Fraction Operations; Applications

Think back to how you learned to ride a bike as a child. What if you were allowed to practice only on a stationary bike rather than a real one? When you finally ventured out onto the neighborhood streets expecting to ride like a pro, you would probably be disappointed! Without an opportunity to apply what you learned to a real-world situation, you would never have to apply the brakes going down a hill or maneuver around a sharp curve. Likewise, if students aren't given a chance to apply what they learn in mathematics to real-world situations, it may seem to them like useless knowledge. To help make mathematics more meaningful to students, Unit 8 asks them to apply what they have learned throughout the year to real-world problems.

Fraction Operations

This year students have explored adding, subtracting, and multiplying fractions. In Unit 8 they will apply fraction and mixed-number operations to help them solve real-world problems involving the perimeter and area of rectangles and units of measure. For example, students will use the relationship between perimeter and area to find the missing side length of a fence or determine the fractional amounts of juice needed to make fruit punch.

Angle Applications

Angles play important roles in many real-life situations, including carpentry, measuring the angles of the sun, and many sports. Lesson 8-2 uses hockey to demonstrate real-world applications of students' knowledge of angles. For instance, when a hockey player wants to pass the puck and an opponent is blocking the path, the passer hits the puck off the boards at an angle, causing the puck to travel around the opponent. This is called "banking the puck." In Lesson 8-2 students also use what they have learned about angles to explore the role angles play in our field of vision, which is the angle that includes the area that can be seen without moving the head or eyes.

More Applications

In Lesson 8-4 students apply their knowledge of symmetry to quilting patterns and then create their own quilt based on specified numbers of lines of symmetry. In Lesson 8-5 students use real-world data about envelope sizes from the U.S. Postal Service to create line plots. They then answer questions about the data by adding and subtracting fractions. In Lesson 8-12 students use their knowledge of place value, addition, and subtraction to solve challenging puzzles called cryptarithms. In Lesson 8-13 students find equivalent names for numbers.

Please keep this Family Letter for reference as your child works through Unit 8.

Vocabulary

Important terms in Unit 8:

equivalent names Different ways of naming the same number. For example, $2 + 6$, $4 + 4$, $12 - 4$, $18 - 10$, $100 - 92$, $5 + 1 + 2$, eight, VIII, and ~~HHT~~ /// are all equivalent names for 8.

fluid ounce (fl oz) A U.S. customary unit of volume or capacity equal to $\frac{1}{16}$ of a pint, or about 29.6 milliliters.

Do-Anytime Activities

To work with your child on concepts taught in this unit, try these activities:

1. Have your child complete number puzzles found in newspapers, magazines, or online. Discuss with your child how he or she found the solutions.

2. Ask your child to measure a rectangular object such as an envelope, notebook, or room in your home. Have him or her find both the perimeter and the area of the object and then compose a word problem about the measurements.

3. Ask your child to point out items that he or she believes are symmetrical. How many lines of symmetry are there in those items?

4. Have your child point out angles in your home and estimate their measures. Ask your child to add angles together or find missing angles based on these estimates.

5. Show your child a food or beverage container and have him or her locate the liquid volume and convert it to a smaller unit. For instance, a juice box might hold 1 cup of juice, which means it holds 8 fluid ounces of juice.

Building Skills through Games

In Unit 8 students play the following game to increase their understanding of numbers and the properties of numbers. For detailed instructions, see the *Student Reference Book*.

Name That Number See *Student Reference Book*, page 268. This game provides practice representing numbers in different ways, using any or all of the four operations: addition, subtraction, multiplication, and division.

As You Help Your Child with Homework

As your child brings assignments home, you may want to go over instructions together, clarifying them as necessary. The answers listed below will guide you through the Home Links in Unit 8.

Home Link 8-1

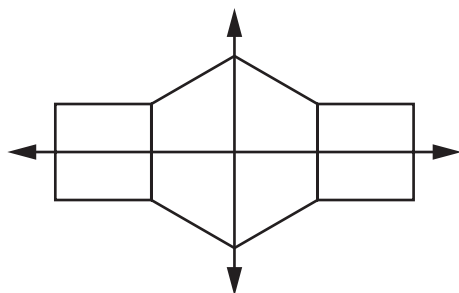**1.** Team B's car; 27 cm   **3.** 180 cm

5. 2,833 R1   **7.** 715 R3

Home Link 8-2

1. $165°$; $82° + 83° = f$ **3.** $87°$; $3° + w = 90°$

5. $137°$; $180° - 43° = s$ **7.** $\frac{5}{3}$, or $1\frac{2}{3}$

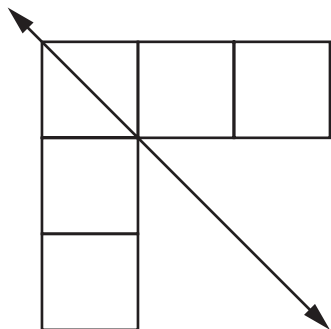**9.** $\frac{11}{5}$, or $2\frac{1}{5}$

Home Link 8-3

1. $60°$; Sample answers: $30° + 30° = 60°$; The measure of each small white rhombus angle is $30°$, so two of them make $60°$.
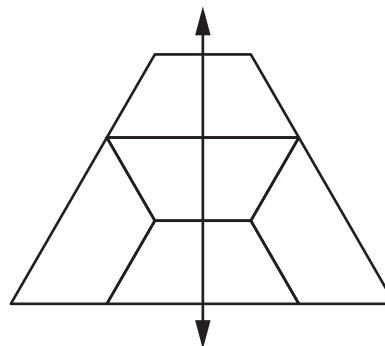
3. 16,764   **5.** 4,888

Home Link 8-4

1.

3.

5. 1 line of symmetry;

7. $\frac{30}{6}$, or 5   **9.** $\frac{28}{10}$, or $2\frac{8}{10}$

Home Link 8-5

Book Heights
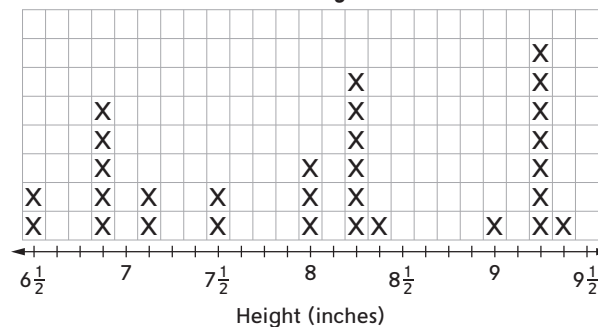
1. $2\frac{7}{8}$ in.   **3.** 1,172 R3

Home Link 8-6

1. $7\frac{2}{6}$ yd   **3.** Width $= \frac{12}{100}$ km

5. Width $= 2\frac{3}{10}$ cm   **7.** $\frac{4}{3}$, or $1\frac{1}{3}$

9. $\frac{36}{5}$, or $7\frac{1}{5}$

Home Link 8-7

1. 3.26 kilograms; Sample answer: I thought about what number added to 4 would give me $7\frac{26}{100}$. First I added 3 to get 7. Then I added $\frac{26}{100}$ to get $7\frac{26}{100}$. Finally, $3 + \frac{26}{100} = 3\frac{26}{100} = 3.26$

3. 7.8 cm; Sample answer: $11.4 = 11\frac{4}{10}$ and $3.6 = 3\frac{6}{10}$; $11\frac{4}{10} = 10 + \frac{10}{10} + \frac{4}{10} = 10\frac{14}{10}$; $10\frac{14}{10} - 3\frac{6}{10} = 7\frac{8}{10} = 7.8$

5. 14,316   7. 2,016

Home Link 8-8

1. **a.** $4\frac{1}{12}$ square feet   **b.** $12\frac{8}{12}$ feet

2. **a.** $5\frac{6}{12}$ square feet   **b.** $6\frac{4}{12}$ feet

3. $8\frac{4}{10}$ square inches

5. $\frac{4}{6}$ 7. $\frac{4}{10}$

Home Link 8-9

1. $5\frac{1}{4}$ feet; Sample answer: $3 * 1\frac{3}{4} = (3 * 1) + (3 * \frac{3}{4}) = 3 + \frac{9}{4} = 3\frac{9}{4}$, or $5\frac{1}{4}$

2. Yes. Sample answer: $(5 * 1\frac{1}{2}) + (4 * 1\frac{3}{4}) = 5\frac{5}{2} + 4\frac{12}{4} = 7\frac{1}{2} + 7 = 14\frac{1}{2}$

3. $\frac{6}{6}$, or 1   5. $\frac{54}{100}$

Home Link 8-10

1. Rule: $* 8$

in (gallons)	out (pints)
2	16
$3\frac{1}{2}$	28
6	48
$7\frac{1}{4}$	58
10	80

3. **a.** Yes. Sample answer: The total amount of all the ingredients combined is 18 fluid ounces, so the smoothie will fit in the 24-fluid ounce glass.

b. $\frac{3}{4}$ cup

c. $2\frac{1}{4}$ cups orange juice; 12 fluid ounces cold water; 3 cups vanilla ice cream

d. 54 fluid ounces

5. 1,859   7. 519

Home Link 8-11

1. **a.** $3\frac{1}{8}$ pounds; Sample answer:
$\left(1\frac{1}{2} + \frac{1}{2}\right) + \left(\frac{3}{4} + \frac{1}{4}\right) + \frac{1}{8} = 2 + 1 + \frac{1}{8} = 3\frac{1}{8}$

b. 50 ounces; Sample answer: One pound equals 16 ounces; $\frac{1}{8}$ of a pound $= 2$ ounces; so $(3 * 16) + 2 = 48 + 2 = 50$

c. 2 packages; Sample answer: 1 of each size uses 50 ounces, so 2 of each size would use $2 * 50 = 100$ ounces. $100 > 80$, so 1 package isn't enough.

2. $1\frac{2}{8}$, or $1\frac{1}{4}$ pounds; Sample answer:
$\left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{4} + \frac{3}{4}\right) = \frac{2}{8} + 1 = 1\frac{2}{8}$, or $1\frac{1}{4}$

3. 15,321   5. 2,146

Home Link 8-12

1. Sample answer: $973 + 51 = 1,024$

3. $80 * 64 = 5,120$

5. **a.** 27; $9 * 3 = 27$ **b.** $\frac{1}{3}$; $3 / 9 = \frac{1}{3}$

7. $4\frac{10}{8}$, or $5\frac{2}{8}$ 9. $10\frac{181}{100}$, or $11\frac{81}{100}$

Home Link 8-13

1. Sample answers:

9,990
2,016 + 7,974
(1,427 * 7) + 1
1,665 * 6
9,000 + 900 + 90
13,558 − 3,568

3. Answers vary.

5. $3\frac{2}{4}$ 7. $2\frac{8}{12}$

End-of-Year Family Letter

Congratulations!

By completing *Fourth Grade Everyday Mathematics*, your child has accomplished a great deal. Thank you for all of your support this year.

This Family Letter is a resource to use throughout your child's vacation. It includes an extended list of "Do-Anytime Activities," directions for games that can be played at home, a list of mathematics-related books to check out over vacation, and a sneak preview of what your child will be learning in *Fifth Grade Everyday Mathematics*. Enjoy your vacation!

Do-Anytime Activities

Mathematics means more to everyone when it is rooted in real-life situations. To help your child review many of the concepts he or she has learned in fourth grade, we suggest the following activities for you to do together over the break. These activities will not only help to prevent your child from forgetting content, but they will also help prepare him or her for *Fifth Grade Everyday Mathematics*.

1. Practice multiplication and division facts to maintain fluency.

2. Convert measurements in real-world contexts. For example, at the grocery store ask, "How many quarts are in this gallon of milk?"

3. Have your child practice multidigit multiplication and division using the algorithms with which he or she is most comfortable.

4. Look at advertisements and compare sale prices to original prices. Use a calculator to find unit prices to determine possible savings.

Building Skills through Games

The following section lists rules for games that can be played at home. You will need a deck of number cards, which can be made from index cards or by modifying a regular deck of cards as follows:

A regular deck of playing cards includes 54 cards (52 regular cards plus 2 jokers).
Use a permanent marker to write on the cards or a ballpoint pen to write on pieces of white adhesive labels to mark some of the cards:

- Mark each of the four aces with the number "1."
- Mark each of the four queens with the number "0."
- Mark each of the four jacks and the four kings with one of the numbers from 11–18.
- Mark the two jokers with the numbers 19 and 20.

Name That Number

Materials 1 set of cards. See above for directions to make this set.

Players 2 or 3

Object of the Game To collect the most cards

Directions

1. Shuffle the cards and deal five cards to each player. Place the remaining cards number-side down. Turn over the top card and place it beside the deck. This is the **target number** for the round.

2. Players try to match the target number by adding, subtracting, multiplying, or dividing the numbers on as many of their cards as possible. A card may be used only once.

3. Players write their solutions on a sheet of paper or a slate. When players have written their best solutions, they:
    • Set aside the cards they used to name the target number.
    • Replace used cards by drawing new cards from the top of the deck.
    • Put the old target number on the bottom of the deck.
    • Turn over a new target number and play another hand.

4. Play continues until there are not enough cards left to replace all of the players' cards. The player who sets aside more cards wins the game.

Example: Target number: 16   A player's cards: 7   5   8   2   10
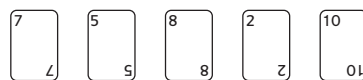
Some possible solutions:

$10 + 8 - 2 = 16$ (*three cards used*)

$7 * 2 + 10 - 8 = 16$ (*four cards used*)

$8 / 2 + 10 + 7 - 5 = 16$ (*all five cards used*)

The player sets aside the cards used to make a solution and draws the same number of cards from the top of the deck.

Top-It Games

Materials Number cards 1–9 (4 of each) as described above
          1 calculator (optional)

Players 2 to 4

Skills Addition, Subtraction, and Multiplication

Object of the Game To collect the most cards

Addition Top-It
Directions

1. Shuffle the cards and place them number-side down on the table.

2. Each player takes eight cards, forms two 4-digit numbers, and finds the sum. Players should carefully consider how they form their numbers, because different arrangements lead to different sums. For example, 7,431 + 5,269 has a greater sum than 1,347 + 2,695. The player with the largest sum takes all the cards. In case of a tie, each player turns over eight more cards and calls out the sum. The player with the largest sum takes all the cards from both rounds.

3. Check answers, using a calculator if necessary.

4. The game ends when there are not enough cards left for each player to have another turn.

5. The player with the most cards wins.

Subtraction Top-It
Directions

1. Shuffle the cards and place the deck number-side down on the table.

2. Each player takes eight cards, forms two 4-digit numbers, and finds the difference. Players should carefully consider how they form their numbers, because different arrangements lead to greater differences. For example, 7,431 — 5,269 has a smaller difference than 7,431 — 2,695. The player with the largest difference takes all the cards. In case of a tie, each player turns over eight more cards and calls out the difference. The player with the largest difference takes all the cards from both rounds.

3. Check answers, using a calculator if necessary.

4. The game ends when there are not enough cards left for each player to have another turn.

5. The player with the most cards wins.

Multiplication Top-It
Directions

1. Shuffle the cards and place them number-side down on the table.

2. Each player turns over four cards, forms two 2-digit numbers, and finds the product. Players should carefully consider how they form their numbers, because different arrangements lead to different products. For example, 74 * 52 has a greater product than 47 * 25. The player with the largest product takes all the cards. In case of a tie, each player turns over four more cards and calls out the product. The player with the largest product takes all the cards from both rounds.

3. Check answers, using a calculator if necessary.

4. The game ends when there are not enough cards left for each player to have another turn.

5. The player with the most cards wins.

Vacation Reading with a Mathematical Twist

Books can contribute to students' learning by representing mathematics in a combination of real-world and imaginary contexts. The titles listed below were recommended by teachers who use *Everyday Mathematics* in their classrooms. They are organized by mathematical topic. Visit your local library and check out these and other mathematics-related books with your child.

Operations and Algebraic Thinking
A Remainder of One by Elinor J. Pinczes
17 Kings and 42 Elephants by Margaret Mahy
Anno's Magic Seeds by Mitsumasa Anno
Pattern by Henry Pluckrose
The Grapes of Math by Greg Tang

Numeration and Operations in Base-Ten
If the World Were a Village by David J. Smith
The Doorbell Rang by Pat Hutchins
*The Man Who Counted: A Collection of
    Mathematical Adventures* by Malba Tahan
The Grizzly Gazette by Stuart J. Murphy

Numeration and Operations: Fractions
Fraction Fun by David A. Adler
Working with Fractions by David Adler
Full House by Dayle Ann Dodds
Funny & Fabulous Fraction Stories by Dan
    Greenberg
*Civil War Recipes: Adding and Subtracting
    Simple Fractions* by Lynn George

*Music Math: Exploring Different Interpretations
    of Fractions* by Kathleen Collins
My Half Day by Doris Fisher and Dani Sneed
The Wishing Club by Donna Jo Napoli

Measurement and Data
How Tall, How Short, How Faraway
    by David A. Adler
Is a Blue Whale the Biggest Thing There Is?
    by Robert E. Wells
Math Curse by Jon Scieszka and Lane Smith
Counting on Frank by Rod Clement
Spaghetti and Meatballs for All! by Marilyn Burns

Geometry
The Greedy Triangle by Marilyn Burns
Grandfather Tang's Story by Ann Tompert
Sweet Clara and the Freedom Quilt by Deborah
    Hopkinson
Whale of a Tale by Barbara Pearl
Zachary Zormer, Shape Transformer by Joanne
    Reisberg

Looking Ahead: *Fifth Grade Everyday Mathematics*
Next year, your child will . . .

- Continue to explore and practice whole-number operations, including the use of exponents, and work with larger numbers.

- Expand skills with decimals and fractions, includeing using all four operations.

- Investigate methods for solving problems using mathematics in everyday situations.
  - Graph points on coordinate planes to solve real-world mathematical problems
  - Work with number lines, times, dates, and rates
  - Collect, organize, describe, and interpret numerical data

- Analyze patterns and relationships.

- Further explore the properties, relationships, and measurement of 2-dimensional objects and begin to work with 3-dimensional objects.

- Understand the concepts of volume.

Again, thank you for all of your support this year. Have fun increasing your own understanding of mathematics while continuing your child's mathematical learning!