
Post-																														
17. Tony S. Pre-				X	X		X	X	X		X	X		X	X		X	X			X	X		X	X		X	X	X	X
Post-																														
18. Ben T. Pre-				X	X	X	X	X					X	X		X	X				X		X	X		X				
Post-																														
19. Erik V. Pre-				X	X	X	X	X	X				X	X	X	X						X	X	X			X	X		
Post-																														
20. Zell W. Pre-				X	X		X	X	X					X	X	X	X	X			X	X	X		X	X	X	X		
Post-																														
% of students with correct answers Pre-																														
% of students with correct answers Post-																														

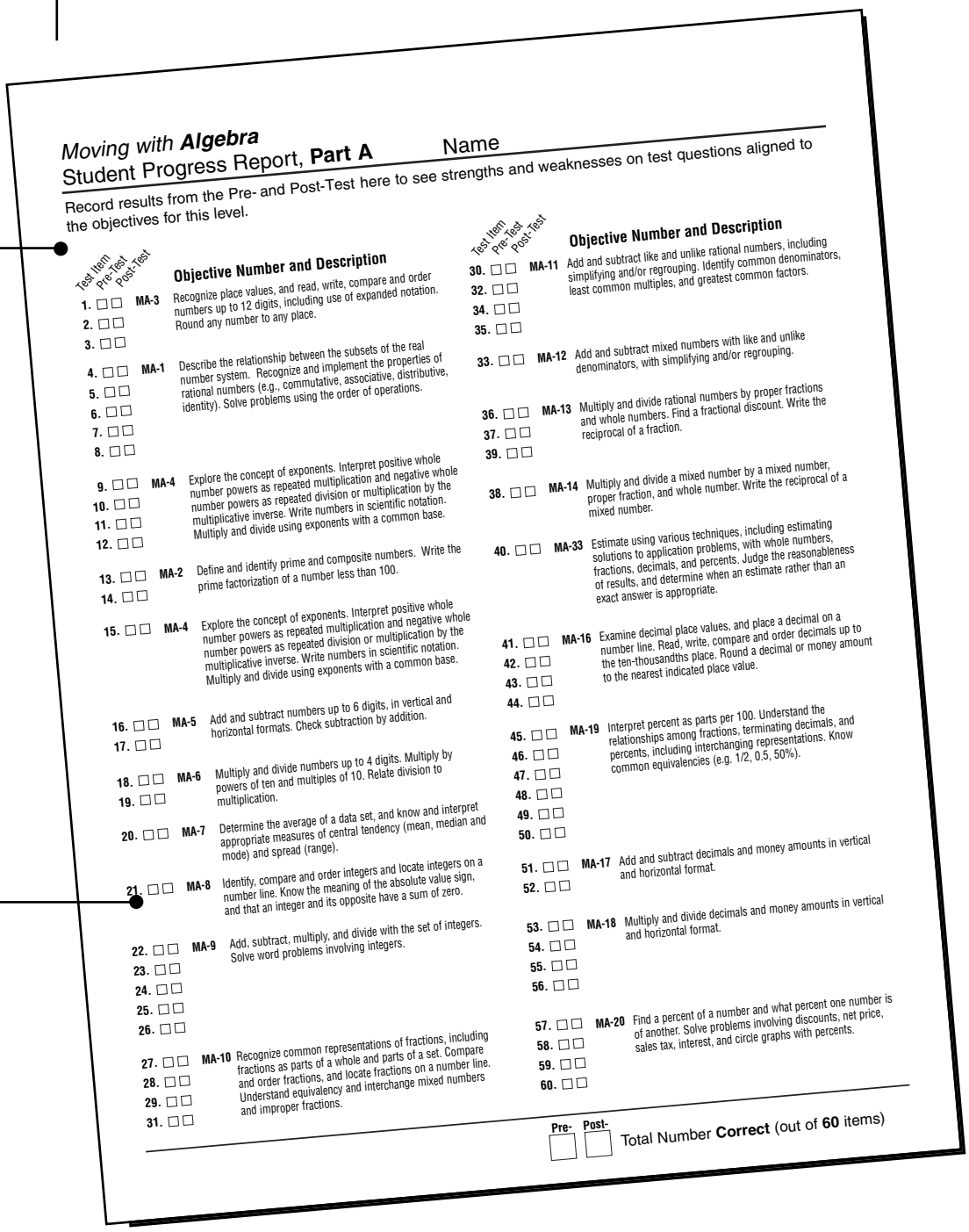
Unit 1 Mean % Correct, Pre: Post:

The **Class Record Sheet** allows the teacher to identify at-risk students, group students for differentiated instruction, and identify content objectives that need extra attention.

Step 4 Identify Student Needs

The **Student Progress Report** is designed to provide an Individualized Education Plan (IEP) for each student. It is also an excellent tool to communicate student strengths and weaknesses to parents and guardians.

The **Student Progress Report** is matched to learning objectives/ standards and can be used to evaluate individual needs and progress.



*Moving with **Algebra***
Student Progress Report, **Part A** Name

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item Pre-Test Post-Test		Objective Number and Description
1. ☐☐	MA-3	Recognize place values, and read, write, compare and order numbers up to 12 digits, including use of expanded notation. Round any number to any place.
2. ☐☐		
3. ☐☐		
4. ☐☐	MA-1	Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.
5. ☐☐		
6. ☐☐		
7. ☐☐		
8. ☐☐		
9. ☐☐	MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
10. ☐☐		
11. ☐☐		
12. ☐☐		
13. ☐☐	MA-2	Define and identify prime and composite numbers. Write the prime factorization of a number less than 100.
14. ☐☐		
15. ☐☐	MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
16. ☐☐	MA-5	Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.
17. ☐☐		
18. ☐☐	MA-6	Multiply and divide numbers up to 4 digits. Multiply by powers of ten and multiples of 10. Relate division to multiplication.
19. ☐☐		
20. ☐☐	MA-7	Determine the average of a data set, and know and interpret appropriate measures of central tendency (mean, median and mode) and spread (range).
21. ☐☐	MA-8	Identify, compare and order integers and locate integers on a number line. Know the meaning of the absolute value sign, and that an integer and its opposite have a sum of zero.
22. ☐☐	MA-9	Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.
23. ☐☐		
24. ☐☐		
25. ☐☐		
26. ☐☐		
27. ☐☐	MA-10	Recognize common representations of fractions, including fractions as parts of a whole and parts of a set. Compare and order fractions, and locate fractions on a number line. Understand equivalency and interchange mixed numbers and improper fractions.
28. ☐☐		
29. ☐☐		
31. ☐☐		
30. ☐☐	MA-11	Add and subtract like and unlike rational numbers, including simplifying and/or regrouping. Identify common denominators, least common multiples, and greatest common factors.
32. ☐☐		
34. ☐☐		
35. ☐☐		
33. ☐☐	MA-12	Add and subtract mixed numbers with like and unlike denominators, with simplifying and/or regrouping.
36. ☐☐	MA-13	Multiply and divide rational numbers by proper fractions and whole numbers. Find a fractional discount. Write the reciprocal of a fraction.
37. ☐☐		
39. ☐☐		
38. ☐☐	MA-14	Multiply and divide a mixed number by a mixed number, proper fraction, and whole number. Write the reciprocal of a mixed number.
40. ☐☐	MA-33	Estimate using various techniques, including estimating solutions to application problems, with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.
41. ☐☐	MA-16	Examine decimal place values, and place a decimal on a number line. Read, write, compare and order decimals up to the ten-thousandths place. Round a decimal or money amount to the nearest indicated place value.
42. ☐☐		
43. ☐☐		
44. ☐☐		
45. ☐☐	MA-19	Interpret percent as parts per 100. Understand the relationships among fractions, terminating decimals, and percents, including interchanging representations. Know common equivalencies (e.g. 1/2, 0.5, 50%).
46. ☐☐		
47. ☐☐		
48. ☐☐		
49. ☐☐		
50. ☐☐		
51. ☐☐	MA-17	Add and subtract decimals and money amounts in vertical and horizontal format.
52. ☐☐		
53. ☐☐	MA-18	Multiply and divide decimals and money amounts in vertical and horizontal format.
54. ☐☐		
55. ☐☐		
56. ☐☐		
57. ☐☐	MA-20	Find a percent of a number and what percent one number is of another. Solve problems involving discounts, net price, sales tax, interest, and circle graphs with percents.
58. ☐☐		
59. ☐☐		
60. ☐☐		

Pre- ☐ Post- ☐ Total Number **Correct** (out of **60** items)

Home Connection

The **Student Progress Report** can be sent home to keep parents informed about student progress.

Instructional Support—Lesson Planning. The pacing calendar directs the instruction for each lesson and reduces planning and prep time. Teachers just turn to the Foreword of the Teacher Manual to find their lesson calendar. Each lesson may be taught in one or more hours, depending on the time available and the math abilities of the class.

Weekly Quizzes are printed at the back of each Student Book (15 quizzes at the back of Part A and 15 quizzes at the back of Part B).

*Moving with **Algebra*** **Pacing Calendar for Part A: Lessons 1–30** **Unit 1**

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Tests, Quizzes, and Reviews	**Pre-Test on Part A (Units 1, 2, & 3)** See p. 5 of Assessment Section	**Pre-Test on Unit 1** See p. 33 of Assessment Section			**Quiz 1** (covers pp. 2–9) See p. 65 of Assessment Section
Hands-On Lessons	**Objectives:** MA-3 **Materials:** Masters 1, 2, 40, 41 and 42, base ten blocks **Teacher Manual pages:** 2, 3	**Objectives:** MA-3 **Materials:** Masters 3, 4 and 42, base ten blocks, tape, red and yellow paper **Teacher Manual pages:** 4, 5	**Objectives:** MA-3 **Materials:** Master 42, base ten blocks, playing cards, index cards, empty can, 10-sided dice or overhead spinner **Teacher Manual pages:** 6, 7	**Objectives:** MA-3 **Materials:** Masters 1, 2 and 42, base ten blocks, playing cards **Teacher Manual pages:** 8, 9	**Objective:** MA-1 **Materials:** Masters 5 and 6, cubes or squares made from inch graph paper **Teacher Manual pages:** 10, 11
Math Practice	**Student Book pages:** 2, 3	**Student Book pages:** 4, 5	**Student Book pages:** 6, 7	**Student Book pages:** 8, 9	**Student Book pages:** 10, 11
Extra Practice	**Skill Builders pages:** 1, 2 (MA-3)	**Skill Builders pages:** 3, 4 (MA-3)	**Skill Builders pages:** 5, 6 (MA-3)	**Skill Builders pages:** 7, 8 (MA-3)	
Games		FillerUp, p. 5	Comparison Game, p. 6 Greatest Number, p. 7	Rounding Relays, p. 9	
Journal Prompt **Test Prep** **Sum it Up!**	**Journal Prompt:** Student Book p. 3 **Sum It Up!** Student Book p. 2	**Test Prep:** Student Book p. 5	**Journal Prompt:** Student Book p. 7		

Each lesson lists the **objectives** taught, the **materials** needed, and the **lesson plan pages** used.

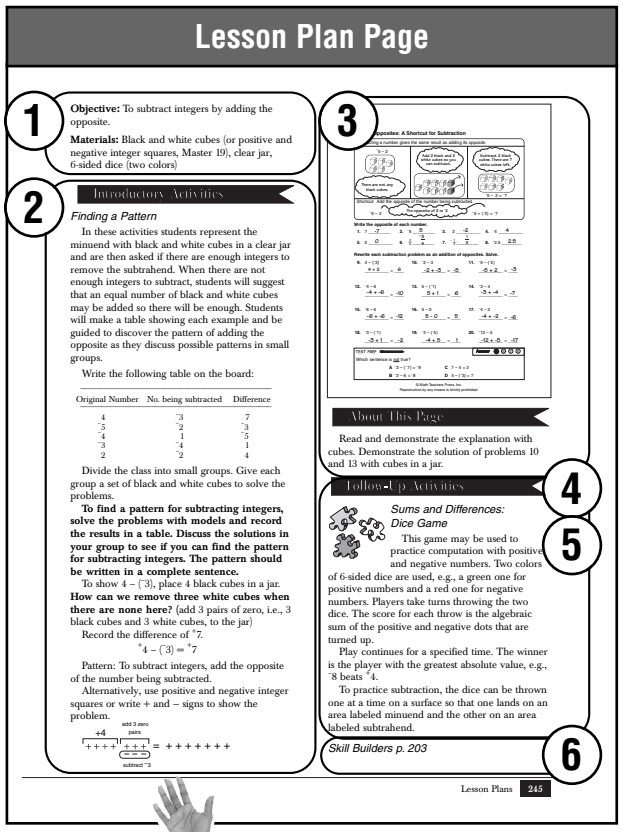
Journal Prompts, **Test Preps,** and **Sum It Ups!** encourage students to demonstrate their knowledge in a variety of ways.

Games at the end of the lesson make learning more fun and help cement student understanding.

Step 5b Structured Lesson Plans

The **Lesson Plans** section of the Teacher Manual contains **everything the teacher needs to do and say for each lesson,** so teachers who need to strengthen their own math skills are provided with daily professional development.

Lesson Plan Page



1. Before We Begin: *Objective, Materials, Vocabulary*

Each lesson starts with a **learning objective** for the day, the **materials** required, and the math **vocabulary** word(s) introduced in the lesson.

2. Introductory Activities: *Hands-On Learning*

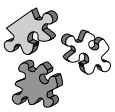
The Introductory Activities section allows students to discover the day's learning objective using an active, hands-on approach. The teacher will find a **lightly scripted** description of what to do, what to say, what questions to ask, and what answers to look for (with statements to be made aloud printed in **bold type**).

3. About This Page: *Student Practice*

The About This Page section links the hands-on activity to the pictures and practice on pages in the Student Book. Each Lesson Plan page number matches the corresponding page number in the Student Activity Book.

4. Follow-Up Activities: *Closing the Lesson*

The Follow-Up Activities section provides additional instructional support in the form of games, problem-solving activities, and suggested reinforcement Masters for remedial practice (found in the *Skill Builders* section of the Teacher Manual).

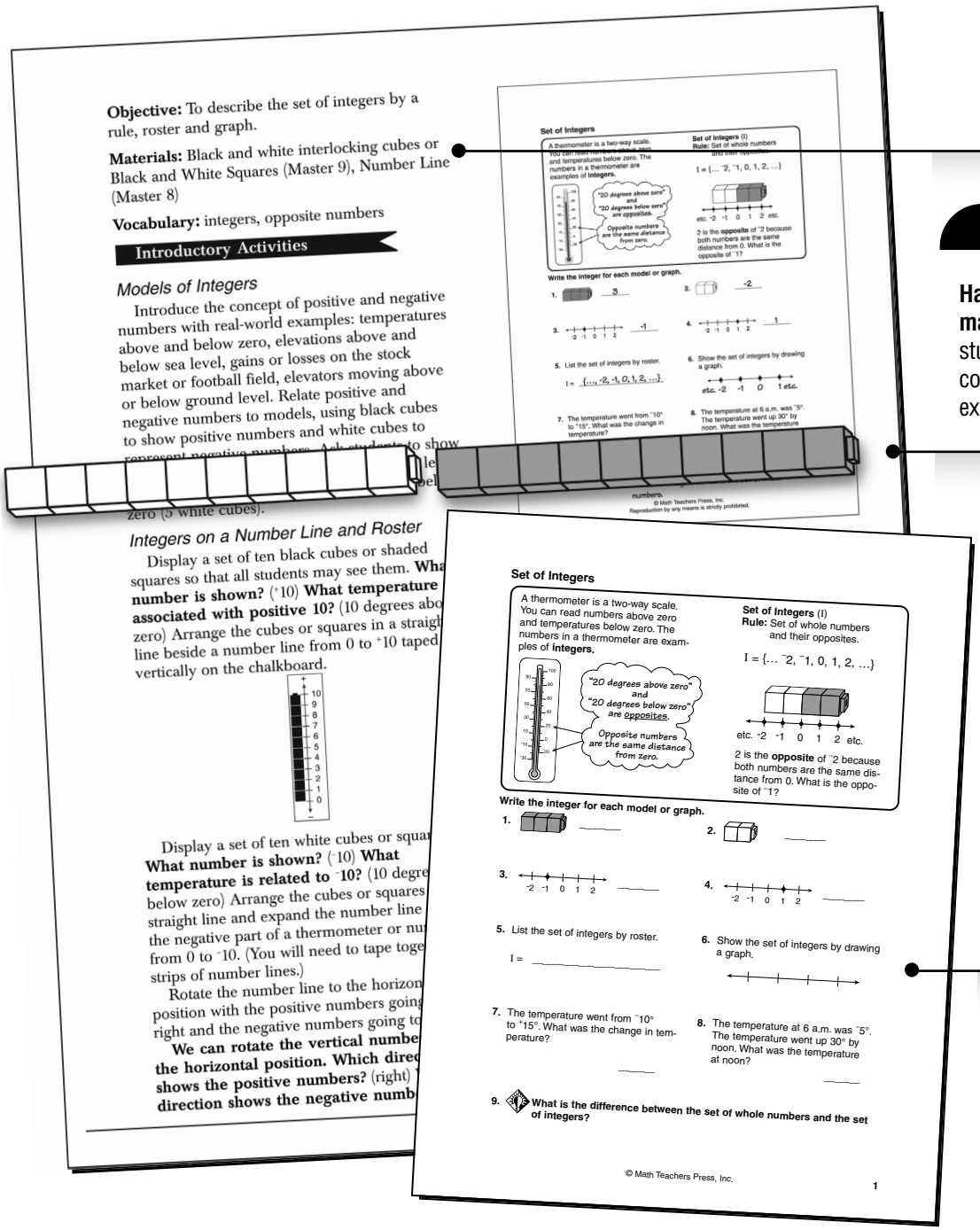


5. Games:

As students discover the winning strategy for each game, they go through steps similar to those used in problem solving.

6. Reinforcement Masters:

Many Lesson Plan pages list a *Skill Builders* page to support the lesson and provide differentiated instruction. These pages may be used as homework or as additional in-class practice when needed.



Objective: To describe the set of integers by a rule, roster and graph.

Materials: Black and white interlocking cubes or Black and White Squares (Master 9), Number Line (Master 8)

Vocabulary: integers, opposite numbers

Introductory Activities

Models of Integers

Introduce the concept of positive and negative numbers with real-world examples: temperatures above and below zero, elevations above and below sea level, gains or losses on the stock market or football field, elevators moving above or below ground level. Relate positive and negative numbers to models, using black cubes to show positive numbers and white cubes to represent negative numbers. Ask students to show zero (5 white cubes).

Integers on a Number Line and Roster

Display a set of ten black cubes or shaded squares so that all students may see them. **What number is shown?** (+10) **What temperature associated with positive 10?** (10 degrees above zero) Arrange the cubes or squares in a straight line beside a number line from 0 to +10 taped vertically on the chalkboard.

Display a set of ten white cubes or squares. **What number is shown?** (−10) **What temperature is related to −10?** (10 degrees below zero) Arrange the cubes or squares in a straight line and expand the number line to show the negative part of a thermometer or number line from 0 to −10. (You will need to tape together strips of number lines.)

Rotate the number line to the horizontal position with the positive numbers going to the right and the negative numbers going to the left.

We can rotate the vertical number line to the horizontal position. Which direction shows the positive numbers? (right) **Which direction shows the negative numbers?**

Set of Integers

A thermometer is a two-way scale. You can read numbers above zero and temperatures below zero. The numbers in a thermometer are examples of **integers.**

Set of Integers (I)
Rule: Set of whole numbers and their opposites.

I = {… −2, −1, 0, 1, 2, …}

"20 degrees above zero" and "20 degrees below zero" are opposites.

Opposite numbers are the same distance from zero.

etc. -2 -1 0 1 2 etc.

2 is the **opposite** of −2 because both numbers are the same distance from 0. What is the opposite of −1?

Write the integer for each model or graph.

1. 3
2. -2
3. -1
4. 1
5. List the set of integers by roster. I = {…, -2, -1, 0, 1, 2, …}
6. Show the set of integers by drawing a graph. etc. -2 -1 0 1 etc.
7. The temperature went from −10° to +15°. What was the change in temperature?
8. The temperature at 6 a.m. was −5°. The temperature went up 30° by noon. What was the temperature at noon?
9. **What is the difference between the set of whole numbers and the set of integers?**

Each lesson begins with the day's **learning objective** and a list of materials needed.

Hands-On

Hands-on activities using **manipulatives** allow students to discover math concepts through experience.

Companion page in the **Student Activity Book** provides the student with opportunities to explore and apply each concept.

Navigating the Stages of Learning. Each lesson starts with a concrete, hands-on activity to introduce the mathematical concept and then guides students as they progress to increasingly abstract statements of the concept. Activities in the Student Book help students move from the hands-on understanding of the concept to more abstract language and written expressions.

Step 5d Varied Assessment Opportunities

Following the **Lesson Plan**, students complete practice exercises on the accompanying page of their **Student Activity Book.** These pages give procedural practice, along with problem-solving and other developmental exercises. Student Activity Book pages provide varied **opportunities for assessment** to demonstrate their understanding of math concepts, as explained in the examples below.

Sum It Up!

This icon indicates an occasion for students to summarize their knowledge and presents an assessment opportunity for the teacher. Teachers lead discussions to develop student understanding of central ideas. Sum It Up! questions may also be used as talking points, so students can hear the views of others and clarify their own thinking.

How are arithmetic patterns and geometric patterns alike? How are they different?

Test Prep TEST PREP

These questions give students practice answering questions in standardized test format. Teachers may discuss test-taking strategies such as eliminating obviously incorrect answers and checking back for reasonableness.

TEST PREP

Answer Ⓐ Ⓑ Ⓒ Ⓓ

Which sentence is not true?

A $^{-}2 - (^{-}7) = {}^{-}9$

B $^{-}2 - 6 = {}^{-}8$

C $7 - 4 = 3$

D $4 - (^{-}3) = 7$

Journal Prompts

Journal Prompts ask students to demonstrate their math understanding using words, pictures, diagrams, and graphs.

Joyce bought a pair of jeans for $28.00 and 3 blouses for $12.95 each. How much did she spend? Draw a picture. Write a number sentence to solve the problem. Explain how you know where to write the numbers in the picture.

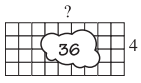
Weekly Quizzes Assess Progress and Direct Reteaching Needs.
Quick, 10-question quizzes provide continuous assessments on all objectives covered in the Lesson Plans. The **Weekly Quiz Record Sheet** printed on the back inside cover of the student book allows students and teachers to track individual progress. The Record Sheet links missed test questions to *Skill Builder* reteaching pages and provides teachers with guidance for individualized instruction.

Name: _____ **Quiz 5**

Date: _____

1. 346 × 25 — 8650 — MA-6

2. Find the missing factor. — 9 — MA-6



4 × ☐ = 36

3. 20 doughnuts are to be packed in 4 boxes. Which number sentence could you use to find the number of doughnuts in each box? — D — MA-32

A 20 + 4 **C** 20 × 4
B 20 – 4 **D** 20 ÷ 4

4. 4)48 — 12 — MA-6

5. The club wants to buy a number of sweatshirts that cost $6 each. How many sweatshirts can they buy for $30? — 5 — MA-6

6. A basket of … shared equa… How many … classroom …

7. 7)163

8. An art te… craft stic… Each cla… to comp… How ma… complet…

9. 34)714

10. $156 … by 13… each …

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***Moving with Algebra* Part A**
Weekly Quiz Record Sheet

Name _____

Record results of each quiz by marking an "**x**" next to ***missed*** questions/objectives. Write the ***total correct*** for each quiz in the space provided. For extra practice, use the *Skill Builders* page next to missed standards.

Unit 1

	Quiz 1		Quiz 2		Quiz 3		Quiz 4		Quiz 5	
1	p. 1 (MA-3)		p. 9 (MA-1)		p. 15 (MA-2)		p. 25 (MA-33)		p. 33 (MA-6)	
2	p. 1 (MA-3)		p. 9 (MA-1)		p. 16 (MA-2)		p. 26 (MA-33)	x	p. 36 (MA-6)	
3	p. 1 (MA-3)		p. 12 (MA-1)		p. 17 (MA-4)		p. 27 (MA-33)		p. 46 (MA-32)	
4	p. 2 (MA-3)		p. 10 (MA-1)		p. 13 (MA-4)		p. 27 (MA-32)		p. 37 (MA-6)	
5	p. 2 (MA-3)		p. 10 (MA-1)		p. 18 (MA-4)		p. 27 (MA-32)		p. 37 (MA-6)	
6	p. 2 (MA-3)		p. 11 (MA-1)	x	p. 19 (MA-5)	x	p. 29 (MA-6)		p. 37 (MA-6)	
7	p. 5 (MA-3)		p. 13 (MA-4)		p. 21 (MA-5)	x	p. 30 (MA-6)		p. 37 (MA-6)	
8	p. 8 (MA-3)	x	p. 13 (MA-4)		p. 20 (MA-5)		p. 31 (MA-6)		p. 39 (MA-6)	
9	p. 8 (MA-3)		p. 14 (MA-4)	x	p. 20 (MA-5)		p. 32 (MA-6)		p. 41 (MA-6)	
10	p. 8 (MA-3)		p. 14 (MA-4)		p. 22 (MA-5)		p. 33 (MA-6)		p. 41 (MA-6)	
	# Correct:	9		8		8		9		10

Unit 2

	Quiz 6		Quiz 7		Quiz 8		Quiz 9		Quiz 10	
1	p. 61 (MA-1)		p. 56 (MA-9)		p. 65 (MA-10)		p. 71 (MA-10)		p. 77 (MA-12)	
2	p. 61 (MA-1)		p. 56 (MA-9)		p. 63 (MA-10)		p. 73 (MA-11)		p. 82 (MA-12)	
3	p. 54 (MA-8)		p. 56 (MA-9)		p. 140 (MA-10)		p. 73 (MA-11)		p. 78 (MA-12)	
4	p. 55 (MA-8)		p. 57 (MA-9)		p. 62 (MA-13)		p. 75 (MA-12)		p. 83 (MA-12)	
5	p. 55 (MA-8)		p. 57 (MA-9)		p. 64 (MA-10)		p. 76 (MA-12)		p. 84 (MA-33)	
6	p. 55 (MA-8)		p. 59 (MA-9)		p. 140 (MA-10)		p. 141 (MA-11)		p. 84 (MA-33)	
7	p. 56 (MA-9)		p. 59 (MA-9)		p. 66 (MA-11)		p. 79 (MA-11)		p. 89 (MA-13)	
8	p. 56 (MA-9)		p. 60 (MA-9)		p. 140 (MA-10)		p. 79 (MA-11)		p. 89 (MA-13)	
9	p. 56 (MA-9)		p. 139 (MA-9)		p. 68 (MA-10)		p. 80 (MA-11)		p. 90 (MA-13)	
10	p. 56 (MA-9)		p. 60 (MA-9)		p. 68 (MA-10)		p. 80 (MA-11)		p. 90 (MA-13)	
	# Correct:									

Unit 3

	Quiz 11		Quiz 12		Quiz 13		Quiz 14		Quiz 15	
1	p. 102 (MA-10)		p. 109 (MA-16)		p. 114 (MA-16)		p. 125 (MA-18)		p. 130 (MA-19)	
2	p. 102 (MA-15)		p. 105 (MA-19)		p. 110 (MA-19)		p. 122 (MA-18)		p. 132 (MA-19)	
3	p. 103 (MA-11)		p. 107 (MA-16)		p. 145 (MA-19)		p. 125 (MA-18)		p. 132 (MA-19)	
4	p. 141 (MA-11)		p. 104 (MA-16)		p. 115 (MA-19)		p. 125 (MA-18)		p. 130 (MA-19)	
5	p. 142 (MA-11)		p. 109 (MA-16)		p. 118 (MA-17)		p. 126 (MA-18)		p. 131 (MA-19)	
6	p. 142 (7MA-11)		p. 110 (MA-19)		p. 119 (MA-17)		p. 126 (MA-18)		p. 136 (MA-20)	
7	p. 142 (MA-11)		p. 111 (MA-19)		p. 119 (MA-33)		p. 126 (MA-18)		p. 132 (MA-19)	
8	p. 142 (MA-11)		p. 112 (MA-16)		p. 120 (MA-18)		p. 127 (MA-18)		p. 134 (MA-20)	
9	p. 143 (MA-13)		p. 144 (MA-16)		p. 121 (MA-18)		p. 124 (MA-33)		p. 133 (MA-20)	
10	p. 143 (MA-13)		p. 114 (MA-16)		p. 123 (MA-18)		p. 129 (MA-32)		p. 133 (MA-20)	
	# Correct:									

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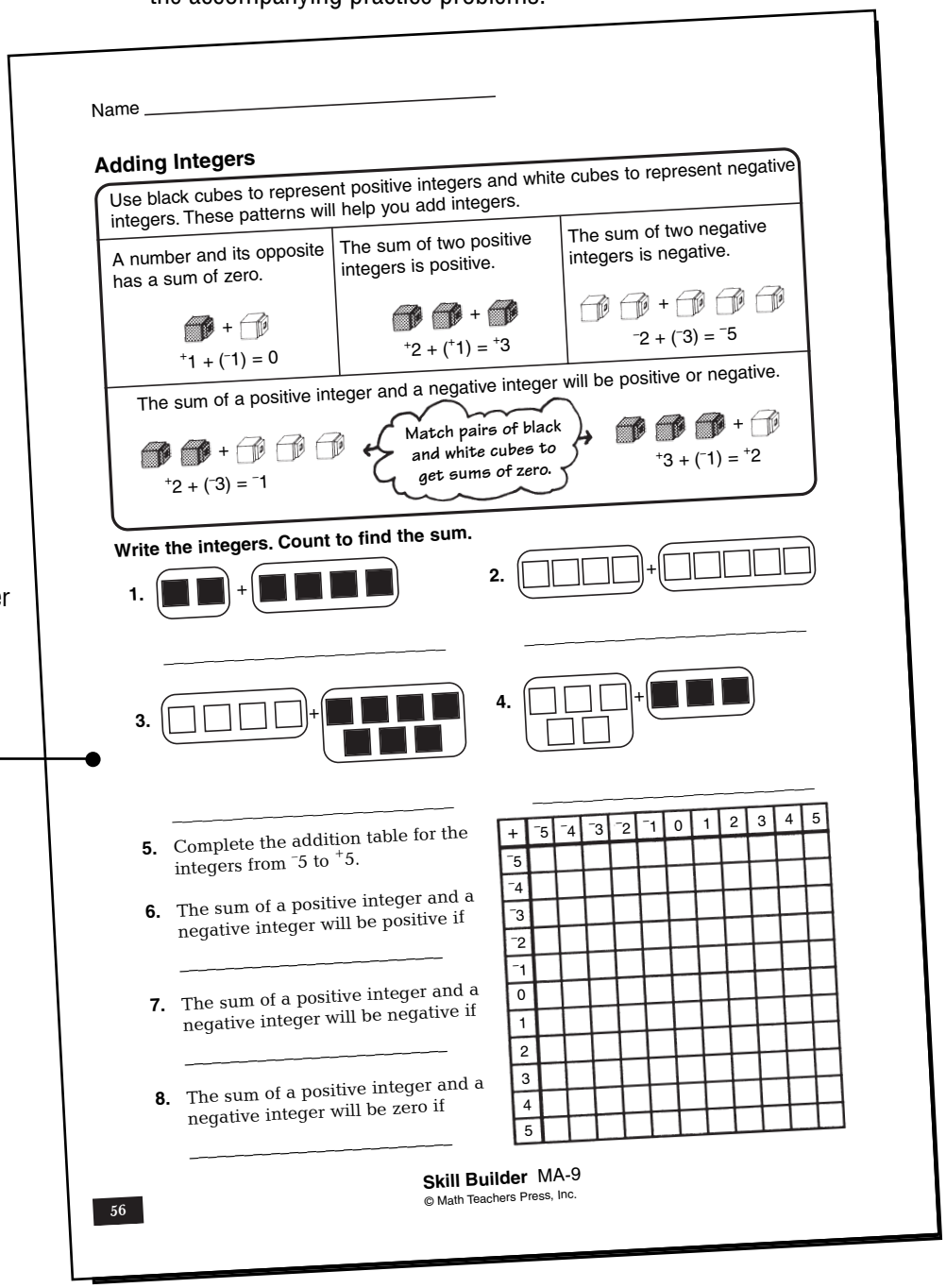
Reproducible Blackline Masters Reinforce Important Skills and Reteach Essential Concepts. *Skill Builders* make reteaching easy. Every learning objective is covered by at least one *Skill Builder*. The top of each page explains the learning objective using pictorial representations that review the activities from the Lesson Plan. Students then apply that understanding when completing the accompanying practice problems.



Name _____

Adding Integers

Use black cubes to represent positive integers and white cubes to represent negative integers. These patterns will help you add integers.

A number and its opposite has a sum of zero.

$^{+}1 + (^{-}1) = 0$

The sum of two positive integers is positive.

$^{+}2 + (^{+}1) = {}^{+}3$

The sum of two negative integers is negative.

$^{-}2 + (^{-}3) = {}^{-}5$

The sum of a positive integer and a negative integer will be positive or negative.

$^{+}2 + (^{-}3) = {}^{-}1$

Match pairs of black and white cubes to get sums of zero.

$^{+}3 + (^{-}1) = {}^{+}2$

Write the integers. Count to find the sum.

1. _____
2. _____
3. _____
4. _____

5. Complete the addition table for the integers from $^{-}5$ to $^{+}5$.

+	$^{-}5$	$^{-}4$	$^{-}3$	$^{-}2$	$^{-}1$	0	1	2	3	4	5
$^{-}5$											
$^{-}4$											
$^{-}3$											
$^{-}2$											
$^{-}1$											
0											
1											
2											
3											
4											
5											

6. The sum of a positive integer and a negative integer will be positive if _____

7. The sum of a positive integer and a negative integer will be negative if _____

8. The sum of a positive integer and a negative integer will be zero if _____

56

Skill Builder MA-9

Skill Builder reteaching worksheets rely heavily on illustrations and other kinds of graphic aids to explain and reinforce the transition from concrete to abstract.

Step 7

Post-Test for Class and Student

A **Post-Test** is administered at the end of each Unit and also at the conclusion of both Part A and Part B.

Name: _____ Date: _____ Score: _____ (out of 60)

*Moving with **Algebra*** **Part A** Post-Test

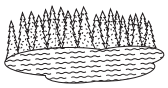
1. There are 1356 students in Hudson Middle School. Which digit is in the hundreds place? _____ MA-3

A 1
B 3
C 5
D 6

2. Which choice shows the number 3148 in expanded notation? _____ MA-3

A 3 + 1 + 4 + 8
B 3000 + 148
C 3000 + 100 + 48
D 3000 + 100 + 40 + 8

3. Blue Lake measures 42,810 feet wide. What is this number rounded to the nearest thousand? _____ MA-3



A 42,000
B 42,800
C 43,000
D 44,000

4. What number do you multiply 635 by to get an answer of 635? _____ MA-1

$635 \times \square = 635$

A $\frac{1}{635}$
B 0
C 1

© Math T

The **Student Progress Report** compares Pre- and Post-Test results and shows the student's progress vis-a-vis each learning objective and math content standard.

*Moving with **Algebra***
Student Progress Report, **Part A** Name

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	Pre-Test	Post-Test		Objective Number and Description
1.	☐	☐	MA-3	Recognize place values, and read, write, compare and order numbers up to 12 digits, including use of expanded notation. Round any number to any place.
2.	☐	☐		
3.	☐	☐		
4.	☐	☐	MA-1	Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.
5.	☐	☐		
6.	☐	☐		
7.	☐	☐		
8.	☐	☐		
9.	☐	☐	MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
10.	☐	☐		
11.	☐	☐		
12.	☐	☐		
13.	☐	☐	MA-2	Define and identify prime and composite numbers. Write the prime factorization of a number less than 100.
14.	☐	☐		
15.	☐	☐	MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
16.	☐	☐	MA-5	Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.
17.	☐	☐		
18.	☐	☐	MA-6	Multiply and divide numbers up to 4 digits. Multiply by powers of ten and multiples of 10. Relate division to multiplication.
19.	☐	☐		
20.	☐	☐	MA-7	Determine the average of a data set, and know and interpret appropriate measures of central tendency (mean, median and mode) and spread (range).
21.	☐	☐	MA-8	Identify, compare and order integers and locate integers on a number line. Know the meaning of the absolute value sign, and that an integer and its opposite have a sum of zero.
22.	☐	☐	MA-9	Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.
23.	☐	☐		
24.	☐	☐		
25.	☐	☐		
26.	☐	☐		
27.	☐	☐	MA-10	Recognize common representations of fractions, including fractions as parts of a whole and parts of a set. Compare and order fractions, and locate fractions on a number line. Understand equivalency and interchange mixed numbers and improper fractions.
28.	☐	☐		
29.	☐	☐		
31.	☐	☐		

Test Item	Pre-Test	Post-Test		Objective Number and Description
30.	☐	☐	MA-11	Add and subtract like and unlike rational numbers, including simplifying and/or regrouping. Identify common denominators, least common multiples, and greatest common factors.
32.	☐	☐		
34.	☐	☐		
35.	☐	☐		
33.	☐	☐	MA-12	Add and subtract mixed numbers with like and unlike denominators, with simplifying and/or regrouping.
36.	☐	☐	MA-13	Multiply and divide rational numbers by proper fractions and whole numbers. Find a fractional discount. Write the reciprocal of a fraction.
37.	☐	☐		
39.	☐	☐		
38.	☐	☐	MA-14	Multiply and divide a mixed number by a mixed number, proper fraction, and whole number. Write the reciprocal of a mixed number.
40.	☐	☐	MA-33	Estimate using various techniques, including estimating solutions to application problems, with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.
41.	☐	☐	MA-16	Examine decimal place values, and place a decimal on a number line. Read, write, compare and order decimals up to the ten-thousandths place. Round a decimal or money amount to the nearest indicated place value.
42.	☐	☐		
43.	☐	☐		
44.	☐	☐		
45.	☐	☐	MA-19	Interpret percent as parts per 100. Understand the relationships among fractions, terminating decimals, and percents, including interchanging representations. Know common equivalencies (e.g. 1/2, 0.5, 50%).
46.	☐	☐		
47.	☐	☐		
48.	☐	☐		
49.	☐	☐		
50.	☐	☐		
51.	☐	☐	MA-17	Add and subtract decimals and money amounts in vertical and horizontal format.
52.	☐	☐		
53.	☐	☐	MA-18	Multiply and divide decimals and money amounts in vertical and horizontal format.
54.	☐	☐		
55.	☐	☐		
56.	☐	☐		
57.	☐	☐	MA-20	Find a percent of a number and what percent one number is of another. Solve problems involving discounts, net price, sales tax, interest, and circle graphs with percents.
58.	☐	☐		
59.	☐	☐		
60.	☐	☐		

Pre- ☐ Post- ☐ Total Number **Correct** (out of **60** items)

*Moving with **Algebra** Number Sense*
Unit 1 Student Progress Report

Name _____

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item (Pre-Test / Post-Test)		Objective Number and Description
1. ☐☐	MA-3	Recognize place values, and read, write, compare and order numbers up to 12 digits, including use of expanded notation. Round any number to any place.
2. ☐☐		
3. ☐☐		
4. ☐☐		
5. ☐☐		
6. ☐☐		
7. ☐☐	MA-1	Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.
8. ☐☐		
9. ☐☐		
10. ☐☐		
11. ☐☐		
12. ☐☐	MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
13. ☐☐		
14. ☐☐		
15. ☐☐	MA-2	Define and identify prime and composite numbers. Write the prime factorization of a number less than 100.
16. ☐☐		
17. ☐☐	MA-4	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
18. ☐☐		
19. ☐☐	MA-5	Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.
20. ☐☐		
21. ☐☐	MA-33	Estimate using various techniques, including estimating solutions to application problems, with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.
22. ☐☐		
23. ☐☐	MA-5	Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.

Test Item (Pre-Test / Post-Test)		Objective Number and Description
24. ☐☐	MA-6	Multiply and divide numbers up to 4 digits. Multiply by powers of ten and multiples of 10. Relate division to multiplication.
25. ☐☐		
26. ☐☐		
27. ☐☐		
28. ☐☐	MA-32	Solve 1- and 2-step word problems. Employ a problem-solving model that incorporates understanding the problem, making a plan, choosing a strategy, and evaluating the solution for reasonableness. Select the correct operation, number sentence and necessary information to solve a problem, and justify those selections. Know when and how to break a problem into simpler parts.
29. ☐☐	MA-6	Multiply and divide numbers up to 4 digits. Multiply by powers of ten and multiples of 10. Relate division to multiplication.
30. ☐☐		
31. ☐☐		
32. ☐☐		
33. ☐☐		
34. ☐☐		
35. ☐☐	MA-33	Estimate using various techniques, including estimating solutions to application problems, with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.
36. ☐☐		
37. ☐☐	MA-32	Solve 1- and 2-step word problems. Employ a problem-solving model that incorporates understanding the problem, making a plan, choosing a strategy, and evaluating the solution for reasonableness. Select the correct operation, number sentence and necessary information to solve a problem, and justify those selections. Know when and how to break a problem into simpler parts.
38. ☐☐	MA-7	Determine the average of a data set, and know and interpret appropriate measures of central tendency (mean, median and mode) and spread (range).
39. ☐☐		
40. ☐☐	MA-5	Add and subtract numbers up to 6 digits, in vertical and horizontal formats. Check subtraction by addition.

Pre- ☐ Post- ☐ Total Number **Correct** (out of **40** items)

Prime and Composite Numbers

Finding a pattern for prime and composite numbers

Objective: To find a pattern for prime and composite numbers.

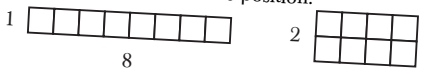
Materials: Cubes or squares cut from Inch Graph Paper (Master 5), index cards, playing cards

Vocabulary: array, prime number, composite number, factor

Introductory Activities

Prime Numbers

Each group will need cubes or square tiles cut from Inch Graph Paper (Master 5). **Count out 8 tiles and arrange them to show how they might be packed into rectangular shaped boxes with only one layer. Draw a picture of the different ways you could arrange the 8 tiles.** Display or draw a sketch of the two possible rectangles: a 1×8 and a 2×4. Rotate each rectangle to several positions to establish that the shape of the rectangle is the same, regardless of the position.



These rectangles are also called *arrays*. The numbers on the side of each box are related to the multiplication facts equal to 8. What are the two multiplication facts shown? ($1 \times 8 = 8$ and $2 \times 4 = 8$) **The numbers on each side are the *factors* of 8.**

Write on the board:

The factors of 8 are: 1, 8, 2, and 4.

Numbers that have more than one array are called *composite numbers*.

Now select 11 cubes. Find all the different arrays that can be made using exactly 11 cubes. (There will be only one array, a 1×11.)

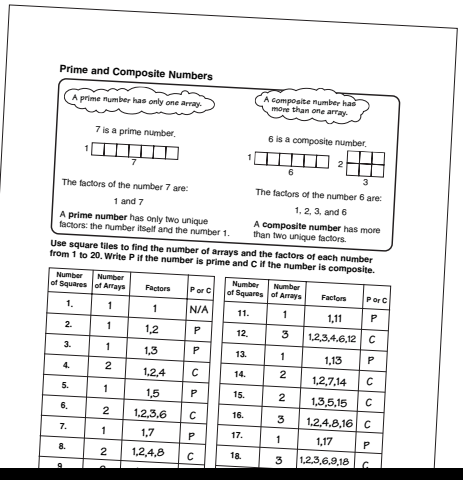
Write on the board:

The factors of 11 are: 1 and 11.

Numbers that have only one array also have only two different or unique *factors*. We call these numbers *prime numbers*. Direct attention to the factors for 8 and 11 on the board. **Is 8 prime or composite?** (composite) **Is 11 prime or composite?** (prime)

Distribute a set of index cards numbered from 1 to 20 to each small group. Each student selects an index card and builds all the different arrays that can be found for the number shown on the card. Students write the number of arrays and the sides (or factors) of each array on the back of each card. Continue until all the cards have been selected.

Ask each small group to select the cards with numbers having only one array. List these numbers on the board: 1, 2, 3, 5, 7, 11, 13, 17, 19. **Which**



Prime and Composite Numbers

A prime number has only one array.

7 is a prime number.

1 7

The factors of the number 7 are: 1 and 7

A **prime number** has only two unique factors: the number itself and the number 1.

A composite number has more than one array.

6 is a composite number.

1 6 2 3

The factors of the number 6 are: 1, 2, 3, and 6

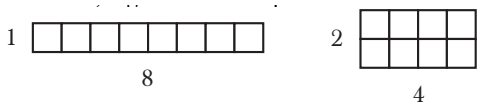
A **composite number** has more than two unique factors.

Use square tiles to find the number of arrays and the factors of each number from 1 to 20. Write P if the number is prime and C if the number is composite.

Number of Squares	Number of Arrays	Factors	P or C
1.	1	1	N/A
2.	1	1,2	P
3.	1	1,3	P
4.	2	1,2,4	C
5.	1	1,5	P
6.	2	1,2,3,6	C
7.	1	1,7	P
8.	2	1,2,4,8	C

Number of Squares	Number of Arrays	Factors	P or C
11.	1	1,11	P
12.	3	1,2,3,4,6,12	C
13.	1	1,13	P
14.	2	1,2,7,14	C
15.	2	1,3,5,15	C
16.	3	1,2,4,8,16	C
17.	1	1,17	P
18.	3	1,2,3,6,9,18	C

Sample Scripting (Bold Type)



These rectangles are also called *arrays*. The numbers on the side of each box are related to the multiplication facts equal to 8. What are the two multiplication facts shown? ($1 \times 8 = 8$ and $2 \times 4 = 8$) **The numbers on each side are the *factors* of 8.**

Prime Card

Have the class separate into groups of 3 with a deck of 52 playing cards (tens and face cards *included*). Deal 5 cards to each player and turn the remaining cards face down in a pile. Players take turns discarding one card with a prime number on it or drawing cards from the deck until it is possible to discard a prime card. The person with the fewest cards at the end of the round wins. The winner receives 1 point for each card in the opponents' hands after subtracting the points in her hand. Play several rounds as time permits. Aces = 1, jacks = 11, queens = 12, kings = 13. Prime numbers: 2, 3, 5, 7, 11 (jacks) and 13 (kings).

Skill Builders pp. 15–16

*Moving with **Algebra** Fractions*
Unit 2 Student Progress Report

Name _____

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item: Pre-Test / Post-Test	Objective Number and Description
1. ☐☐	**MA-1** Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.
2. ☐☐ 3. ☐☐	**MA-8** Identify, compare and order integers and locate integers on a number line. Know the meaning of the absolute value sign, and that an integer and its opposite have a sum of zero.
4. ☐☐ 5. ☐☐ 6. ☐☐ 7. ☐☐ 8. ☐☐ 9. ☐☐ 10. ☐☐ 11. ☐☐ 12. ☐☐	**MA-9** Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.
13. ☐☐ 14. ☐☐ 15. ☐☐ 16. ☐☐	**MA-10** Recognize common representations of fractions, including fractions as parts of a whole and parts of a set. Compare and order fractions, and locate fractions on a number line. Understand equivalency and interchange mixed numbers and improper fractions.
17. ☐☐	**MA-11** Add and subtract like and unlike rational numbers, including simplifying and/or regrouping. Identify common denominators, least common multiples, and greatest common factors.
18. ☐☐ 19. ☐☐	**MA-10** Recognize common representations of fractions, including fractions as parts of a whole and parts of a set. Compare and order fractions, and locate fractions on a number line. Understand equivalency and interchange mixed numbers and improper fractions.
20. ☐☐ 21. ☐☐ 22. ☐☐ 23. ☐☐ 24. ☐☐	**MA-11** Add and subtract like and unlike rational numbers, including simplifying and/or regrouping. Identify common denominators, least common multiples, and greatest common factors.

Test Item: Pre-Test / Post-Test	Objective Number and Description
25. ☐☐ 26. ☐☐	**MA-12** Add and subtract mixed numbers with like and unlike denominators, with simplifying and/or regrouping.
27. ☐☐	**MA-33** Estimate using various techniques, including estimating solutions to application problems with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.
28. ☐☐ 29. ☐☐ 30. ☐☐	**MA-13** Multiply and divide rational numbers by proper fractions and whole numbers. Find a fractional discount. Write the reciprocal of a fraction.
31. ☐☐ 32. ☐☐ 33. ☐☐	**MA-14** Multiply and divide a mixed number by a mixed number, proper fraction, and whole number. Write the reciprocal of a mixed number.
34. ☐☐ 35. ☐☐ 36. ☐☐ 37. ☐☐	**MA-13** Multiply and divide rational numbers by proper fractions and whole numbers. Find a fractional discount. Write the reciprocal of a fraction.
38. ☐☐	**MA-14** Multiply and divide a mixed number by a mixed number, proper fraction, and whole number. Write the reciprocal of a mixed number.
39. ☐☐ 40. ☐☐	**MA-13** Multiply and divide rational numbers by proper fractions and whole numbers. Find a fractional discount. Write the reciprocal of a fraction.

Pre- ☐ Post- ☐ Total Number **Correct** (out of **40** items)

Multiplying Fractions

Finding the pattern for multiplying fractions

Objective: To subtract fractions with unlike denominators.

Materials: Fraction Bars®, multiple strips (made from the Multiplication Table (Master 6), 10-sided dice

Introductory Activities

Subtraction with Fraction Bars

Write on the board:

You buy $\frac{3}{4}$ yard of fabric. You use $\frac{1}{3}$ yard to make a pillow. How much do you have left?

You live $\frac{9}{10}$ kilometer from school. You walk $\frac{1}{2}$ kilometer. How far are you from school?

Demonstrate the solution to each problem with Fraction Bars® and multiple strips. Each small group will need a set of fraction bars and a Multiplication Table (Master 6) cut into multiple strips.

Remember the Golden Rule of fractions. You cannot add or subtract fractions unless they are the same color. Find ¾ and ⅓. Are they the same color? (No) **What color can they be changed to?** (orange)

For problem 1 change the blue ¾ bar into orange $^9/_{12}$ and the yellow ⅓ bar to orange $^4/_{12}$.

To show the same problem with multiple strips, place the 3 multiple strip over the 4 strip and the 1 strip over the 3 strip.

3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48

1	2	3	4	5	6	7	8	9	10	11	12
3	6	9	12	15	18	21	24	27	30	33	36

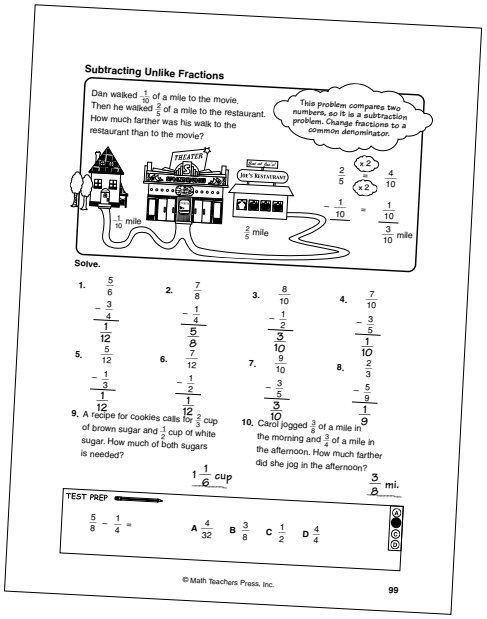
Write on the board:

$$\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$$

For problem 2, change ½ green to $^5/_{10}$ white and then subtract: $^9/_{10} - {}^5/_{10} = {}^4/_{10}$. The fraction $^4/_{10}$ may be simplified to $^2/_5$.

About This Page

Direct attention to the top of the page. Demonstrate the solution with multiple strips. Students may use fraction bars or multiple strips to complete the rest of the page.



Subtracting Unlike Fractions

Dan walked $\frac{1}{10}$ of a mile to the movie. Then he walked $\frac{2}{5}$ of a mile to the restaurant. How much farther was his walk to the restaurant than to the movie?

This problem compares two numbers, so it is a subtraction problem. Change fractions to a common denominator.

THEATER

JIM'S RESTAURANT

$\frac{1}{10}$ mile

$\frac{2}{5}$ mile

$\frac{2}{5}$ x 2 = $\frac{4}{10}$

$\frac{1}{10}$ x 2 = $\frac{1}{10}$

$\frac{4}{10} - \frac{1}{10} = \frac{3}{10}$ mile

Solve.

1. $\frac{5}{6} - \frac{3}{4} = \frac{1}{12}$
2. $\frac{7}{8} - \frac{1}{4} = \frac{5}{8}$
3. $\frac{8}{10} - \frac{1}{2} = \frac{3}{10}$
4. $\frac{7}{10} - \frac{3}{5} = \frac{1}{10}$
5. $\frac{5}{12} - \frac{1}{3} = \frac{1}{12}$
6. $\frac{7}{12} - \frac{1}{2} = \frac{1}{12}$
7. $\frac{9}{10} - \frac{3}{5} = \frac{3}{10}$
8. $\frac{2}{3} - \frac{5}{9} = \frac{1}{9}$

9. A recipe for cookies calls for $\frac{2}{3}$ cup of brown sugar and $\frac{1}{2}$ cup of white sugar. How much of both sugars is needed? $1\frac{1}{6}$ cup

10. Carol jogged $\frac{3}{8}$ of a mile in the morning and $\frac{3}{4}$ of a mile in the afternoon. How much farther did she jog in the afternoon? $\frac{3}{8}$ mi.

TEST PREP

$\frac{5}{8} - \frac{1}{4} =$ A $\frac{4}{32}$ B $\frac{3}{8}$ C $\frac{1}{2}$ D $\frac{4}{4}$

99

Follow-Up Activities

Dicey Differences

Game for 2 players. Players take turns throwing two 10-sided dice twice and forming a fraction each time using the smaller number for the numerator and the larger number for the denominator. The player with the greater difference between his or her fractions earns one point. For example, a player throwing a 1 and a 6 on the first throw and a 2 and a 3 on the second throw would subtract: $^2/_3 - {}^1/_6$ for a difference of ½.

Authoring Word Problems

Continue developing a class file of word problems by having students author at least one addition problem and one subtraction problem that might be solved by a computation problem from pages 98–100. Suggest common settings for the problems, e.g., cooking, map directions, capacity. Encourage students to write problems about their real world.

Skill Builders pp. 80, 81

*Moving with **Algebra** Decimals and Percents*
Unit 3 Student Progress Report

Name _____

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item Pre-Test Post-Test	Objective Number and Description
1. ☐☐	**MA-10** Recognize common representations of fractions, including fractions as parts of a whole and parts of a set. Compare and order fractions, and locate fractions on a number line. Understand equivalency and interchange mixed numbers and improper fractions.
2. ☐☐ 3. ☐☐ 4. ☐☐ 5. ☐☐	**MA-11** Add and subtract like and unlike rational numbers, including simplifying and/or regrouping. Identify common denominators, least common multiples, and greatest common factors.
6. ☐☐ 7. ☐☐ 8. ☐☐	**MA-16** Examine decimal place values, and place a decimal on a number line. Read, write, compare and order decimals up to the ten-thousandths place. Round a decimal or money amount to the nearest indicated place value.
9. ☐☐ 10. ☐☐ 11. ☐☐	**MA-19** Interpret percent as parts per 100. Understand the relationships among fractions, terminating decimals, and percents, including interchanging representations. Know common equivalencies (e.g. 1/2, 0.5, 50%).
12. ☐☐ 13. ☐☐	**MA-16** Examine decimal place values, and place a decimal on a number line. Read, write, compare and order decimals up to the ten-thousandths place. Round a decimal or money amount to the nearest indicated place value.
14. ☐☐ 15. ☐☐	**MA-19** Interpret percent as parts per 100. Understand the relationships among fractions, terminating decimals, and percents, including interchanging representations. Know common equivalencies (e.g. 1/2, 0.5, 50%).
16. ☐☐	**MA-17** Add and subtract decimals and money amounts in vertical and horizontal format.
17. ☐☐ 18. ☐☐ 19. ☐☐ 20. ☐☐ 21. ☐☐ 22. ☐☐ 23. ☐☐ 24. ☐☐	**MA-18** Multiply and divide decimals and money amounts in vertical and horizontal format. .

Test Item Pre-Test Post-Test	Objective Number and Description
25. ☐☐ 26. ☐☐ 27. ☐☐	**MA-19** Interpret percent as parts per 100. Understand the relationships among fractions, terminating decimals, and percents, including interchanging representations. Know common equivalencies (e.g. 1/2, 0.5, 50%).
28. ☐☐ 29. ☐☐ 30. ☐☐ 31. ☐☐ 32. ☐☐ 33. ☐☐ 34. ☐☐ 35. ☐☐ 36. ☐☐ 37. ☐☐ 38. ☐☐ 39. ☐☐	**MA-20** Find a percent of a number and what percent one number is of another. Solve problems involving discounts, net price, sales tax, interest, and circle graphs with percents.
40. ☐☐	**MA-33** Estimate using various techniques, including estimating solutions to application problems with whole numbers, fractions, decimals, and percents. Judge the reasonableness of results, and determine when an estimate rather than an exact answer is appropriate.

Pre- ☐ Post- ☐ Total Number **Correct** (out of **40** items)

Change Fractions to Decimals

Changing fractions to decimals when the denominator is a factor of 10 or 100

Objective: To change fractions to decimals when the denominator is a factor of 10 or 100.

Materials: Interlocking cubes

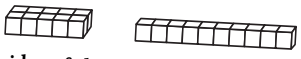
Introductory Activities

Factors of 10 and 100 from Arrays

Each small group will need at least 10 interlocking cubes and the class will need at least 100 interlocking cubes.

Use 10 cubes to build all the different rectangles you can. How many different rectangles can you build? (2)

Ask a volunteer to draw a picture of the two different rectangles on the board:



The sides of the rectangles are the factors of 10. What are the factors of 10? (2, 5, 1, 10)

Repeat the activity with the whole class, this time using 100 cubes. The rectangles that can be built are 2×50, 4×25, 5×20, 10×10, and 100×1. **What are the factors of 100?** (1, 2, 5, 10, 20, 25, 50, and 100)

Changing Fractions to Decimals: Denominator is a Factor of 10 or 100

Can we change ¾ to an equivalent fraction with a denominator of 10? (No.) **Can we change ¾ to an equivalent fraction with a denominator of 100 ... is 4 a factor of 100?** (Yes.)

Write on the board:

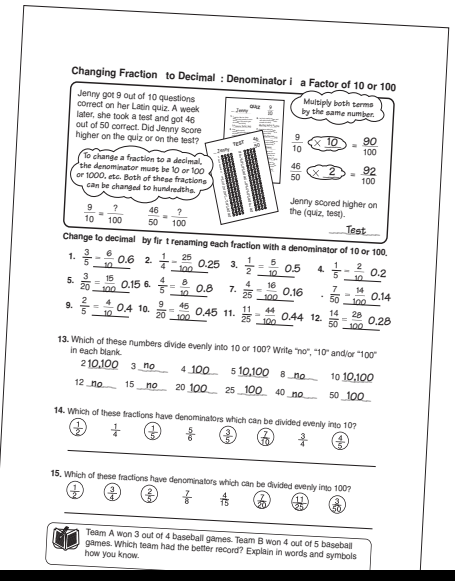
$$\frac{3}{4}\ \begin{matrix}\times 25\\ \times 25\end{matrix} = \frac{75}{100}$$

$$\frac{75}{100} = 0.75$$

Write on the board:
Change each fraction to an equivalent fraction with a denominator of 10 or 100. Then change each fraction to a decimal in tenths or hundredths.

$$\frac{2}{5} \qquad \frac{7}{20} \qquad \frac{11}{25} \qquad \frac{21}{50}$$

How can we change ⅖ to an equivalent fraction with a denominator of 10 or 100? (Multiply both terms by 2 to change the fraction to tenths.)


Changing Fraction to Decimal : Denominator i a Factor of 10 or 100

Jenny got 9 out of 10 questions correct on her Lasin quiz. A week later, she took a test and got 46 out of 50 correct. Did Jenny score higher on the quiz or on the test?

To change a fraction to a decimal, the denominator must be 10 or 100 or 1000, etc. Both of these fractions can be changed to hundredths.

$\frac{9}{10} = \frac{?}{100}$ $\frac{46}{50} = \frac{?}{100}$

Multiply both terms by the same number.

$\frac{9}{10} \times 10 = \frac{90}{100}$ $\frac{46}{50} \times 2 = \frac{92}{100}$

Jenny scored higher on the (quiz, test).

Test

Change to decimal by fir t renaming each fraction with a denominator of 10 or 100.

1. $\frac{3}{5} = \frac{6}{10}$ 0.6 2. $\frac{1}{4} = \frac{25}{100}$ 0.25 3. $\frac{1}{2} = \frac{5}{10}$ 0.5 4. $\frac{1}{5} = \frac{2}{10}$ 0.2
5. $\frac{3}{20} = \frac{15}{100}$ 0.15 6. $\frac{4}{5} = \frac{8}{10}$ 0.8 7. $\frac{4}{25} = \frac{16}{100}$ 0.16 . $\frac{7}{50} = \frac{14}{100}$ 0.14
9. $\frac{2}{5} = \frac{4}{10}$ 0.4 10. $\frac{9}{20} = \frac{46}{100}$ 0.45 11. $\frac{11}{25} = \frac{44}{100}$ 0.44 12. $\frac{14}{50} = \frac{28}{100}$ 0.28

13. Which of these numbers divide evenly into 10 or 100? Write "no", "10" and/or "100" in each blank.
2 10,100 3 no 4 100 5 10,100 8 no 10 10,100
12 no 15 no 20 100 25 100 40 no 50 100

14. Which of these fractions have denominators which can be divided evenly into 10?
$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{5}{6}$ $\frac{3}{5}$ $\frac{7}{10}$ $\frac{3}{4}$ $\frac{4}{5}$

15. Which of these fractions have denominators which can be divided evenly into 100?
$\frac{1}{2}$ $\frac{3}{4}$ $\frac{2}{5}$ $\frac{7}{8}$ $\frac{4}{15}$ $\frac{7}{20}$ $\frac{11}{25}$ $\frac{3}{50}$

Team A won 3 out of 4 baseball games. Team B won 4 out of 5 baseball games. Which team had the better record? Explain in words and symbols how you know.

Sample Scripting (Bold Type)

Use 10 cubes to build all the different rectangles you can. How many different rectangles can you build? (2)

Ask a volunteer to draw a picture of the two different rectangles on the board:

The sides of the rectangles are the factors of 10. What are the factors of 10? (2, 5, 1, 10)

About This Page

Read the example together at the top of the page. Emphasize that fractions must have the same denominators before they can be compared. Work problems 1, 5, 6 and 8 together. Students may complete the page on their own.

Follow-Up Activities

Skill Builders p. 115

*Moving with **Algebra** Geometry and Measurement*
Unit 4 Student Progress Report

Name _____

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item: Pre-Test / Post-Test	Objective Number and Description
1. ☐☐ 2. ☐☐ 3. ☐☐ 4. ☐☐	**MA-21** Recognize geometric symbols and/or the properties of the following: point, line, ray, angle, line segment, parallel, perpendicular, intersecting, radius, diameter, circumference, and chord.
5. ☐☐	**MA-23** Classify triangles and quadrilaterals by the relationships of their sides and angles. Name polygons with up to 10 sides. Know and apply the Pythagorean theorem to find missing sides of right triangles.
6. ☐☐ 7. ☐☐	**MA-22** Identify angles as acute, right, obtuse, and straight. Measure and estimate angles. Find the measure of a missing angle for complementary, supplementary, vertical and adjacent angles. Recognize the relationships of angles when parallel lines are cut by a transversal.
8. ☐☐ 9. ☐☐ 10. ☐☐	**MA-23** Classify triangles and quadrilaterals by the relationships of their sides and angles. Name polygons with up to 10 sides. Know and apply the Pythagorean theorem to find missing lsides of right triangles.
11. ☐☐ 12. ☐☐	**MA-24** Recognize properties of common 3-dimensional solids (prism, cube, pyramid, cone, cylinder, and sphere), including faces, edges and vertices. Create 2-dimensional nets for 3-dimensional figures. Find the volume of a rectangular solid and other prisms with and without formulas.
13. ☐☐ 14. ☐☐	**MA-22** Identify angles as acute, right, obtuse, and straight. Measure and estimate angles. Find the measure of a missing angle for complementary, supplementary, vertical and adjacent angles. Recognize the relationships of angles when parallel lines are cut by a transversal.
15. ☐☐ 16. ☐☐ 17. ☐☐	**MA-30** Discover the value of the sum of the angles in a triangle and in a quadrilateral. Know the functional relationship between number of sides of a regular polygon and the sum of the interior angles. Find missing angles in triangles and quadrilaterals.
18. ☐☐	**MA-22** Identify angles as acute, right, obtuse, and straight. Measure and estimate angles. Find the measure of a missing angle for complementary, supplementary, vertical and adjacent angles. Recognize the relationships of angles when parallel lines are cut by a transversal.
19. ☐☐	**MA-29** Understand and use coordinate graphs to place a point, name its coordinates, and draw and identify geometric figures.
20. ☐☐ 21. ☐☐	**MA-25** Understand congruency and similarity among 2-dimensional figures. Name corresponding parts of similar and congruent figures, and recognize different types of transformations. Identify lines of symmetry.
22. ☐☐ 23. ☐☐	**MA-27** Determine the perimeter of a square, rectangle, or any polygon, with and without a formula. Calculate the circumference of a circle.
24. ☐☐ 25. ☐☐ 26. ☐☐	**MA-28** Determine the area of a square, rectangle and triangle, with and without a formula.
27. ☐☐	**MA-24** Recognize properties of common 3-dimensional solids (prism, cube, pyramid, cone, cylinder, and sphere), including faces, edges and vertices. Create 2-dimensional nets for 3-dimensional figures. Find the volume of a rectangular solid and other prisms with and without formulas.
28. ☐☐	**MA-35** Explore the inverse relationship between raising to a power and extracting the square root of a perfect square integer. For an integer that is not square, determine the two integers between which its square root lies and explain why.
29. ☐☐ 30. ☐☐	**MA-23** Classify triangles and quadrilaterals by the relationships of their sides and angles. Name polygons with up to 10 sides. Know and apply the Pythagorean theorem to find missing sides of right triangles.
31. ☐☐ 32. ☐☐	**MA-15** Understand ratio and proportion. Find a missing number in a proportion, and use proportions to solve word problems involving geometric figures, scale drawings and rates.
33. ☐☐ 34. ☐☐	**MA-26** Measure to the nearest 1/8 inch and millimeter. Convert measurements within the customary and metric measurement systems. Solve word problems involving measurements.
35. ☐☐ 36. ☐☐ 37. ☐☐	**MA-15** Understand ratio and proportion. Find a missing number in a proportion, and use proportions to solve word problems involving geometric figures, scale drawings and rates.
38. ☐☐	**MA-39** Explore linear functions and related equations. Understand that a function represents a dependence of one quantity on another and can be described in a variety of ways. Write and graph functions with up to two variables. Solve word problems using the distance relationship d = rt.
39. ☐☐ 40. ☐☐	**MA-26** Measure to the nearest 1/8 inch and millimeter. Convert measurements within the customary and metric measurement systems. Solve word problems involving measurements.

Pre- ☐ Post- ☐ Total Number **Correct** (out of **40** items)

Pythagorean Theorem

Finding the Pythagorean relationship in right triangles

Objective: To find the Pythagorean relationship in right triangles.

Materials: Centimeter Graph Paper (Master 4), scissors, glue

Vocabulary: square of a number, exponent, factor, Pythagorean theorem, legs, hypotenuse

Introductory Activities

Discover the Right Triangle Pattern

In this activity, students find the squares of numbers from 1 to 10. Each student or small group will need a sheet of centimeter graph paper and scissors. Have students outline and cut out 10 squares having sides of 1, 2, 3, …, 10 cm.

Display a 1-centimeter square and describe the number of units on each side. **This is the smallest square shape we can make with these squares. Each side of the square has a unit of 1. How many units on the horizontal side?** (1) **on the vertical side?** (1) **How many small squares in the whole figure?** (1)

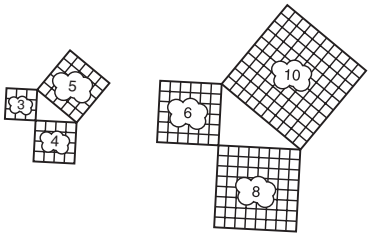
Write on the board:
The square of 1 or 1 squared or 1^2 means $1 \times 1 = 1$

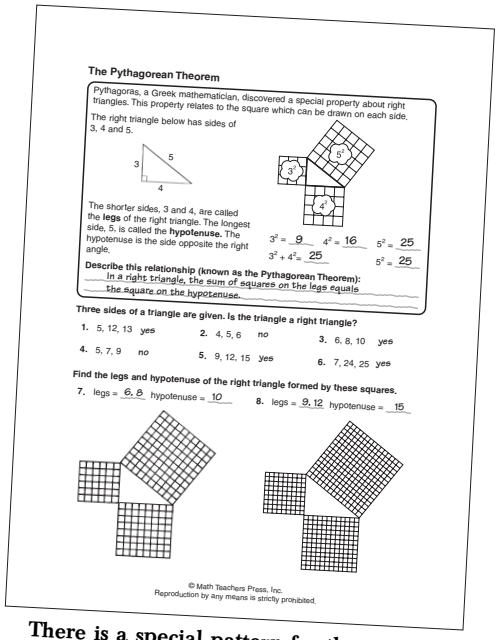
Have students complete the following table:

Units	Vertical x Horizontal	Squares	Relationship
1	1×1	1	$1^2 = 1 \times 1 = 1$
2	2×2	4	$2^2 = 2 \times 2 = 4$
⋮	⋮	⋮	⋮
10	10×10	100	$10^2 = 10 \times 10 = 100$

Try forming a right triangle by connecting the sides of any 3 of your squares. How many different right triangles can you make? (2)

Ask students to describe each right triangle they find. (Students will find the 3-4-5 right triangle and the 6-8-10.)





The Pythagorean Theorem

Pythagoras, a Greek mathematician, discovered a special property about right triangles. This property relates to the square which can be drawn on each side.

The right triangle below has sides of 3, 4 and 5.

The shorter sides, 3 and 4, are called the **legs** of the right triangle. The longest side, 5, is called the **hypotenuse.** The hypotenuse is the side opposite the right angle.

$3^2 = 9$ $4^2 = 16$ $5^2 = 25$

$3^2 + 4^2 = 25$ $5^2 = 25$

Describe this relationship (known as the Pythagorean Theorem):
In a right triangle, the sum of squares on the legs equals the square on the hypotenuse.

Three sides of a triangle are given. Is the triangle a right triangle?

1. 5, 12, 13 yes
2. 4, 5, 6 no
3. 6, 8, 10 yes
4. 5, 7, 9 no
5. 9, 12, 15 yes
6. 7, 24, 25 yes

Find the legs and hypotenuse of the right triangle formed by these squares.

7. legs = 6, 8 hypotenuse = 10
8. legs = 9, 12 hypotenuse = 15

There is a special pattern for the sides of every right triangle. Study your squares to find the pattern. (The sum of the squares on the 2 small sides of a right triangle equals the square on the large side.)

About This Page

Read the top of the page with the class.

Ask students to circle the side that would be the hypotenuse (the longest side) in each of the problems 1 to 6. Ask volunteers to use the words "if" and "then" to describe how they will know if the sides form a right triangle. (In problem 1, if the sum of the squares of 5 and 12 equals the square of 13, then the triangle is a right triangle.)

Follow-Up Activities

Skill Builders p. 186

*Moving with **Algebra** Algebra and Functions*
Unit 5 Student Progress Report

Name _____

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item Pre-Test Post-Test	Objective Number and Description
1. ☐☐ 2. ☐☐ 3. ☐☐	**MA-8** Identify, compare and order integers, and locate integers on a number line. Know the meaning of the absolute value sign, and that an integer and its opposite have a sum of zero.
4. ☐☐ 5. ☐☐ 6. ☐☐ 7. ☐☐	**MA-9** Add, subtract, multiply, and divide with the set of integers. Solve word problems involving integers.
8. ☐☐ 9. ☐☐	**MA-36** Translate models, pictures and words into an algebraic expression.
10. ☐☐ 11. ☐☐ 12. ☐☐	**MA-37** Simplify algebraic expressions before solving equations by combining like terms and removing parentheses, including expressions that involve exponents.
13. ☐☐ 14. ☐☐ 15. ☐☐ 16. ☐☐ 17. ☐☐ 18. ☐☐ 19. ☐☐ 20. ☐☐	**MA-38** Solve 1-step and multi-step algebraic equations involving addition, subtraction, multiplication and division, providing justification for each step. Understand the properties of equality, equals added to equals are equal and equals multiplied by equals are equal. Multiply and divide monomials, and find square roots.
21. ☐☐ 22. ☐☐	**MA-37** Simplify algebraic expressions before solving equations by combining like terms and removing parentheses, including expressions that involve exponents.
23. ☐☐ 24. ☐☐	**MA-38** Solve 1-step and multi-step algebraic equations involving addition, subtraction, multiplication and division, providing justification for each step. Understand the properties of equality, equals added to equals are equal and equals multiplied by equals are equal. Multiply and divide monomials, and find square roots.
25. ☐☐ 26. ☐☐ 27. ☐☐	**MA-32** Solve 1- and 2-step word problems. Employ a problem-solving model that incorporates understanding the problem, making a plan, choosing a strategy, and evaluating the solution for reasonableness. Select the correct operation, number sentence and necessary information to solve a problem, and justify those selections. Know when and how to break a problem into simpler parts.

Test Item Pre-Test Post-Test	Objective Number and Description
28. ☐☐ 29. ☐☐	**MA-15** Understand ratio and proportion. Find a missing number in a proportion, and use proportions to solve word problems involving geometric figures, scale drawings and rates.
30. ☐☐	**MA-39** Explore linear functions and related equations. Understand that a function represents a dependence of one quantity on another and can be described in a variety of ways. Write and graph functions with up to two variables. Solve word problems using the distance relationship d = rt.
31. ☐☐ 32. ☐☐ 33. ☐☐ 34. ☐☐ 35. ☐☐ 36. ☐☐ 37. ☐☐ 38. ☐☐ 39. ☐☐ 40. ☐☐	**MA-34** Solve and graph 1- or 2-step linear equations and inequalities with whole-number coefficients.

Pre- ☐ Post- ☐ Total Number **Correct** (out of **40** items)

Positive and Negative Integers

Adding positive and negative integers

Objective: To add positive and negative integers.

Materials: Black and white cubes (or positive and negative integer squares, Master 19), Algebra Tiles

Introductory Activities

Adding Positive and Negative Integers

In this lesson, students begin operations with integers. Positive and negative integers may be modeled using black and white cubes, black and white squares (Master 19), or Algebra Tiles. If using Algebra Tiles, distribute a small set to each group. Let the students explore and discover the tiles' similarities and differences. (The important similarity is that all tiles have one side that is red.) Explain that the red side of each tile represents the negative value. **We will use the smallest squares to represent integers.**

Write on the board:
Stephen owed his father $6. He earned $8 mowing the lawn. After paying his father back, how much money did Stephen have?

Have students use black and white cubes, or integer squares or tiles, to model the problem and find the solution. Match pairs of red and yellow tiles, making 6 zero pairs and leaving 2 yellow tiles, or $^{+}2$.

Write on the board:

$$^{-}6 + 8 = 2$$

Write on the board:
Kelly owes her father $8. She earns $6 weeding. What is Kelly's current money situation?

Have students use black and white cubes, integer squares or tiles to model the problem and solve.

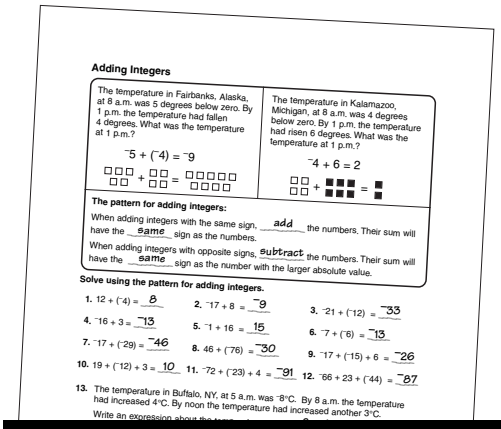
Write on the board:

$$^{-}8 + 6 = -2$$

Does Kelly owe her father $2 or is the $2 hers? (Kelly still owes her father $2.) Put together 8 white cubes and 6 black cubes. Make all the pairs of zero, and two white cubes will be left.

How do you know? (The money you owe someone is represented by negative numbers.)

Show the students how to work the same problem using 8 red tiles and 6 yellow tiles. Match pairs of red and yellow tiles, making 6 zero pairs and leaving 2 red tiles, or $^{-}2$. Also show how to write using positive and negative signs:



Adding Integers

The temperature in Fairbanks, Alaska, at 8 a.m. was 5 degrees below zero. By 1 p.m. the temperature had fallen 4 degrees. What was the temperature at 1 p.m.?

$^{-}5 + (^{-}4) = ^{-}9$

The temperature in Kalamazoo, Michigan, at 8 a.m. was 4 degrees below zero. By 1 p.m. the temperature had risen 6 degrees. What was the temperature at 1 p.m.?

$^{-}4 + 6 = 2$

The pattern for adding integers:

When adding integers with the same sign, add the numbers. Their sum will have the same sign as the numbers.

When adding integers with opposite signs, subtract the numbers. Their sum will have the same sign as the number with the larger absolute value.

Solve using the pattern for adding integers.

1. $12 + (^{-}4) = 8$
2. $^{-}17 + 8 = ^{-}9$
3. $^{-}21 + (^{-}12) = ^{-}33$
4. $^{-}16 + 3 = ^{-}13$
5. $^{-}1 + 16 = 15$
6. $^{-}7 + (^{-}6) = ^{-}13$
7. $^{-}17 + (^{-}29) = ^{-}46$
8. $46 + (^{-}76) = ^{-}30$
9. $^{-}17 + (^{-}15) + 6 = ^{-}26$
10. $19 + (^{-}12) + 3 = 10$
11. $^{-}72 + (^{-}23) + 4 = ^{-}91$
12. $^{-}66 + 23 + (^{-}44) = ^{-}87$
13. The temperature in Buffalo, NY, at 5 a.m. was $^{-}8$°C. By 8 a.m. the temperature had increased 4°C. By noon the temperature had increased another 3°C. Write an expression about the temperature.

Sample Scripting (Bold Type)

Write on the board:

$$^{-}8 + 6 = -2$$

Does Kelly owe her father $2 or is the $2 hers? (Kelly still owes her father $2.) Put together 8 white cubes and 6 black cubes. Make all the pairs of zero, and two white cubes will be left.

How do you know? (The money you owe someone is represented by negative numbers.)

Mia owes her father $5. She borrows another $9 to go out to lunch with friends. How much money does Mia owe her father?

Have students use black and white cubes, or integer squares or tiles, to model the problem and find the solution.

Write on the board:

$$^{-}5 + (^{-}9) = ^{-}14$$

About This Page

Read the problems in the illustration together. Complete the sentences in "The pattern for adding integers" together.

Follow Up Activities

Skill Builders p. 202

Solving One-Step Equations

Solving addition and subtraction equations using models

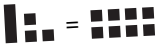
Objective: To solve addition or subtraction equations with models.

Materials: Rectangular rods or lunch bags (or positive rectangular rods, Master 19, or Algebra Tiles), black and white cubes (or positive and negative integer squares, Master 19), index card with equal sign (or Master 19)

Introductory Activities

Equations with Addition or Subtraction

Model the equation $x + 3 = 8$ with rods or lunch bags and cubes as shown. The activity may also be modeled on the overhead using black and white squares and rectangular rods from a transparency of Master 19.

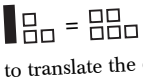


Ask a student to translate the equation shown into words. (x plus three is equal to eight, or some number plus three is equal to eight.) **What must be done to an equation to keep it balanced?** (Whatever operation is done on one side of the equal sign must be repeated on the other side of the equal sign.)

To solve an equation, get the variable by itself on one side of the equal sign. What is on the same side as the variable *x*? (3) **How can we get rid of the 3?** (add $^{-}3$) **If we add $^{-}3$ to the left side, what must be done on the right side of the equal sign?** (add $^{-}3$) Model this by placing 4 white cubes on each side. **Now how does the equation read?** ($x + 3 - 3 = 8 - 3$) **If we put together the like terms on both sides of the equal sign, what do we get?** ($x = 5$)

Let us check our answer. If we put 5 in for *x*, is the equation true? (yes) **Why?** (because $5 + 3 = 8$)

Model the equation $x - 3 = {}^{-}5$ with rods and cubes as shown below.

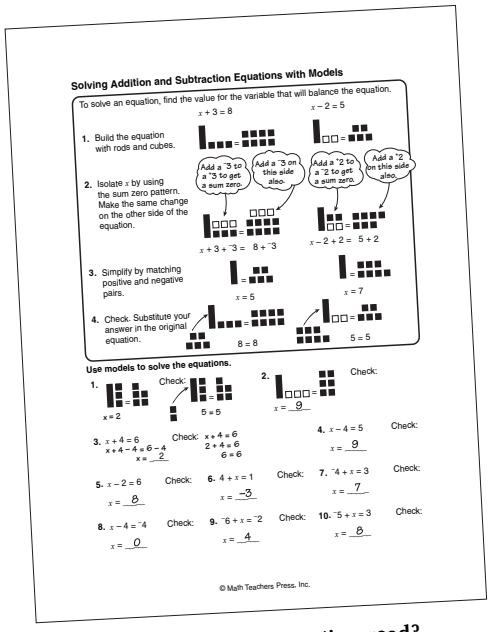


Ask a student to translate the equation shown into words. (x minus three equals negative five, or a number minus three equals negative five) **What must we get rid of to get *x* by itself on one side of the equal sign?** ($^{-}3$) **How can we do this?** (add $^{+}3$) **If we add $^{+}3$ to the left side, what must be done on the right side of the equal sign?** (add $^{+}3$)

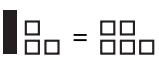
Model this by placing 3 black cubes on each side. **Now how does the equation read?** ($x - 3 + 3 = {}^{-}5 + 3$) **Simplify the equation by putting together the like terms on both sides of the equal sign. What are we left with?** ($x = {}^{-}2$) **If we put $^{-}2$ in for *x*, is the equation true?**

To check, we substitute $^{-}2$ for *x*. Show the check on the board:

$$({}^{-}2) - 3 = {}^{-}5$$
$${}^{-}2 + ({}^{-}3) = {}^{-}5$$
$${}^{-}5 = {}^{-}5$$



Sample Scripting (Bold Type)



Ask a student to translate the equation shown into words. (x minus three equals negative five, or a number minus three equals negative five) **What must we get rid of to get *x* by itself on one side of the equal sign?** ($^{-}3$) **How can we do this?** (add $^{+}3$) **If we add $^{+}3$ to the left side, what must be done on the right side of the equal sign?** (add $^{+}3$)

Skill Builders p. 212

Solving Two-Step Equations

Solving two-step equations using inverse operations

Objective: To solve two-step equations using inverse operations.

Materials: Black and white cubes (or positive and negative integer squares, Master 19, or Algebra Tiles), brown paper bags (or envelopes), small paper plates

Introductory Activities

Two-Step Equations

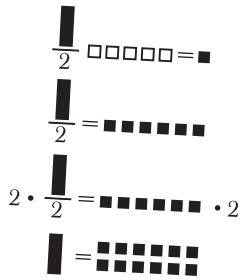
Write on the board or overhead: (Student's name) thought of a number. He divided it by 2 and subtracted 5 from the quotient. The result was 1. What was the number?

Ask a student to suggest the related number sentence.

$$\frac{n}{2} - 5 = 1$$

Model the solution with rods, cubes (or squares) and bags (or envelopes). You will need 2 paper plates for the second step when 12 black cubes are shared or divided on 2 paper plates. Ask students to draw a picture of the solution and solve the problem with pencil.

Drawing:



Solution with paper and pencil:

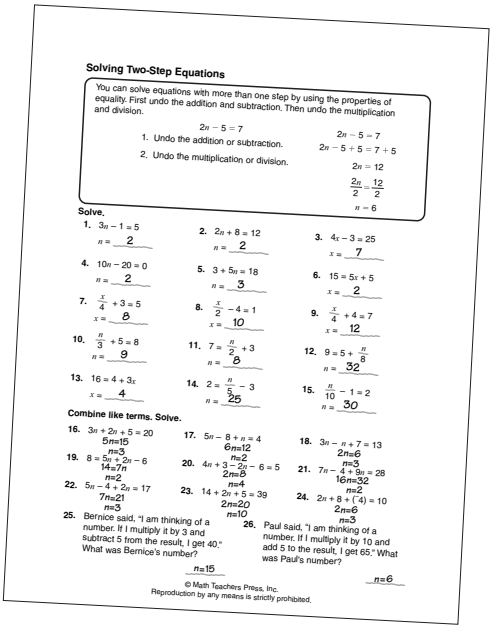
$\frac{n}{2} - 5 = 1$ Add 5 to both sides.

$\frac{n}{2} - 5 + 5 = 1 + 5$

$\frac{n}{2} = 6$ Multiply both sides by 2.

$2 \cdot \frac{n}{2} = 6 \cdot 2$

$n = 12$



Solving Two-Step Equations

You can solve equations with more than one step by using the properties of equality. First undo the addition and subtraction. Then undo the multiplication and division.

$2n - 5 = 7$

1. Undo the addition or subtraction.
2. Undo the multiplication or division.

$2n - 5 = 7$
$2n - 5 + 5 = 7 + 5$
$2n = 12$
$\frac{2n}{2} = \frac{12}{2}$
$n = 6$

Solve.

1. $3n - 1 = 5$, $n =$ 2
2. $2n + 8 = 12$, $n =$ 2
3. $4x - 3 = 25$, $x =$ 7
4. $10n - 20 = 0$, $n =$ 2
5. $3 + 5n = 18$, $n =$ 3
6. $15 = 5x + 5$, $x =$ 2
7. $\frac{x}{4} + 3 = 5$, $x =$ 8
8. $\frac{x}{2} - 4 = 1$, $x =$ 10
9. $\frac{x}{4} + 4 = 7$, $x =$ 12
10. $\frac{n}{3} + 5 = 8$, $n =$ 9
11. $7 = \frac{n}{2} + 3$, $n =$ 8
12. $9 = 5 + \frac{n}{8}$, $n =$ 32
13. $16 = 4 + 3x$, $x =$ 4
14. $2 = \frac{n}{5} - 3$, $n =$ 25
15. $\frac{n}{10} - 1 = 2$, $n =$ 30

Combine like terms. Solve.

16. $3n + 2n + 5 = 20$; $5n=15$; $n=3$
17. $5n - 8 + n = 4$; $6n=12$; $n=2$
18. $3n - n + 7 = 13$; $2n=6$; $n=3$
19. $8 = 5n + 2n - 6$; $14=7n$; $n=2$
20. $4n + 3 - 2n - 6 = 5$; $2n=8$; $n=4$
21. $7n - 4 + 9n = 28$; $16n=32$; $n=2$
22. $5n - 4 + 2n = 17$; $7n=21$; $n=3$
23. $14 + 2n + 5 = 39$; $2n=20$; $n=10$
24. $2n + 8 + (-4) = 10$; $2n=6$; $n=3$
25. Bernice said, "I am thinking of a number. If I multiply it by 3 and subtract 5 from the result, I get 40." What was Bernice's number? $n=15$
26. Paul said, "I am thinking of a number. If I multiply it by 10 and add 5 to the result, I get 65." What was Paul's number? $n=6$

About This Page

Read the explanation together. Relate the pattern of undoing to using the inverse operation. **In the first step, 5 was subtracted from the variable, so we add 5 to both sides of the equation to undo the operation. In the second step, the variable is multiplied by 2, so we divide both sides by 2.**

The odd-numbered problems may be worked with a partner. Have students complete the even-numbered problems independently.

Follow-Up Activities

Checking by Substitution

Have students check their answers using substitution.

Creating Puzzles

Have students make up their own two-step number puzzles. Collect the problems and redistribute copies to other class members.

Example: If I multiply my age by 2 and subtract 6, the answer is 20. How old am I?

Skill Builders pp. 217, 218, 245

*Moving with **Algebra** Algebra and Functions*
Unit 6 Student Progress Report

Name _____

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item Pre-Test Post-Test		Objective Number and Description
1. ☐☐ 2. ☐☐ 3. ☐☐	**MA-1**	Describe the relationship between the subsets of the real number system. Recognize and implement the properties of rational numbers (e.g., commutative, associative, distributive, identity). Solve problems using the order of operations.
4. ☐☐ 5. ☐☐ 6. ☐☐ 7. ☐☐	**MA-4**	Explore the concept of exponents. Interpret positive whole number powers as repeated multiplication and negative whole number powers as repeated division or multiplication by the multiplicative inverse. Write numbers in scientific notation. Multiply and divide using exponents with a common base.
8. ☐☐ 9. ☐☐ 10. ☐☐ 11. ☐☐ 12. ☐☐ 13. ☐☐	**MA-38**	Solve 1-step and multi-step algebraic equations involving addition, subtraction, multiplication and division, providing justification for each step. Understand the properties of equality, equals added to equals are equal and equals multiplied by equals are equal. Multiply and divide monomials, and find square roots.
14. ☐☐	**MA-31**	Recognize, describe and extend patterns (numerical and geometric). Includes finding the nth term of a pattern.
15. ☐☐	**MA-29**	Understand and use coordinate graphs to place a point, name its coordinates, and draw and identify geometric figures.
16. ☐☐	**MA-39**	Explore linear functions and related equations. Understand that a function represents a dependence of one quantity on another and can be described in a variety of ways. Write and graph functions with up to two variables. Solve word problems using the distance relationship d = rt.
17. ☐☐	**MA-29**	Understand and use coordinate graphs to place a point, name its coordinates, and draw and identify geometric figures.

Test Item Pre-Test Post-Test		Objective Number and Description
18. ☐☐ 19. ☐☐	**MA-39**	Explore linear functions and related equations. Understand that a function represents a dependence of one quantity on another and can be described in a variety of ways. Write and graph functions with up to two variables. Solve word problems using the distance relationship d = rt.
20. ☐☐	**MA-29**	Understand and use coordinate graphs to place a point, name its coordinates, and draw and identify geometric figures.
21. ☐☐ 22. ☐☐ 23. ☐☐ 24. ☐☐ 25. ☐☐ 26. ☐☐ 27. ☐☐ 28. ☐☐ 29. ☐☐ 30. ☐☐ 31. ☐☐ 32. ☐☐ 33. ☐☐ 34. ☐☐ 35. ☐☐ 36. ☐☐ 37. ☐☐ 38. ☐☐ 39. ☐☐ 40. ☐☐	**MA-40**	Determine the slope of a line, and verify that a point lies on a line. Know and apply the relationship between slopes of parallel and perpendicular lines. Recognize lines with zero and undefined slopes, and identify lengths of horizontal and vertical line segments.Understand the slope-intercept form, and calculate x- and y- intercepts. Given ordered pairs for two points on a line, write and graph the equation for the line.

Pre- ☐ Post- ☐ Total Number **Correct** (out of **40** items)

Square Roots of Monomials

Finding the square roots of monomials

Objective: To find square roots of monomials.

Materials: Black and white cubes (or positive and negative integer squares, Master 19)

Vocabulary: squaring a number, square root, radical sign

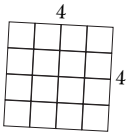
Introductory Activities

Squares and Square Roots

Ask students to name everyday activities that are inverses, such as zipping and unzipping a jacket, tying and untying shoes. Then have them list mathematical operations and their inverses. (addition and subtraction; multiplication and division)

Squaring a number is like knowing the length of the sides of a rug and finding its area.

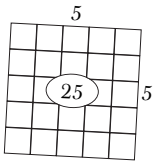
Example: A rug with 4 feet on each side has 4 squared or 16 square feet.



$4^2 = 16$ sq. units

Finding the square root is the opposite of finding the area. The square root means to find the length of the sides of the square. If you have 25 square inches and want to arrange them as a large square, how many inches on each side? Use 25 cubes, tiles or squares. Rearrange them as a square to find the number of units on each side.

Draw on the board:

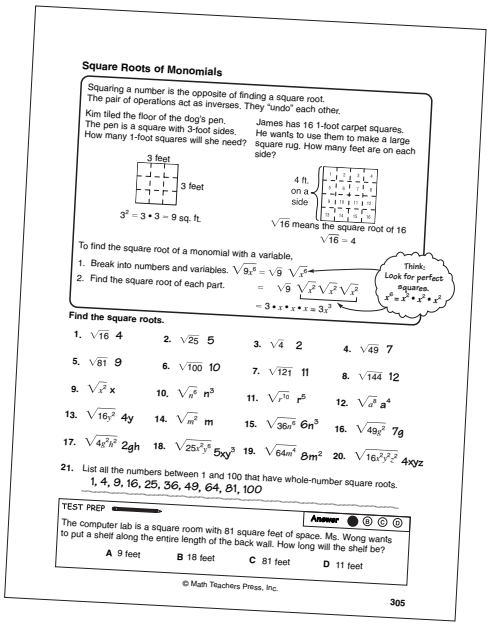


The square root of 25 is 5.

$\sqrt{25} = 5$

This special symbol that means to find the square root is called a radical sign.

To find the square root of a monomial with a variable, break apart the numbers and letters. Then find the square root of each part.



Square Roots of Monomials

Squaring a number is the opposite of finding a square root. The pair of operations act as inverses. They "undo" each other.

Kim tiled the floor of the dog's pen. The pen is a square with 3-foot sides. How many 1-foot squares will she need?

3 feet, 3 feet

$3^2 = 3 \cdot 3 = 9$ sq. ft.

James has 16 1-foot carpet squares. He wants to use them to make a large square rug. How many feet are on each side?

4 ft. on a side

$\sqrt{16}$ means the square root of 16

$\sqrt{16} = 4$

To find the square root of a monomial with a variable,

1. Break into numbers and variables. $\sqrt{9x^6} = \sqrt{9}\ \sqrt{x^6}$
2. Find the square root of each part. $= \sqrt{9}\ \sqrt{x^2}\sqrt{x^2}\sqrt{x^2}$

$= 3 \cdot x \cdot x \cdot x = 3x^3$

Think: Look for perfect squares. $x^6 = x^2 \cdot x^2 \cdot x^2$

Find the square roots.

1. $\sqrt{16}$ 4
2. $\sqrt{25}$ 5
3. $\sqrt{4}$ 2
4. $\sqrt{49}$ 7
5. $\sqrt{81}$ 9
6. $\sqrt{100}$ 10
7. $\sqrt{121}$ 11
8. $\sqrt{144}$ 12
9. $\sqrt{x^2}$ x
10. $\sqrt{n^6}$ n^3
11. $\sqrt{r^{10}}$ r^5
12. $\sqrt{a^8}$ a^4
13. $\sqrt{16y^2}$ 4y
14. $\sqrt{m^2}$ m
15. $\sqrt{36n^6}$ $6n^3$
16. $\sqrt{49g^2}$ 7g
17. $\sqrt{4g^2h^2}$ 2gh
18. $\sqrt{25x^2y^6}$ $5xy^3$
19. $\sqrt{64m^4}$ $8m^2$
20. $\sqrt{16s^2y^2z^2}$ 4xyz
21. List all the numbers between 1 and 100 that have whole-number square roots. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

TEST PREP

The computer lab is a square room with 81 square feet of space. Ms. Wong wants to put a shelf along the entire length of the back wall. How long will the shelf be?

Answer ● Ⓑ Ⓒ Ⓓ

A 9 feet B 18 feet C 81 feet D 11 feet

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Write on the board:

$\sqrt{16x^2} = \sqrt{16}\ \sqrt{x^2} = 4x$

About This Page

Read the explanations at the top of the page together. Use cubes or squares on an overhead to demonstrate the examples related to the dog's pen and carpet. Emphasize that monomials with variables must be broken into separate parts.

Work problems 1–9 on page 305.

Sample Scripting (Bold Type)

Finding the square root is the opposite of finding the area. The square root means to find the length of the sides of the square. If you have 25 square inches and want to arrange them as a large square, how many inches on each side? Use 25 cubes, tiles or squares. Rearrange them as a square to find the number of units on each side.

Using Tables and Graphs

Writing equations, tables, and graphs from sets of ordered pairs

Objective: To write equations, tables and graphs for sets of ordered pairs.

Materials: Measuring cup, empty pint and quart containers, water or rice

Vocabulary: direct variation, constant of variation, independent variable, dependent variable

Introductory Activities

Converting Measurements

Display a measuring cup, an empty 1-pint carton and a 1-quart carton that might be found at a deli counter. Write "1 cup," "1 pint" and "1 quart" on the correct containers. **How many cups are in 1 pint?** Fill the measuring cup with water or rice and pour the cup into the pint container to show that 2 cups equal 1 pint.

How many cups in 1 quart? Fill a cup with rice or water and pour into the 1-quart container. Continue this activity to show that 4 cups equal 1 quart.

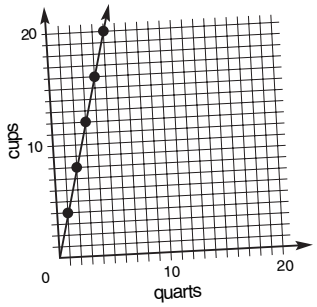
Write on the board:
Make a table to show the relationship between the number of cups in from 1 to 5 quarts. Write an equation and make a graph of the information.

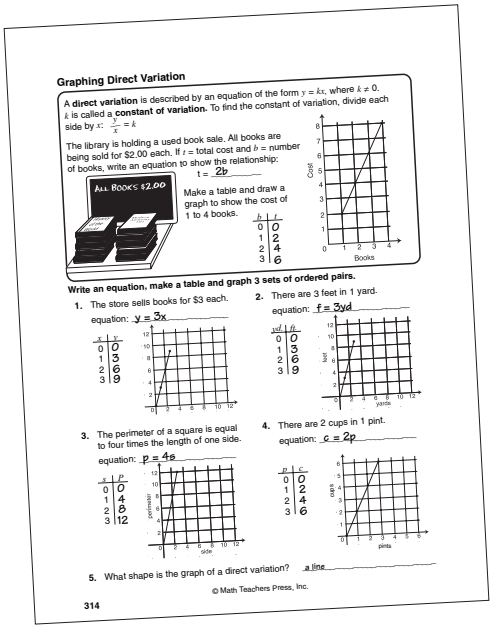
equation: $c = 4q$

q	c
1	4
2	8
3	12
4	16
5	20

Which are the independent and dependent variables? (quarts and cups, respectively)

Graph:





Graphing Direct Variation

A **direct variation** is described by an equation of the form $y = kx$, where $k \neq 0$. k is called a **constant of variation.** To find the constant of variation, divide each side by x: $\frac{y}{x} = k$

The library is holding a used book sale. All books are being sold for $2.00 each. If t = total cost and b = number of books, write an equation to show the relationship:

$t = 2b$

Make a table and draw a graph to show the cost of 1 to 4 books.

b	t
0	0
1	2
2	4
3	6

Cost — Books

Write an equation, make a table and graph 3 sets of ordered pairs.

1. The store sells books for $3 each.
equation: $y = 3x$

x	y
0	0
1	3
2	6
3	9

2. There are 3 feet in 1 yard.
equation: $f = 3yd$

yd	ft
0	0
1	3
2	6
3	9

feet — yards

3. The perimeter of a square is equal to four times the length of one side.
equation: $p = 4s$

s	p
0	0
1	4
2	8
3	12

perimeter — side

4. There are 2 cups in 1 pint.
equation: $c = 2p$

p	c
0	0
1	2
2	4
3	6

cups — pints

5. What shape is the graph of a direct variation? a line

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About This Page

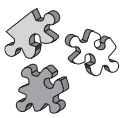
Read the explanation at the top of the page. **What is the equation showing the relationship between the total cost of the books, the cost per book and the number of books?** ($t = 2b$)

Have students graph the 4 points from the table.

Read problem 1 together. **What is the equation?** ($y = 3x$) **If x is 1, what is y?** (3) **If x is 2, what is y?** (6) **If x is 3, what is y?** (9) Have students graph the 3 points and describe the graph. (a straight line) Have students complete the page on their own.

Follow-Up Activities

Skill Builders p. 237



Representation Rummy, Skill Builders pp. 238–239

Slope of a Line

Defining and exploring the slope of a line

Objective: To define and explore the slope of a line.

Materials: Geoboards, overhead geoboard, Coordinate Grids (Master 30), transparency of Overhead Coordinate Grid (made from Master 39)

Vocabulary: slope, rise, run

Introductory Activities

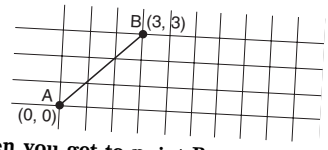
Introducing Slope

In this activity, a bicycle ride is used to introduce slope. The picture of the ride is drawn on the board or on a transparency.

Suppose you are going on a bicycle ride. Your trip goes up and down several hills. As you look at the first hill you say to yourself, "This is a steep hill. I had better change the gears on my bike."

You start at point A and bike uphill to point B.

Draw a picture of the hill on the board or on a transparency of Master 39.



When you get to point B, you have gone 3 units in a horizontal direction at the same time you have gone 3 units in a vertical direction. The slope of this line is the ratio between the vertical change (rise) to the horizontal change (run).

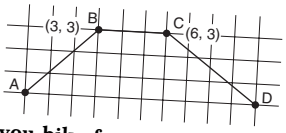
Write on the board:

$$\text{slope of } \overline{AB} = \frac{\text{rise}}{\text{run}} = \frac{3}{3} = \frac{1}{1}$$

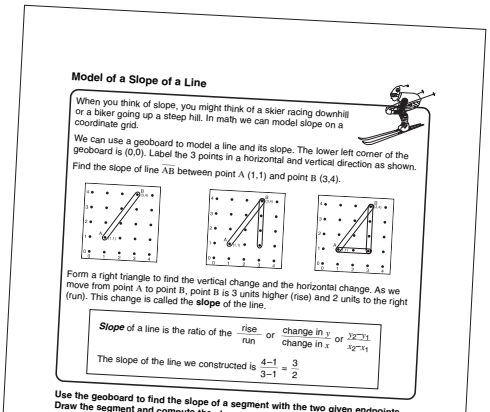
Now you bike on a flat road from point B to point C. What is the slope? (rise = 0/3, or 0)

You begin to go downhill from point C to point D.

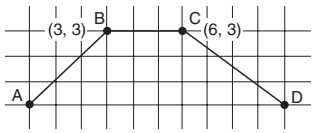
Continue to draw on the board:



When you bike from point C to point D, you have gone 4 units in a horizontal direction at the same time you have gone down 3 units vertically or we could say rising 3 in the negative direction. What is the slope of $\overline{CD}$?



Sample Scripting (Bold Type)

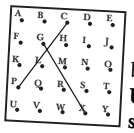


When you bike from point C to point D, you have gone 4 units in a horizontal direction at the same time you have gone down 3 units vertically or we could say rising 3 in the negative direction. What is the slope of $\overline{CD}$?

What is the slope of $\overline{BC}$?

$$(\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{3-3}{6-3} = \frac{0}{3} = 0)$$

What kind of line is a line with a slope of 0? (a horizontal line parallel to the *x*-axis)



Slope on a Geoboard

Each small group will need a geoboard labeled with the points A–Y.

Use a geoboard to show line segment $\overline{PC}$. Find the slope of $\overline{PC}$.

$$\overline{PC} = \frac{\text{rise}}{\text{run}} = \frac{+3}{2}$$

Show line segment $\overline{GX}$. Find the slope of $\overline{GX}$.

$$\overline{GX} = \frac{\text{rise}}{\text{run}} = \frac{-3}{2}$$

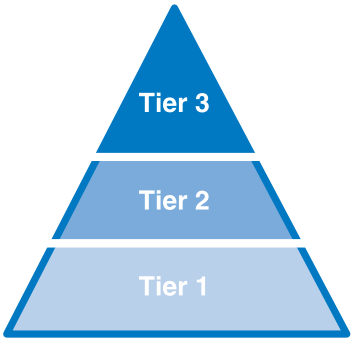
About This Page

Read the explanation together. Demonstrate the slope on an overhead geoboard. Have students show each problem on a geoboard or compute slopes from the drawings.

Moving with Algebra®
RTI Component Checklist

"RTI intentionally cuts across the borders of special education and general education and involves school-wide collaboration."

Assisting Students Struggling with Mathematics: Response to Intervention (RTI) for Elementary and Middle Schools, National Center for Education Evaluation and Regional Assistance, 2009



Moving with ***Algebra***® is **RTI Ready**™ and integrates all eight of the RTI Best Practices recommended by **What Works Clearinghouse**.

Moving with ***Algebra***® RTI Check List ✔

✔ **Predictive Screening:**
- **Pre-Tests**, **Post-Tests**, **Daily Reviews**, and weekly **Check Points** identify at-risk students and monitor progress

✔ **In-Depth Instruction:**
- Focus on whole numbers in grades 1 through 4
- Focus on rational numbers in grades 4 through 8 (decimals and fractions)

✔ **Systematic and Explicit Instruction:**
- Lightly-scripted lesson plans guide instruction
- Classroom activities use explicit models and strategies
- Students given opportunities to verbalize, write, discuss, and practice skills learned

✔ **Solving Word Problems:**
- Explicit steps and strategies for solving word problems
- Practice solving word problems using alternative strategies
- Use of word frames [underlying structures] in solving word problems

✔ **Visual Representations of Math Concepts:**
- Manipulative-based activities introduce each math concept
- Pictorial representations on every student page

✔ **Fluency-Building Activities:**
- *Skill Builder* worksheets include flash cards, timed exercises, speed games
- Include research-based strategies such as fact families

✔ **Monitoring:**
- **Pre-Tests**, **Post-Tests**, **Daily Reviews**, weekly **Check Points**, and embedded assessments monitor the progress of at-risk students

✔ **Motivation:**
- Activity-based instruction offers rich opportunities for student success and natural occasions for praise and encouragement

Moving with Math® **Foundations** and **Math by Topic (IM/MH)** are also **RTI Ready**™. Visit our website to learn more.

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