Fifth Grade

Color Math

Teacher's Manual Samples

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McRuffy Fifth Grade Color Math

The McRuffy Fifth Grade Color Math is designed around state and national standards. Many math topics review and build upon learning from previous levels. The early part of the curriculum more directly reviews fourth grade material, while introducing additional related fifth grade concepts.

The application of calculating skills is applied in ways that extend to 5th grade topics. Multiplication, division, addition, or subtraction problems are still included on workbook sheets to keep skills sharp and to identify any needs for extra review, with the greatest emphasis on multiplication and division. This includes working with decimals.

Problems taking a lot of page space are intended to be copied by the students so they can practice accurately copying and then solving problems. This is a common practice, especially as students move into math in the higher grade levels. You may have the students then record the answers to the problems on the workbook page to once again practice accurately copying numbers. As mental math is emphasized, students will be encouraged to complete basic steps mentally rather than writing every single step once the basic algorithm is practiced. This is especially true with multi-step problems such as adding fractions with unlike denominators. Students will also be encouraged to use and develop their own note taking style in problem solving that combines mental math with numbers from steps to develop a very practical, efficient, and realistic problem solving strategy.

Students should require less daily direct teacher instruction at this level. The workbook contains additional pages for the student to read about new topics or review previous learning, rather than an in depth teacher explanation. Instead, teachers should follow up student's independent reading to check for comprehension. Most instruction is introduced the first two lessons of a week (lesson numbers ending with 1, 2, 6, or 7). A copy of these pages can be found in the resource pack so the teacher may follow along or copy them for display in the classroom.

The first lesson of each week usually includes geometry puzzles. The last lesson of each week usually features word problems.

Lesson plans tend to present topics in the order of the workbook page sections, after an auditory exercise. Generally, the sections may be taught in any order. You may want to teach the entire lesson before having the student complete the workbook activity page or you may have students complete sections one at a time before moving on to introducing the next section. Teachers should be encouraged to follow whatever structure best meets the classroom needs. Bold print is generally words you can speak directly to the students. Answers to questions are formatted as regular print in parenthesis. The Teacher's Manual is printed in two parts.

Many activities include sheets from the resource pack. Sheets that involve using manipulatives directly on the page are generally included in the packet, as well as many other activities, such as measuring where the binding of a book can interfere with its usage, and all the tests.

Auditory math daily activities are a big part of the program. The Response Book provides a self-checking format for the students with students using dry erase markers. Occasionally, a sheet from the Resource Pack will be used during the activity to give choices of responses.

The purpose of the auditory activities is not to provide primary instruction, but to review, and just as importantly, develop detailed listening skills. Generally, the activities are simplified activities that relate in some way to other educational goals for the week. Feel free to adapt the activities to meet student needs, such as shortening the activity if it proves to be too difficult, allowing the use of paper to write and remember details, the use of calculators when appropriate, and the use of manipulatives or other learning aides. The pacing of the reading of the items and completion time allowed for students, as well as decisions for repeating, clarifying, or giving additional examples is left up to the teacher. The goal is to make it a bit challenging, but not frustrating.

Manipulative Kit

Quantity	Manipulative

New to 5th Grade:

1	Angle Ruler
1	Protractor
1	Compass for drawing circles

From previous grade levels:

20	Pattern Blocks
2	Tangram Sets: Seven piece sets
1	Geoboard and rubber bands
1	Pentomino twelve piece set.
3	Dice
12	One Inch Cubes
1	Pattern Block Mirror

Coins (not included in the manipulative kit)

Calculator (not included in the manipulative kit)

Scope and Sequence

Also included are weekly geometric puzzles and weekly word problems.

Auditory math exercises are presented daily through lesson 150.

Lessons 1 to 21 (Review emphasis)
Place Value: billions
Place Value: millionths
Moving a design, rotation, flip, slide
Multiplication
Making change, counting money
Number Patterns
Division
Numbers written as words
Rounding
Estimating
Subtracting dollar amounts
Adding decimals
Distributive property
Graphing
Long division
Associative property
Commutative property
Subtracting decimals
Test 1

Lessons 22 to 41
Subtracting decimals
Comparing decimals
Multiple decimals
Exponents
Elapsed times
Distributive property and subtraction
Estimating
Subtracting time units
Fractions on a number line
Divisibility
Powers of 10
Decimals on number lines
Test 2

Lessons 42 to 61
Prime and composite numbers
Adding fractions (common denominators)
Long division, decimal divisors
Percent
Common multiples
Prime factorization
Subtracting fractions (common denominators)
Multiple operations in a problem
Least common multiples
Multiplying decimals
Subtracting (negative differences)
Comparing fractions
Percentages of numbers
Changing denominators in fractions
Add and subtract fractions (common denominators)
Changing fractions to decimals
Percentage discounts
If-then, x and y (variables)
Estimating products (decimals)
Test 3

Lessons 62 to 81
Mixed numbers
Multiplying dollar amounts
Comparing decimals and fractions
Venn Diagrams
Subtracting time units
Greatest Common Factors
Changing mixed numbers to fractions
Adding mixed numbers
Estimate fractions on a number line
Add decimals
Graph coordinates on a grid
Simplify fractions
Write coordinates for points on a grid
Calculate x and y values and graph lines
Number patterns with fractions
Subtract mixed numbers
Number fractions with decimals
Test 4

Scope and Sequence

Lessons 82 to 101
Ratios
Multiply a fraction by a whole number
Equations with negative answers
Subtracting decimals
Multiplying fractions
Line vocabulary
Naming lines
Probability
Dividing fractions
Measuring and labeling angles
Tree diagrams (probability trees)
Polygons
Test 5

Lessons 102 to 121
Mean, median, mode, range
Classifying triangles by angles and sides
Area of triangles
Collecting, analyzing, and organizing data
Fraction problems with multiple operations
Multiplying mixed numbers
Ruler markings (to eighths)
Length units (Standard US)
Estimating products (decimals)
Measuring length
Converting length units
Classifying Quadrilaterals
Metric measurement
Long distance measurement
Area of quadrilaterals
Creative problem solving
Subtracting percentages
Test 6

Lessons 122 to 141
Solving for an unknown
Measuring around a point (central angles)
Adding percentages
Histograms
Drawing angles
Measuring degrees of rotation
Circle vocabulary
Measuring mass
Discounts as fractions
Constructing a circle graph
Calculating central angles from a percentage
Area and circumference of a circle
Measuring temperatures
Convert between °F and °C
Mental math: Multiplying by 11
Adding mixed weight units
Mental math: Converting 11ths to decimals
Stem and Leaf plots
Perimeters of regular polygons
Adding more than two fractions
Area and perimeter of irregular shapes
Discounts and discount prices
Test 7

Lessons 142 to 160
Multiplying 3 or more fractions
Area and perimeter of a central angle
Volume units
Probability expressed from 0 to 1
Identifying solids
Surface area and volume of prisms
Volume of a cylinder
Adding mixed volume units
Multiplying mixed measurement units
Graphing inequalities
Multiplying 3 or more decimals
Converting volume units.
Matching solidest to 2-dimensional diagrams
Subtracting mixed volume units
Dividing mixed volume units
Multiple operations with decimals
Final test review
Test 8

Response Book

Most lessons feature an opportunity for students to listen and respond. These are short exercises that review concepts. Responses can be recorded in the Response Book. By using a dry erase marker to write on the clear plastic flip sheet, students can record their answers, then flip the clear sheet to an answer page and check their answers. This also makes the response book a non-consumable item. If you prefer a paper copy to use with a pencil, there is a copy master response form.

Directions for exercises recorded in the Response Book are stated in the lessons. These are usually easier exercises, as the emphasis is on listening and responding. **Teachers may allow or even encourage students to use the appropriate manipulatives to help visualize and solve the problems. Students may also jot down notes on scrap paper if necessary to help respond.**

Exercises contain ten responses that are recorded in a column of boxes. **If students are having difficulty with an exercise, or it is taking too much time for a review activity, you may choose to end the exercise before asking for all ten responses.** Responses within an exercise are random in difficulty. There is no planned progression from easiest to hardest.

To make the self-checking feature work properly, two important directions must be followed. **The correct form must be used and the correct column must be used**. Form 2 is a flipped version of Form 1 otherwise they are identical. Since answers are printed two-sided, the correct form must be used to match the answers. Form 1 also features a small picture of a giraffe. Form 2 features a small picture of a zebra. The pictures were added to make the forms more distinctive. An answer page is designated by a letter in the lesson directions. The same answer sheet is used for 5 lessons (test lessons have no exercises).

Columns are designated by shapes in the upper right-hand corner of each response box. Each lesson will use a designated column. The order of shapes are star, circle, triangle, hexagon, square. At the beginning of the Response exercise, the correct form and correct column will be noted.

Answer page

Response form
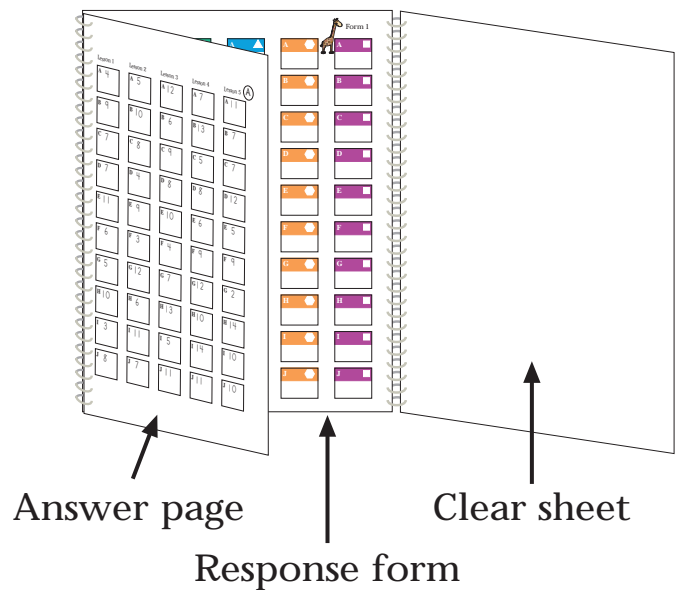
Clear sheet

1. Flip the clear sheet onto the response form.

2. Students record answers onto the face of the clear sheet. The response form helps students to align and record their responses in the correct area for checking.

3. Find the correct answer page. Flip the clear sheet onto the page and match the answers.

Shapes

Columns

Form number
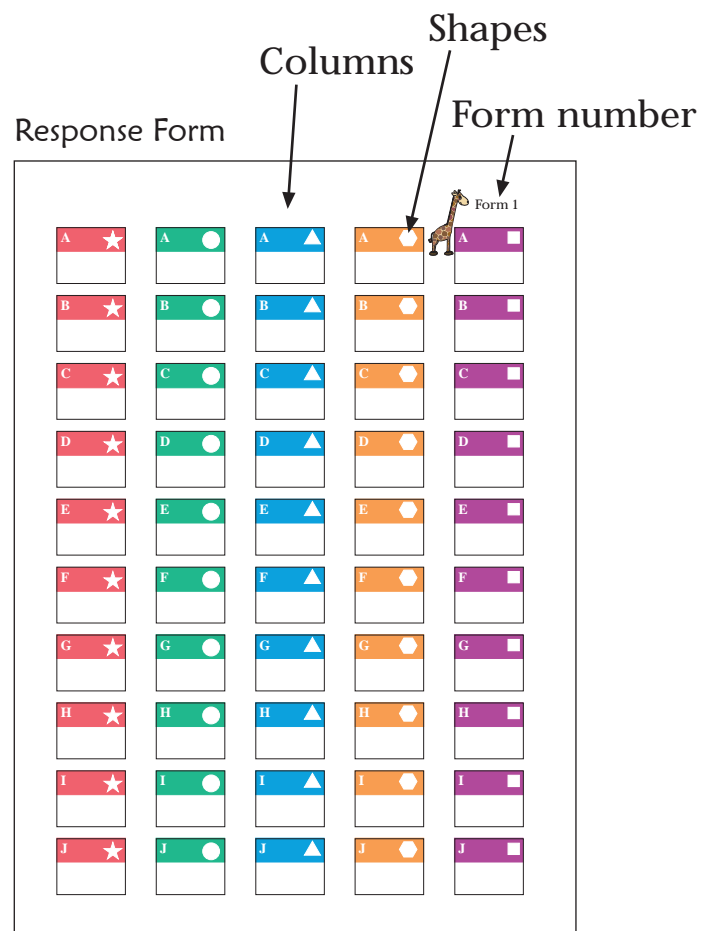
Response Form

Lesson 1

Objectives

1. Students will review multiplication.
2. Students will practice auditory math skills.
3. Students will read numbers to the billions.
4. Students will review transforming shapes.

Materials

Workbook pages 3, 4, and 5
Response book (It's used in most lessons. It will not be listed in
materials in future lessons.)
Tangrams

Teaching

1. Use the section A of workbook page. Basic math problems such as the first two rows of workbook page 5 are written in a smaller font size than previous levels, often without space to neatly calculate directly on the page. An area of emphasis in the fifth grade level will be to accurately copy and solve problems on another piece of paper. After solving, students may write the answers in the workbooks.

   Look at the two rows of math problems on workbook page 5. How are the two rows alike? (Both rows are multiplication problems.) **How is the second row different?** (All the multipliers are two-digits and end with zero.) **How will this change the products of the problems?** (The products will be ten times greater and will had a zero in the ones place.) You may have students compare problems 1 and 10, and 4 and 7 after finishing to prove that this is true.

2. Response book form 1: **Look at the boxes. When you look at the boxes going across the page, you are looking at a row of boxes. When you look at boxes going down the page, you are looking at a column. The places where you write answers in the response book are in columns, the boxes going down the page. In the boxes are small shapes. The shapes will help you find the correct column to write your answers, since you will use the same page for several days.**

   Use form 1 and the column with the star. Today we will review place value. I will say a number that has one digit followed by zeros. Write the number of zeros that would follow that digit. For example, three hundred is written with the number 3 followed by two zeros. You would write a number 2 as the answer for the two zeros.

   A **Forty thousand** B **Two million** C **Fifty** D **Seven hundred thousand** E **Sixty million,**

   F **Eight thousand** G **Nine hundred** H **Three hundred million** I **Seven** J **One million**

   Check the answers on page A. Help students find the correct checking page in the response book. The clear sheet can be flipped over the page and the answers will show above the student's answers.

3. Review place value. Write the number 845,732,169. **What is the place value of the 2?** (thousands) **What place is the 4 in?** (ten millions place). **What is the place value of 7?** (hundred thousands) Point to each digit and have the students say the place value starting with ones.

   Add three zeros after the nine: 845,732,169,000. **This changes all the place values.** Point to 169. **These are now thousands, one hundred sixty-nine thousand.** Point to 732. **What are these now?** (millions) Point to 845. **So what did these become, what comes after millions?** (billions)

After millions comes billions. Now read the number. (845 billion, 732 million, 169 thousand)

Read about a billion on page 3 of the workbook. After students have finished reading, you may ask the following questions to check for understanding.

What are three forms a number can be written in? (word form, expanded form, standard form) **Explain the differences.** (Word form uses words in place of numbers. Expanded form shows each place value followed by zeros as place holders, standard form is the normal way to write a numbers using digits for each place value.)
How did reading about billions help you understand how big the numbers are?

Bonus exercise: Have students make up their own how much is a billion facts by dividing a number into a billion, for example the cost or weight of a car, number of paperclips in a box, number of children it would take to weigh a billion pounds, etc. They may make a poster or book with several comparisons.

Workbook page 5, section B: **Read the numbers. Write the digits in the place values.**

4. Begin with workbook page 4. Have students review transformations of geometrical designs using workbook page 4. Have students model different kinds of transformations with their own designs using pattern blocks. Students may draw their own examples. The answers for examples at the bottom of the page are rotation, flip, and slide.

Workbook page 5, section C: **Look at the first design in each row. Do the following designs show a duplicate flip, slide, or rotation? Fill in the circles to mark your answers. Use two sets of tangrams to help determine the answers.**

Workbook Page 5 Answers

Activity A

1. 158 × 9 = 1422
2. 396 × 5 = 1980
3. 1,674 × 7 = 11,718
4. 899 × 8 = 7,192
5. 909 × 3 = 2,727
6. 4,680 × 20 = 93,600
7. 899 × 80 = 71,920
8. 6,231 × 60 = 373,860
9. 3,263 × 40 = 130,520
10. 1,580 × 90 = 142,200

Activity B

B. Write the numbers in the boxes to show the place value of each digit.

A 897,230,154,893   B 526,489,053,179   C 174,502,368,492

D 409,736,182,608   E 746,810,395,265

	hundred billions	ten billions	billions	hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
A	8	9	7	2	3	0	1	5	4	8	9	3
B	5	2	6	4	8	9	0	5	3	1	7	9
C	1	7	4	5	0	2	3	6	8	4	9	2
D	4	0	9	7	3	6	1	8	2	6	0	8
E	7	4	6	8	1	0	3	9	5	2	6	5

Activity C

C. Look at the first design in each row. Do the following designs show a duplicate flip, slide, or rotation? Fill in the circles to mark your answers. Use two sets of tangrams to help determine the answers.

Row 1:
- ● flip ○ slide ○ rotation
- ○ flip ● slide ○ rotation
- ○ flip ○ slide ● rotation

Row 2:
- ○ flip ● slide ○ rotation
- ○ flip ○ slide ● rotation
- ● flip ○ slide ○ rotation

Lesson 16

Objectives

1. Students will practice auditory math skills.
2. Students will multiply by two digits.
3. Students will add decimals.
4. Students will review the distributive property.
5. Students will solve cube problems.

Materials

Workbook pages 21 and 22
Inch Cube set of 12
Cube Value Card (Resource Pack)
Cube Value Sheet (Resource Pack)
Dry erase marker

Teaching

1. Use the Response book. Students will be given two numbers with decimals to add.

   Use form 2 and the column with the stars. Today you will add numbers with decimals. I will say two numbers and you will write the sum.

   A $0.4 + 0.7$ (read as: point four plus point seven) **B** $0.9 + 0.6$ **C** $0.8 + 0.8$ **D** $0.5 + 0.3$

   E $0.7 + 0.3$ **F** $0.8 + 0.9$ **G** $0.1 + 0.3$ **H** $0.2 + 0.8$ **I** $0.6 + 0.5$ **J** $0.3 + 0.9$

   Check the answers on page D. Answer key note: answers where zero is in the tenths place may be written with or without the decimal. For example on problem H the answer may be written as 1 or 1.0. Students would considered either correct. On the answer key it will be written 1.0

2. Begin by using the first section of workbook page 21. Students can see a review problem for two-digit multiplication. After students have read just the first section ask: **What is the first step in multiplying by more than one digit?** (Multiply the ones place of the bottom or second number time the top or first number.) **What is the next step?** (Multiply by the tens place of the second number.) **What is the last step?** (Add the products of the ones place and the tens place to find the total product.)

   Use workbook page 22, section A. **Write the problems on another piece of paper. Find the products and write the answers on the workbook page.**

3. Begin with the right top section of workbook page 21. Students will read about adding decimals. After students have studied that section ask: **What do you have to be careful to do when you add numbers with decimals?** (You have to be careful to keep the decimal point lined up correctly between all the numbers.) **What do you do next?** (Add the numbers like any other numbers.)

   Use workbook page 22, section B. **Add the decimals and write the sums.**

4. Use the bottom section of workbook page 21. Students will read about the distributive property. Ask the following: **Describe the distributive property.** (It allows you to expand problems that include multiplication and addition.) **How might the distributive property be helpful?** (You can use it to simplify problems for mental math.) Use workbook page 22, section C. **Fill in the missing numbers to show the distributive property.**

5. Use workbook page 22, section D. The inch cube set, Cube Value Card, Cube Value Sheet, and dry erase marker will be needed.

5. **In the first part (first row of green outlined boxes) each color of cube has been assigned a value. Find the total value of each design. The laminated Cube Value Card may be used to help think through finding the total. You can write the values of each color on the color boxes. You can write the numerical values on the blank boxes on the right. Add up the value of each row and then add the sums of all the rows.**

   The two boxes at the bottom of the page are slightly different. Some of the values are missing, but totals are given for one or both designs. Deduce any missing values and totals. You may use the inch cubes to help model the problems. You may also create your own puzzles on the Cube Value Sheet by coloring boxes different colors and assigning each color a value on the right.

Workbook Answers

A. Copy and solve the problems. Write the products in the space provided.

1.	2.	3.	4.	5.
328	916	673	486	209
x 24	x 57	x 85	x 36	x 79
7,872	52,212	57,205	17,496	16,511

B. Add the decimals.

1.	2.	3.	4.	5.
0.623	0.284	0.769	0.307	0.875
+ 0.145	+ 0.516	+ 0.434	+ 0.945	+ 0.697
0.768	0.800	1.203	1.252	1.572

C. Fill in the missing numbers to show the distributive property.

4 x (8 + 9)= (__4__ x 8) + (4 x __9__)   __11__ x (3 + 6) = (11 x __3__) + (__11__ x 6)

2 x (7 + 10)= (2 x __7__) + (__2__ x 10)   __8__ x (2 + 9) = (8 x __2__) + (__8__ x 9)

6 x (4 + 5)= (__6__ x 4) + (6 x __5__)   7 x (9 + __4__) = (7 x __9__) + (__7__ x 4)

D. Give each cube a numerical value and find the sum of the values for each design. Use these values: `1 2 3 4 5 6`

28

29

38
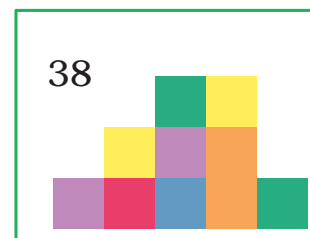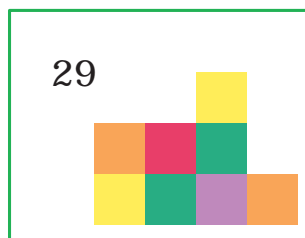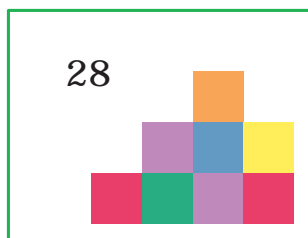
Find the missing values of green and orange by looking at the totals of the designs.

Find the missing values of the red cube looking at the total of the first design. Find the value of the second design.

`5 3 4 1 7 8`

35

39

`6 10 7 3 9 12`

53

69
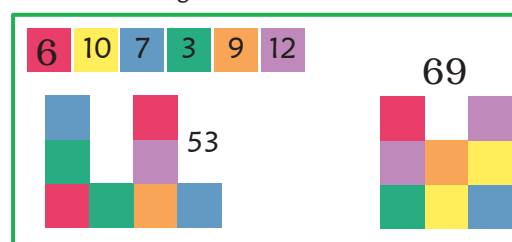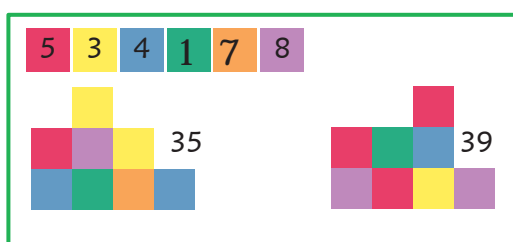
Lesson 26

Objectives

1. Students will multiply decimals.
2. Students will practice auditory math skills.
3. Students will estimate and find sums of three numbers.
4. Students will match exponents to multiplication problems.
5. Students will find elapsed times.
6. Students will make pentomino puzzles.

Materials

Workbook pages 32 and 33
Pentominoes
Pentomino Puzzles 4, 5, and 6 (Resource Pack)
Pentomino Clue Cards for puzzles 4, 5, and 6 (4 for each puzzle)

Teaching

1. Have students begin with workbook page 32 and read just the section about multiplying decimals. **How is multiplying with decimals different than multiplying other numbers?** (A decimal point is placed in the answer.) **How do you know where to place the decimal point in the product?** (Count the total number of decimal places in the multipliers and count over from right to left that many place values.)

   If you multiply by a number that is less than 1, such as 0.5, notice that the product will be smaller than the other multiplier.

   Use workbook page 33, section A. **Write the problems with decimals on another piece of paper. Find the products and write the answers on the workbook page.**

2. Use the Response book. Students will be given numbers with decimals to multiply.

   Use form 2 and the column with the stars. Today you will multiply numbers with decimals. I will say two numbers and you will write the product.

   A 0.4 x 3 B 2 x 0.7 C 0.1 x 9 D 6 x 0.8 E 5 x 0.5 F 0.9 x 8 G 7 x 0.6

   H 0.6 x 5 I 4 x 0.3 J 10 x 0.1 Check the answers on page F.

3. Write the problem: 781 + 347 + 497 =. **If you wanted to estimate an answer for this problem, what might you do?** (Round) **You could round to tens or you could round to hundreds. Which way would give you the easiest numbers to add?** (rounding to hundreds) **What would this problem be if each addend was rounded to the nearest hundred?** (800 + 300 + 500) **What would the estimate equal?** (1600)

   Use workbook page 33, section B. **Round the addends and write the estimate in the box below the problem. Next, add the numbers and write the sums.**

4. Begin with workbook page 32. **Read about exponents.** After students have finished reading, ask questions. **Where would you write an exponent?** (To the right and slightly above another number) **What does an exponent tell you?** (How many times a number is multiplied by itself)

   Write the example from the workbook: $4^5 = 4 \times 4 \times 4 \times 4 \times 4$. **Would it also equal 16 x 16 x 4?** (yes) **The associative property would let us group the 4's in any combination.** Write (4 x 4) x (4 x 4) x 4. Use workbook page 33, section C. **Match all the answers to the exponents.**

5. Begin with workbook page 32. **Read about finding elapsed times. Then find the elapsed times on workbook page 33, section D. Remember how to borrow. If you borrow minutes, add 60 to seconds. If you borrow an hour, add 60 to minutes, and if you borrow a day, add 24 to the hours.**

6. Use the pentominoes, pentomino puzzles, clue cards, and workbook page 33, section E. **Make the pentomino puzzles using pentominoes. Trace an answer for each puzzle on the workbook page.** Use clue cards if students have difficulty solving the puzzles.

Workbook Answers

A. Copy and solve the problems. Write the products in the space provided.

1.	2.	3.	4.	5.
23	59	160	369	591
x 0.3	x 1.8	x .25	x .047	x 0.92
6.9	106.2	40	17.343	543.72

B. After rounding addends to the nearest 100, write an estimate in the box. Then solve the problems.

1.	2.	3.	4.	5.
3 5 8	7 2 6	1 7 6	5 9 8	8 2 7
3 9 7	2 0 8	9 6 4	1 1 2	4 4 9
+ 5 4 9	+ 6 3 5	+ 2 9 1	+ 8 8 3	+ 7 6 9
1304	1569	1431	1593	2045
1300	1500	1500	1600	2000

C. Answer the questions about exponents. Fill in the circles next to all correct answers.

1. $3^3 =$ ○33 ●3x3x3 ●9x3 ○3+3+3

2. $2^4 =$ ●16 ○2 x 4 ●2x2x2x2 ○2+4

3. $5^2 =$ ○5x2 ●5x5 ○2^5 ●25

4. $1^5 =$ ●1x1x1x1x1 ●1 ○1+5 ●1^8

5. $6^3 =$ ○36 ○6x6x6x6 ●36x6 ●6x6x6

D. Find the difference in times:

6 d	3 h	18 m	47 s
− 3 d	12 h	9 m	36 s
2 d	15 h	9 m	11 s

14 d	23 h	6 m	13 s
− 2 d	13 h	58 m	38 s
12 d	9 h	7 m	35 s

15 d	15 h	26 m	29 s
− 7 d	18 h	43 m	30 s
7 d	20 h	42 m	59 s

E. Make the designs on the pentomino puzzle sheets and copy the answers below. Can you find more than one way to solve each puzzle? Other answers may be possible.

Puzzle 4
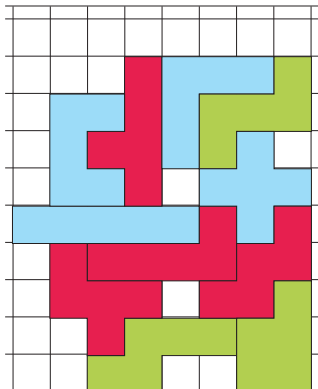
Puzzle 5

Puzzle 6

Lesson 46

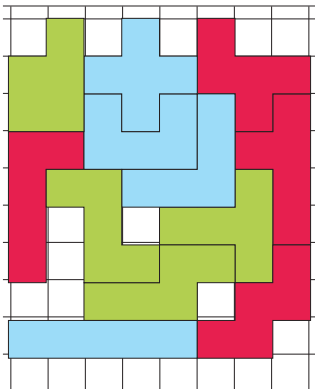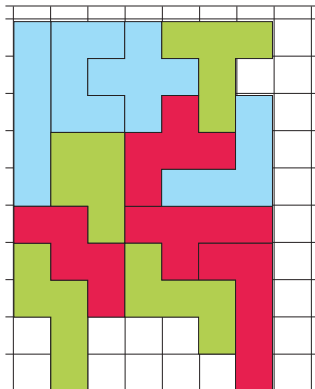## Objectives

1. Students will practice auditory math skills.
2. Students will solve problems with multiple operations.
3. Students will subtract fractions with like denominators.
4. Students will write fractions as percentages.
5. Students will find least common multiples.
6. Students will solve pentomino puzzles.

Materials

Workbook pages 54 and 55
Pentomino set
Pentomino puzzles 7, 8, and 9 (Resource pack)
Pentomino Clue Cards for puzzles 7, 8, 9 (4 for each puzzle)

Teaching

1. Use the Response book. Students will identify prime numbers. **Use form 2 and the column with the stars. Today, I will say a number. If it is prime, write a capital P in the box. If it is a composite number write a capital C.**

    A 29 B 37 C 45 D 33 E 41 F 69 G 87 H 53 I 99 J 79 Check the answers on page J.

2. Use workbook page 55, section A. **When you see a math problem with parenthesis what does that mean?** (Solve that part of the problem before using the numbers inside the parentheses.) **On the problems at the top of the page this week, you will solve problems that use parentheses. Write the problems on another piece of paper, or write the next step in solving the problem and then find the solution. Division signs are highlighted in red to help distinguish them from plus signs.**

3. Use workbook page 55, section B. **What has to be true before you can add fractions?** (They must have the same denominator.) **How do you add fractions that have the same denominator?** (Add the numerators)
    Subtraction follows the same rules. The denominators have to be the same, and then you subtract the second numerator from the first, like a normal subtraction problem.

    Subtract the fractions and write the differences.

4. Begin with workbook page 54. **Read the first section of the page about percent.** After students have read, ask: **What percent is 75 hundredths?** (75%) **Today you will only change hundredths into percentages.** Use workbook page 55, section C. **Write each fraction as a percent.**

5. Begin with workbook page 54. **Read the next section about Common Multiples. Save last section until the next lesson.** After students have read ask: **What would be the least common multiple of 2 and 3?** (6) **What would be the least common multiple of 2 and 6?** (6)

    Use workbook page 55, section D. **Find the least common multiple of the pairs of numbers. In the box is a list of multiples for the numbers you will be using.**

6. Use the pentominoes, pentomino puzzles, clue cards, and workbook page 33, section E. **Make the pentomino puzzles using pentominoes. Trace an answer for each puzzle on the workbook page.** Use clue cards if students have difficulty solving the puzzles.

Workbook Answers

A. Write the problems on another piece of paper and find the answers.

1. $37 + (42 \times 7) =$ ___331___ 2. $52 \times (83 - 43) =$ ___2,080___ 3. $123 - (6 \times 8) =$ ___75___

4. $180 \div (2^2 \times 3^2) =$ ___5___ 5. $0.52 + (3 \times 0.1) =$ ___0.82___

B. Subtract the fractions.

1. $\dfrac{70}{72} - \dfrac{63}{72} = \dfrac{7}{72}$ 2. $\dfrac{14}{20} - \dfrac{5}{20} = \dfrac{9}{20}$ 3. $\dfrac{31}{36} - \dfrac{19}{36} = \dfrac{12}{36}$

4. $\dfrac{16}{44} - \dfrac{12}{44} = \dfrac{4}{44}$ 5. $\dfrac{52}{57} - \dfrac{26}{57} = \dfrac{26}{57}$ 6. $\dfrac{76}{81} - \dfrac{18}{81} = \dfrac{58}{81}$

C. Write the fractions as percents (%).

1. $\dfrac{62}{100} = 62\%$ 2. $\dfrac{35}{100} =$ ___35%___ 3. $\dfrac{8}{100} =$ ___8%___ 4. $\dfrac{120}{100} =$ ___120%___ 5. $\dfrac{16}{100} =$ ___16%___

D. Find the least common multiple of the numbers.

1. 10 and 3 ___30___ 6. 3 and 7 ___21___

2. 2 and 7 ___14___ 7. 4 and 8 ___8___

3. 6 and 8 ___24___ 8. 9 and 3 ___9___

4. 5 and 4 ___20___ 9. 10 and 2 ___10___

5. 9 and 6 ___18___ 10. 6 and 5 ___30___

Multiples of
2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22
3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30
4: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40
5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
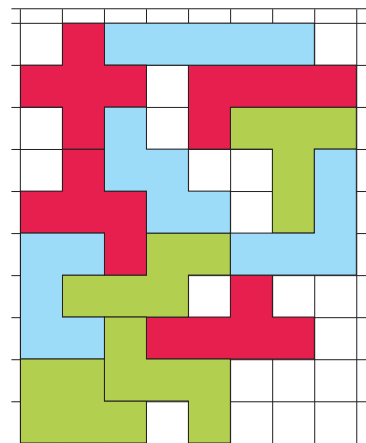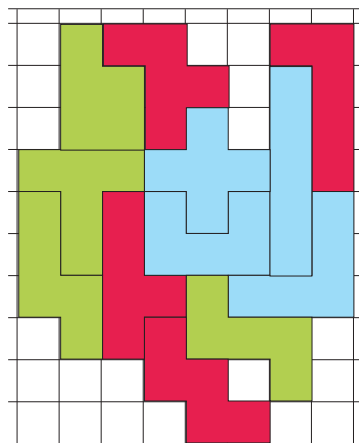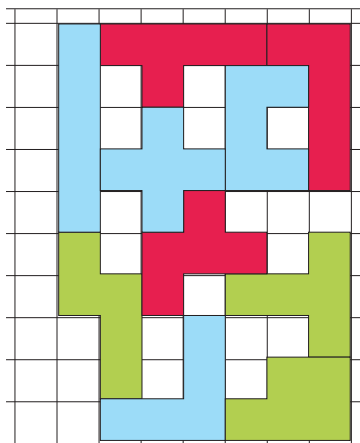6: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60
7: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70
8: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
9: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90
10: 10, 20, 30, 40, 50, 60, 70, 80, 90

E. Make the designs on the pentomino puzzle sheets and copy the answers below. Can you find more than one way to solve each puzzle?

Lesson 76

Objectives

1. Students will practice auditory math skills.
2. Students will divide with decimal divisors.
3. Students will regroup fractions.
4. Students will change improper fractions to their simplest form.
5. Students will flip geoboard designs.

Materials

Geoboard
Geoboard Grid Paper
Mirror

Teaching

1. Use the Response book. Students will recognize fractions in their simplest form.**Use form 2 and the column with the stars. Today, I will say a fraction. If it is in its simplest form, write a capital S in the box for simplest. If not, write a capital N in the box for not simplest.**

    A 1/3 B 5/9 C 3/2 D 6/10 E 4/7 F 3/15 G 6/12 H 1/2 I 2/4 J 4/5

    Check the answers on page P.

2. **Look at the problems on the top of the workbook page. What do you have to remember to do first when the divisor has a decimal in it.**

    Use workbook page, section A. **Copy the problems on another piece of paper and find the quotients.**

3. Write the problem 2 1/2 - 3/4 = . **What would be the first step in solving this problem?** (Change the fractions so they have a common denominator) Write 2 2/4 - 3/4. **Can you subtract 3/4 from 2/4? We can regroup a whole number into a fraction and add it to 2/4. To do that, subtract 1 from the whole number. Change it to a fraction with the same denominator as the fraction. Add four-fourths to two-fourths, which you do by simply adding 4 to the numerator.** Write 1 6/4 - 3/4. **Now you can subtract the fractions.** 1 6/4 - 3/4 = 1 3/4.

    Workbook, section B: **Regroup a whole number into the fraction and subtract. The first step you will show is regrouping. After subtracting, simplify the answers.**

4. Write 10/8. **How would you rewrite this so that it is not an improper fraction?** (1 2/8) **Is this the simplest form for the fraction?** (No) **What would be the simplest form for 10/8?** (1 1/4)

    Workbook, section C: **Simplify the fractions.**

5. Use the workbook page, section D. **Look at the number patterns for the fractions. Write the next number in the pattern.** Pattern Guide: **1.** plus 1 1/2, **2.** The amount added increases by 1/4 each time (+1/4, +1/2, +3/4, + 1) **3.** The numerator increases by 1, the denominator is multiplied by 2, **4.** The amount added to the whole number increase by 1 each time (+2, +3, +4, +5) and the denominator increases by 1 each time.

6. Use workbook page section E, geoboard, and geoboard grid paper.**To begin, make design A on the geoboards with rubber bands. Use the mirror to picture a flip and then add it to the design. Draw the result on the workbook page. Repeat with the other three designs. Use the geoboard grid paper to make up your own flips.**

Workbook Answers

A. Write the problems on another piece of paper and find the quotients.

1. $0.32\overline{)431.04}$ $\dfrac{1,347}{}$

2. $0.68\overline{)400.52}$ $\dfrac{589}{}$

3. $0.49\overline{)943.74}$ $\dfrac{1,926}{}$

4. $0.71\overline{)591.43}$ $\dfrac{833}{}$

5. $0.28\overline{)847}$ $\dfrac{3,025}{}$

B. Subtract the mixed numbers. Regroup fractions when needed.

1. $26\frac{1}{6} - 12\frac{5}{6} = 25\frac{7}{6} - 12\frac{5}{6} = 13\frac{2}{6} = 13\frac{1}{3}$

2. $51\frac{2}{9} - 22\frac{8}{9} = 50\frac{11}{9} - 22\frac{8}{9} = 28\frac{3}{9} = 28\frac{1}{3}$

3. $95\frac{3}{16} - 48\frac{11}{16} = 94\frac{19}{16} - 48\frac{11}{16} = 46\frac{8}{16} = 46\frac{1}{2}$

4. $63\frac{7}{10} - 7\frac{9}{10} = 62\frac{17}{10} - 7\frac{9}{10} = 55\frac{8}{10} = 55\frac{4}{5}$

C. Write the fractions in simplest form.

1. $\dfrac{38}{14} = \underline{2\frac{5}{7}}$

2. $\dfrac{96}{27} = \underline{3\frac{5}{9}}$

3. $\dfrac{55}{10} = \underline{5\frac{1}{2}}$

4. $\dfrac{56}{12} = \underline{4\frac{2}{3}}$

D. Write the next number in the patterns.

1. $\frac{1}{2}, 2, 3\frac{1}{2}, 5, \underline{6\frac{1}{2}}$

2. $\frac{1}{4}, \frac{1}{2}, 1, 1\frac{3}{4}, \underline{2\frac{3}{4}}$

3. $\frac{1}{2}, \frac{2}{4}, \frac{3}{8}, \frac{4}{16}, \underline{\frac{5}{32}}$

4. $1\frac{1}{2}, 3\frac{1}{3}, 6\frac{1}{4}, 10\frac{1}{5}, \underline{15\frac{1}{6}}$

E. Build the designs on a geoboard. Show a flip of the design on the second half of the board. Record your answers on the grids below.
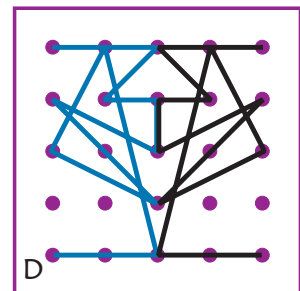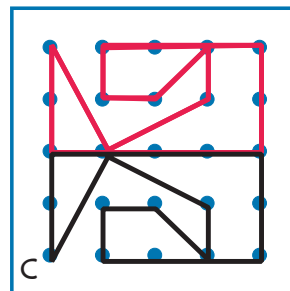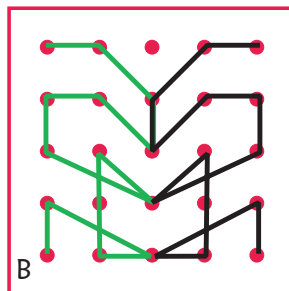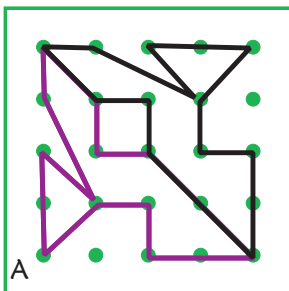
Lesson 99

Objectives

1. Students will practice auditory math skills.
2. Students will choose correct operations and solve problems.
3. Students will review fraction operations.
4. Students will review parallel and perpendicular lines.
5. Students will answer ratio if-then questions.
6. Students will calculate coordinates and graph lines.
7. Students will make polygons.

Materials

Auditory Coordinates sheet (Resource Pack)
Geoboard
Grid Paper (Resource Pack)
Angle ruler or protractor

Teaching

1. Use the Response book and Auditory Coordinates sheet. Students will locate quadrants for coordinates. **Use form 2 and the column with the hexagons. Today, I will say a set of coordinates. Look at the Auditory Coordinates sheet and decide what part of the grid that coordinate would be plotted. The sections are labeled K, L, M, and N. Write a capital letter for the section the point would be located.**

   A (-7, 10) B (5, -11) C (-8, -12) D (7, 15) E (15, -18) F (-9, -6) G (-13, 14) H (16, -7)

   I (20, 17) J (23, 25) Check the answers on page T.

2. Use the workbook page, section A. **Write the problems on another piece of paper in the format easiest for you to solve. Write the answers on the workbook page.**

3. Use workbook page, section B. **Solve the fraction problems on the workbook page. Be careful to watch the signs and choose the correct operation.**

4. Review the terms *parallel* and *perpendicular*. **Describe parallel lines.** (Lines that are always the same distance apart) **Describe perpendicular lines.** (Lines that intersect at a 90° angle)

   Use workbook page, section C. **Find the lines that match the descriptions. Write the name of the lines with the correct line symbol above them.**

5. Use workbook page, section D. **Answer the if-then questions about ratios.**

6. Use the workbook page section E and grid paper. **Calculate points using the equations. Graph the points on grid paper and draw a line through the points.**

7. Use the geoboard. **Try to make all the different polygons you've learned about on the geoboard. Which ones are regular and which ones are not. Check by measuring sides and angles. Make a list of your results on a piece of paper. You may use either side of the geoboard.**

Workbook Answers

A. Write the problems on another piece of paper and solve.

1. The product of 129.3 and 6.8 = __879.24__

2. The sum of 3.94 and 7.72 and 8.56 = __20.22__

3. The difference of 5.2147 and 2.4698 = __2.7449__

4. The product of 9.225 and 4.6 = __42.435__

5. The sum of 9.5412 and 7.4869 = __17.0281__

6. The quotient of 1,100.58 divided by 8.3 = __132.6__

B. Solve the fraction problems. Write answers in simplest form.

1. $\dfrac{9}{10} - \dfrac{1}{2} = \dfrac{2}{5}$

2. $\dfrac{20}{21} \times \dfrac{7}{12} = \dfrac{5}{9}$

3. $\dfrac{14}{15} + \dfrac{2}{3} = 1\dfrac{3}{5}$
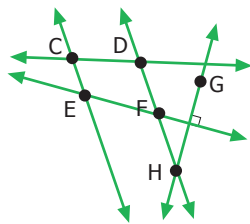
4. $\dfrac{4}{7} \div \dfrac{24}{35} = \dfrac{5}{6}$

C. Find the lines that match the descriptions. Use symbols above the letters.

1. Parallel lines
$\overleftrightarrow{CE}$ $\overleftrightarrow{DF}$ or $\overleftrightarrow{DH}$ $\overleftrightarrow{FH}$

2. Perpendicular lines
$\overleftrightarrow{EF}$ $\overleftrightarrow{GH}$

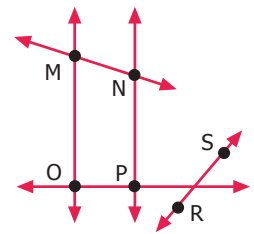3. Perpendicular lines
$\overleftrightarrow{OP}$ $\overleftrightarrow{NP}$ or $\overleftrightarrow{MO}$ $\overleftrightarrow{OP}$

4. Parallel lines
$\overleftrightarrow{MO}$ $\overleftrightarrow{NP}$

D. Use the ratios to answer the if-then questions. The ratio of:

1. pens to pencils in the box is 2:3. If there are 10 pens, then there are __15__.

2. pairs of shoes to pairs of socks in the closet is 4:9. If there are 12 pairs of shoes, then there are __27__ socks.

3. hammers to screwdrivers in a store is 1:5. If there are 25 screwdrivers, then then there are __5__ hammers.

4. tomato plants to flowers in the greenhouse is 6:7. If there are 150 tomato plants, there are __175__ flowers.

E. Find coordinates for two values of x. Plot the points on a grid and connect them to make a line.

1. $x + 4 = y$ If x = -9 (__-9, -5__), If x = -2 (__-2, 2__) Label the line CD.

2. $2x + 2 = y$ If x = -1 (__-1, 0__), If x = 2 (__4, 6__) Label the line HJ.

3. $4x - 8 = y$ If x = 5 (__5, 12__), If x = -1 (__-1, -12__) Label the line LM.

4. $3x + 3 = y$ If x = -4 (__-4, -9__), If x = 3 (__3, 12__) Label the line QR.

5. $8 - x = y$ If x = 10 (__10, -2__), If x = 5 (__5, 3__) Label the line ST.

Lesson 108

Objectives

1. Students will practice auditory math skills.
2. Students will estimate products.
3. Students will multiply mixed numbers.
4. Students will review data.
5. Students will convert feet to yards.
6. Students will measure and draw lines.

Materials

Ruler
Calculator

Teaching

1. Use the Response book. Students will convert inches to feet. **Use form 2 and the column with the triangles. I will say a length in inches. Change it to feet and inches. Write the number of feet in the box. For example if I said 64 inches, you would write 5 because there are 5 feet and 4 inches in 64 inches. Write only the number for the feet.**

   A 25" B 72" C 120" D 60" E 40" F 52" G 18" H 240" I 96" J 144"

   Check the answers on page V.

2. Use workbook page, section A. **Find and estimate for each product by rounding numbers to the ones place. After you have an estimate for all the problems, find the actual answer on a calculator and write them on the second blank of each problem.**

3. Use the workbook page, section B. **Multiply the mixed numbers. Remember, the first step is to change the mixed numbers to improper fractions.**

4. Review the terms range, median, mode, and mean. Ask students to tell you what they are and how they are calculated. (Range: the amount that the data changes, subtract the highest number from the lowest. Median: the middle of the data. Arrange the data in order from least to greatest. If there is an odd number of data, it will be the middle number. If there is an even number of data, it will be the average of the middle two data. Mode: the most frequently occurring number. Mean: the average of the numbers. Add all the data together and divide the sum by the number of data.)

   Workbook, section C: **Look at the data in the tables. Find the range, median, mode, and mean.**

5. **How do you change inches to feet?** (Divide inches by 12) **Why do you divide inches by 12 to find feet?** (because 12 inches equal 1 foot) **How many feet equal a yard?** (3) **If you measure 12 feet, what would that be in yards?** (4) **How did you calculate that?** ($12 \div 3 = 4$) **If there were 13 feet instead of twelve, you could say there are 4 yards and 1 foot.** Write 13 ft = 4 yd, 1 ft. **Remember that yards is abbreviated as yd.** Workbook, section D: **Change the feet to yards and feet. Use the abbreviations yd and ft.**

6. Use the workbook page section E, and ruler. **Draw lines to equal the measurements. Start at the dot and follow the arrow.**

Workbook Answers

A. Estimate answers by rounding to the ones place. Write the estimate in the first blank. Check with a calculator and write the product.

1. 67.4 x 1.83 = __134__ __123.342__

2. 4.37 x 81.5 = __328__ __356.155__

3. 9.72 x 31.3 = __310__ __304.236__

4. 68.4 x 6.84 = __476__ __467.856__

5. 14.92 x 15.47 = __225__ __230.8124__

6. 122.6 x 2.22 = __246__ __272.172__

B. Multiply the mixed numbers.

1. $3\frac{5}{7} \times 1\frac{1}{13} = \frac{26}{7} \times \frac{14}{13} = 4$

2. $4\frac{1}{2} \times 3\frac{5}{9} = \frac{9}{2} \times \frac{32}{9} = 16$

3. $5\frac{1}{7} \times 1\frac{3}{4} = \frac{36}{7} \times \frac{7}{4} = 9$

4. $2\frac{3}{16} \times 3\frac{7}{15} = \frac{35}{16} \times \frac{52}{15} = 7\frac{7}{12}$

C. Find the range, median, mode, and mean for the data on the tables.

Sales	
Day	$
1	32
2	18
3	40
4	23
5	18
6	36
7	43

range __25__

median __32__

mode __18__

mean __30__

Test 5	
Student	Score
Kim	84
Joe	80
Hannah	100
Matt	90
Gary	72
Sue	78
Ziggy	90
Kay	98

range __28__

median __87__

mode __90__

mean __86.5__

D. Convert the feet to yards and feet.

1. 23' = __7 yd, 2 ft__

2. 63' = __21 yd__

3. 43' = __14 yd, 1 ft__

4. 17' = __5 yd, 2 ft__

5. 55' = __18 yd, 1 ft__

6. 100' = __33 yd, 1 ft__

E. Draw lines starting at the dot and following the arrows to show the length.

1. $5\frac{5}{8}$"

2. $4\frac{3}{8}$"

3. 9 cm

4. 14 cm