Unit 8: Family Letter

Home Link 7-14

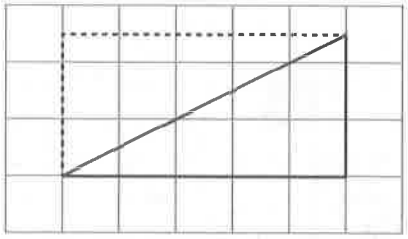
NAME DATE TIME

Applications of Measurement, Computation, and Graphing

Unit 8 provides opportunities for your child to review and apply in engaging, real-world contexts many of the mathematical skills and concepts learned during the school year.

At the beginning of the unit students apply their knowledge of area to find areas of playing surfaces for different sports and to make a plan for an athletic center. They also explore the rectangle method, which is a way of using the area formula for a rectangle to find the areas of other figures. Students do not learn area formulas for other figures, but this work will prepare them for using formulas to find areas of other figures in future grades.

For example, to find the area of the triangle at the right using the rectangle method, students draw a rectangle around it as shown by the dotted lines. The area of the rectangle is $5 * 2\frac{1}{2} = 12\frac{1}{2}$ square units, and the triangle is half of the rectangle. Therefore, the area of the triangle is $12\frac{1}{2} \div 2 = 6\frac{1}{4}$ square units.



In Lesson 8-3 students use their knowledge of length, area, and volume, as well as guidelines about the amount of space and oxygen that fish need to be healthy, to choose an aquarium and the fish that will live in it. In Lesson 8-4 they apply similar skills to explore how the height of a fixed volume of water will change as the length of a room changes.

The middle of the unit focuses on applications of whole-number and decimal computation and unit conversions. In Lesson 8-5 students develop a plan for how they would spend $1,000,000 to open and operate an animal shelter. In Lessons 8-6 and 8-7 they calculate how long it would take to earn $1,000,000 and to pay off the national debt. In Lesson 8-8 they use the length of one step to calculate how many steps they would take to walk to a specific destination and how much time the trip would take.

In the last part of the unit students collect data and learn how graphs can be used to illustrate how one variable affects another. In Lessons 8-9 and 8-10 they explore how exercise affects their heart rates and cardiac output. In Lessons 8-11 and 8-12 they investigate how different features of a pendulum, such as its length or the size of its arc, affect the length of time it takes the pendulum to swing back and forth.

The lessons in this unit are a culmination of the hard work students have done in mathematics in fifth grade. We hope your child enjoys learning how his or her mathematical skills can be used to solve engaging, real-world problems.

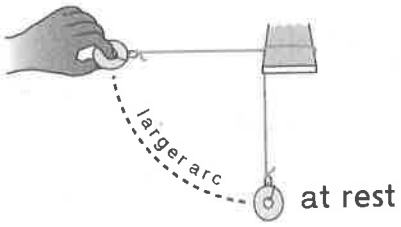
Vocabulary

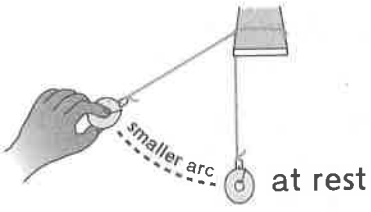
Important terms in Unit 8.

acre A unit of area equal to 43,560 square feet. Acres are often used to measure land. One acre is roughly the size of one football field.

arc of a pendulum The curved path that the *bob* of a *pendulum* follows as it swings back and forth.

arc size A measure of the *arc* created by a *pendulum* swing. In Lesson 8-12 students measure arc size according to the angle made by the pendulum's string when the *bob* is at its highest point and when the pendulum is at rest.





bob The object at the end of a *pendulum.*

cardiac output The amount of blood pumped by a person's heart in one minute.

debt An amount of money that one person or institution owes to another.

heart rate The number of times a person's heart beats in a given amount of time. For example, a typical heart rate for a fifth grader is about 90 beats per minute.

heart-rate profile A graph that shows changes in *heart rate* according to amount of exercise, intensity of exercise, or some other variable.

national debt The total amount of money that a national government owes.

pendulum An object, called the *bob*, suspended from a fixed support by a string or wire so that the object can swing freely back and forth.

pulse The regular throbbing of the arteries caused by the heart pushing blood through the body. The pulse can usually be felt along the wrist and jawline.

rectangle method A method for finding area in which rectangles are drawn around a figure or parts of a figure. The area of the original figure can be found by adding or subtracting the areas of rectangles or triangular halves of rectangles.

unit conversion A fixed relationship, such as 1 yard = 3 feet, that can be used to convert measurements within or between systems.

unit cost The cost per item or per unit of measure. For example, if dog collars cost $3.99 each, the unit cost for a dog collar is $3.99. If a 10-pound bag of dog food costs $12.50, the unit cost is $12.50 per bag or $1.25 per pound.

Do-Anytime Activities

To work with your child on the key concepts in this unit, try some of these activities:

1. Have your child look up the dimensions of his or her favorite sport's playing surface and calculate the area. Then have him or her convert the area to a different unit.
2. Have your child look up the price of something he or she wants to buy. Suggest an hourly wage and have your child calculate how many hours he or she would have to work to earn the money for the item.
3. Have your child take his or her pulse before and after different types of exercise and analyze the effects of the exercise on heart rate.

Building Skills through Games

In Unit 8 your child will play these games to practice multiplying fractions, multiplying decimals, multiplying and dividing decimals by powers of 10, and drawing and naming figures with given attributes. Detailed instructions for each game are in the *Student Reference Book*. Many of these games can be played with items you likely already have at home. Gameboards and card decks may be copied for home use.

Decimal Domination See *Student Reference Book*, page 295. Two players need number cards 0-9 (4 of each), 4 counters (2 per player), and a coin to play this game. *Decimal Domination* provides practice with multiplying decimals.

Exponent Ball See *Student Reference Book*, pages 303–304. Two players need number cards 1–4 (4 of each), two 6-sided dice, a counter, and the *Exponent Ball* Gameboard from *Math Masters*, page G28 to play this game. *Exponent Ball* provides practice with multiplying and dividing decimals by powers of 10.

Property Pandemonium See *Student Reference Book*, page 320. Two players need the *Property Pandemonium* Card Deck and Record Sheet from *Math Masters*, pages G32 and G33 to play this game. *Property Pandemonium* provides practice with drawing, naming, and classifying quadrilaterals.

Spoon Scramble See *Student Reference Book*, page 324. Four players need three spoons and the *Spoon Scramble* cards from *Math Masters*, page G30 to play this game. *Spoon Scramble* provides practice with multiplying fractions and multiplying and dividing by powers of 10.

As You Help Your Child with Homework

As your child brings assignments home, you might want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through this unit's Home Links.

Home Link 8-1

1. Carson: 1,584; 22 × 8; 176. Flanigan: 42 × 38; 1,596; $177\frac{1}{3}$. Salazar: 1,520; $6\frac{1}{3} \times 26\frac{2}{3}$; $168\frac{8}{9}$. De Marco: 15 × 106; 1,590; $176\frac{2}{3}$.

2a. Flanigan **2b.** Salazar

3. 9; Sample explanation: There are 9 square feet in 1 square yard, so it makes sense that an area in square feet would be 9 times the area in square yards.

4. $\frac{21}{4}$, or $5\frac{1}{4}$ **5.** $\frac{34}{5}$, or $6\frac{4}{5}$

6. $\frac{99}{12}$, or $8\frac{3}{12}$ **7.** $\frac{75}{16}$, or $4\frac{11}{16}$

Home Link 8-2

1. 5 **2.** $8\frac{1}{4}$ **3.** 9 **4.** $6\frac{3}{4}$ **5.** 1.12 **6.** 11.825

Home Link 8-3

1. 102 **2.** The Ice Storm

3. $\frac{19}{8}$, or $2\frac{3}{8}$ **4.** $6\frac{12}{15}$, or $\frac{102}{15}$

Home Link 8-4

1. 16 centimeters **2.** 28 **3.** 61.2

Home Link 8-5

1.–2. Answers vary. **3.** $\frac{780}{24}$, or $32\frac{12}{24}$

4. $\frac{1,495}{24}$, or $62\frac{7}{24}$

Home Link 8-6

1a. 5 hours **1b.** $10 **1c.** 20 months, or 100 hours

2. 40 **3.** $\frac{1}{48}$

Home Link 8-7

1. 6 cars **2a.** 8 times **2b.** 24 miles

3a. $5,060 **3b.** Yes. **4.** 4,530

5. 0.00628 **6.** 29,100,000 **7.** 73.542

Home Link 8-8

1. 212

2. Answers vary based on step length.

3. $\frac{168}{15}$, or $11\frac{3}{15}$ **4.** $\frac{437}{12}$, or $36\frac{5}{12}$

Home Link 8-9

1. 2 cups; 2 pints **2.** 75; 150; 300

3. Sample answer: There are 300 blueberries in 1 quart, and a plant produces 4 quarts in 1 year. So a plant would produce 300 * 4, or 1,200, blueberries in 1 year.

4. 1,320,000

5a. 24,000 **5b.** 26,400,000

6. 29.824 **7.** 169.624

Home Link 8-10

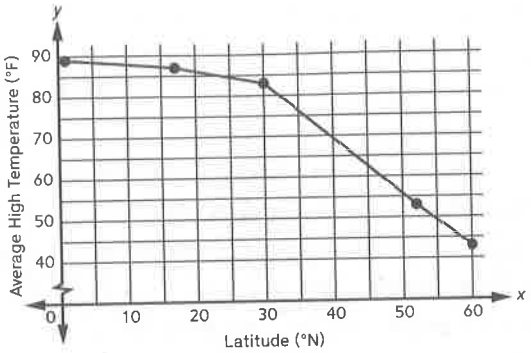
1a. 72; 2.4; 172.8 **1b.** 10,368 **1c.** 1,296

2a. 135; 0.25; 33.75 **2b.** 2,025 **2c.** 253

3. 25.8 **4.** 9.1

Home Link 8-11

1. (1, 89); (17, 87); (30, 83); (52, 53); (60, 43)



2. About 84°F

3. Yes; Sample answer: As the latitude increases, average high temperature seems to go down. I can tell because as you move to the right on the graph, the points get lower.

Home Link 8-12

1. 207°F **2.** 214°F

3. Sample answer: As altitude goes up, the boiling point of water goes down.

4. Sample answer: As the amount of salt goes up, the boiling point of water goes up too.

5. $\frac{1}{24}$ **6.** 50

Comparing Yard Sizes

Home Link 8-1

NAME DATE TIME

SRB 215-217, 222, 225

① Some neighbors are deciding where to hold the annual cookout and block party. They would like to have it in the largest backyard. Use the dimensions given to find the area of each neighbor's backyard in square feet and square yards. Then answer the questions.

Family	Dimensions (ft)	Area (ft^2)	Dimensions (yd)	Area (yd^2)
Carson	66×24			
Flanigan			$14 \times 12\frac{2}{3}$	
Salazar	19×80			
De Marco			$5 \times 35\frac{1}{3}$	

② **a.** Which family has the largest yard? _____

b. Which family has the smallest yard? _____

③ Look at the number of square feet and the number of square yards in each family's yard. What number could you multiply the number of square yards by to get the number of square feet? Explain why this makes sense.

_____

_____

_____

Practice

④ $\frac{3}{4} * 7 =$ _____

⑤ $17 * \frac{2}{5} =$ _____

⑥ $9 * \frac{11}{12} =$ _____

⑦ $\frac{15}{16} * 5 =$ _____

Finding Area with the Rectangle Method

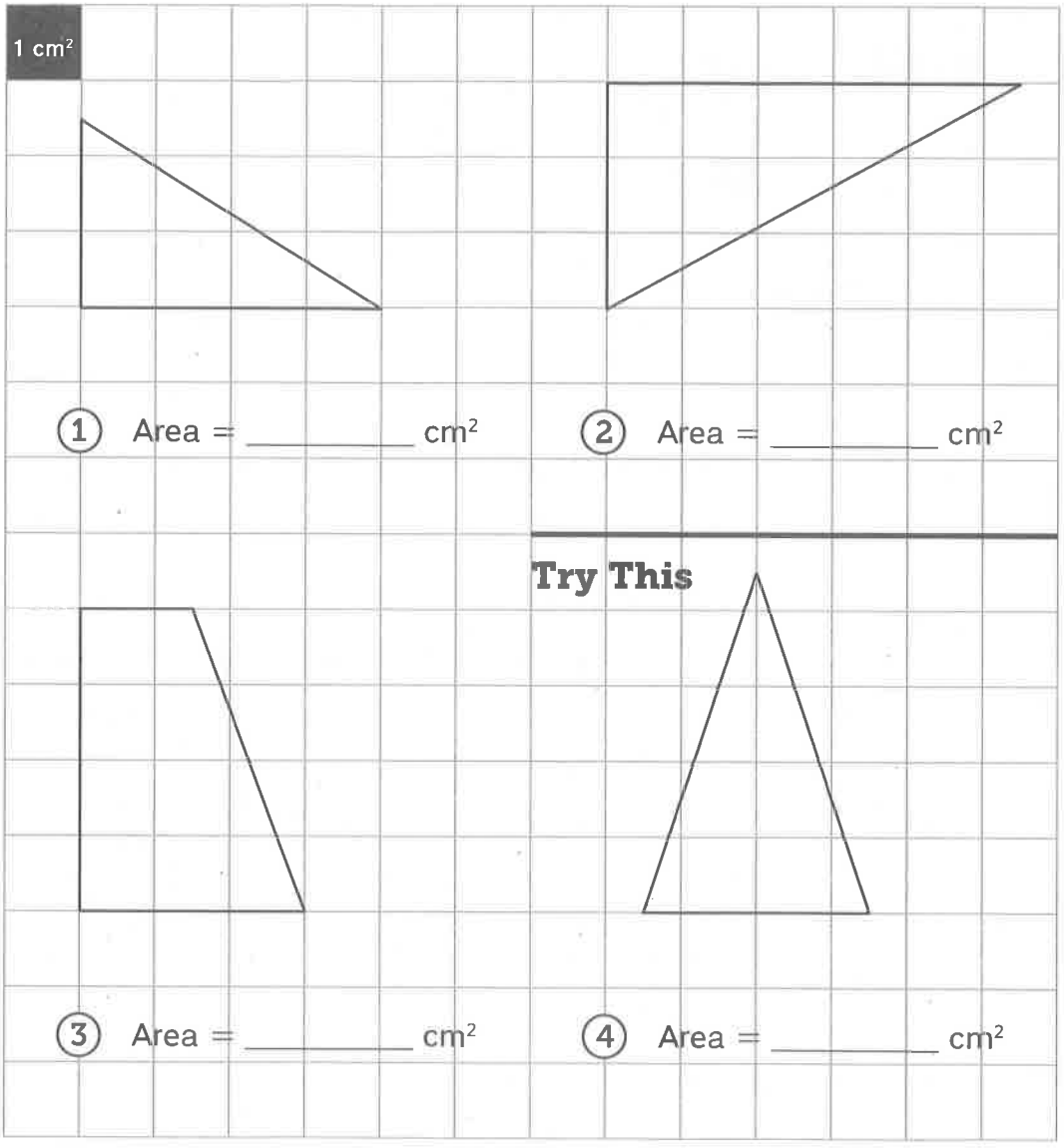
Home Link 8-2

NAME DATE TIME

SRB 228-229

Use the rectangle method to find the area of each figure.
To use the rectangle method:

- Draw one or more rectangles around the figure or parts of the figure.
- Use the area of the rectangle(s) to determine the area of the original figure.



Practice

Solve. Show your work on the back of this page.

5 $0.14 * 8 =$ _____

6 $2.75 * 4.3 =$ _____

Solving Remodeling Problems

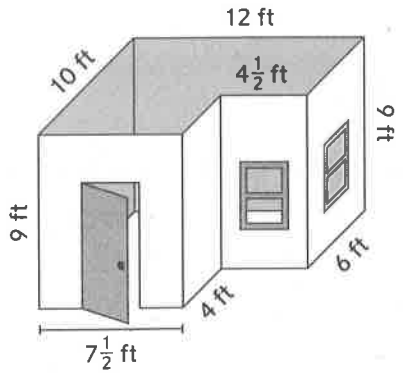
Home Link 8-3

NAME DATE TIME

Therese is remodeling her bedroom. A drawing of her bedroom is shown below. Solve Therese's remodeling problems. Show your work.

SRB 225, 227, 233-234

① How many square feet of carpet should Therese buy to cover the entire floor of her room? _____ ft^2



Therese's bedroom

② Which air conditioner should Therese buy for her room?

- ☐ *The Coolmax: Cools up to 800 cubic feet*
- ☐ *The Ice Storm: Cools up to 1,500 cubic feet*
- ☐ *The Polar Extreme: Cools up to 2,500 cubic feet*

Explain your choice.

Practice

Solve. Show your work on the back of this page.

③ $4\frac{3}{4} * \frac{1}{2} =$ _____

④ $\frac{2}{3} * 10\frac{1}{5} =$ _____

Milk Carton Volume

Home Link 8-4

NAME DATE TIME

SRB 233

Myles poured milk from a carton into glasses for his family for breakfast on Monday and Tuesday. Each day he poured 200 cubic centimeters of milk for each of his 2 sisters and himself. He also poured 300 cubic centimeters of milk for his mom and the same amount for his dad.

The milk carton is a rectangular prism. The length is 15 centimeters and the width is 10 centimeters.

(1) What is the minimum height of the milk carton if all of the milk for both days came from one carton? Show your work and explain your answer.

Practice

Solve. Show your work on the back of this page.

(2) $36.4 \div 1.3 =$ _____

(3) $33.66 \div 0.55 =$ _____

Spending $500

Home Link 8-5

NAME DATE TIME

You are planning a camping trip for yourself and two friends. After saving money for a few months, you and your friends have $500 to spend on the trip.

SRB 128

Item	Unit Cost	Item	Unit Cost
Waterproof sleeping bag	$98.86	Rain tarp	$14.99
Standard sleeping bag	$30.76	Flashlight	$7.24
Campsite (1 night)	$22.00	Meals (1 day, 3 people)	$22.04
6-person tent (no rain protection)	$154.99	Single kayak (2-hour rental)	$29.99
8-person tent (with rain protection)	$229.99	Mountain bike rental (1 day)	$40.59

(1) Use the prices above to plan how you will spend $500. Round each unit cost to find approximate total costs. Write a number sentence in the last column to show how you estimated. Spend as close to $500 as you can.

Item	Quantity	Unit Cost	Approximate Total Cost
		Total cost:	

(2) On the back of this page, explain one decision you made as you planned.

Practice

(3) $6\frac{2}{3} * 4\frac{7}{8} =$ _____

(4) $10\frac{5}{6} * 5\frac{3}{4} =$ _____

Calculating Earnings

Home Link 8-6

NAME DATE TIME

Solve. Show your work. Write a number model to show how you solved.

SRB 108, 204, 215

(1) Jeremiah mows his neighbor's lawn to earn money. His neighbor pays him $50 per month. It takes Jeremiah 1 hour and 15 minutes to mow the lawn once. He mows the lawn 4 times per month.

a. How many hours does Jeremiah spend mowing the lawn each month?

Number model: _____ Answer: _____

b. How much money does Jeremiah earn per hour?

Number model: _____ Answer: _____

c. How long would it take Jeremiah to earn $1,000? Give your answer in both months and hours.

Number model(s): _____

Jeremiah would have to work for _____ months, or _____ hours.

Practice

Solve using common denominators. Show your work.

(2) $8 \div \frac{1}{5} = ?$

$8 \div \frac{1}{5} =$ _____

(3) $\frac{1}{4} \div 12 = ?$

$\frac{1}{4} \div 12 =$ _____

Paying Off Debts

Home Link 8-7

NAME DATE TIME

SRB 113, 140 215

Solve Problems 1–3. Write a number model to show how you solved.

1. Kendall lent Kel $40 to buy a game. Kel is earning money by washing cars. He charges $7 per car. How many cars will Kel need to wash in order to pay Kendall back?

   Number model: _____

   Answer: _____

2. Josie borrowed $65 from her mom for a class trip to Washington, D.C. When she returns from the trip, Josie will start working for her neighbors. She will make $8.50 each time she walks their dogs.

   a. How many times will Josie have to walk the dogs in order to repay her debt?

   Number model: _____

   Answer: _____

   b. If Josie walks 3 miles each time she takes the dogs out, how many miles will she have walked by the time she repays her debt?

   Number model: _____

   Answer: _____

3. Langdon earns $23 an hour at a law office. He works about 55 hours per week.

   a. If there are about 4 weeks in one month, how much money does Langdon earn each month?

   Number model: _____

   Answer: About _____

   b. Langdon took out a $5,000 loan to help pay for college. Would one month's earnings pay off his loan? _____

Practice

4. $4.53 * 10^3 =$ _____

5. $62.8 \div 10^4 =$ _____

6. $29.1 * 10^6 =$ _____

7. $7{,}354.2 \div 10^2 =$ _____

Hiking a New Zealand Trail

Home Link 8-8

NAME DATE TIME

Use the information from journal page 300 to fill in the blank.

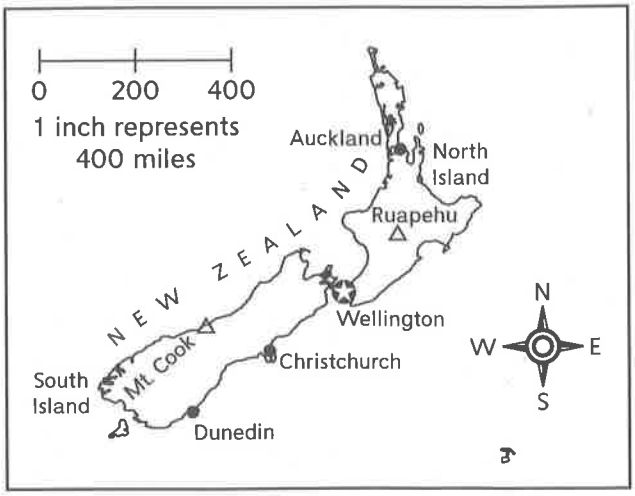
SRB 215-217, 328, 332

Length of one footstep: About _____ feet

A group of hikers in New Zealand is walking to a campsite. They will hike from Wellington to Ruapehu, a distance of about 200 miles. Then they will follow a trail for another 12 miles to their campsite. (The campsite is not shown on the map.)

Use your class information about step length to solve the problems.

Reminder: 1 mile = 5,280 feet



① About how many total miles is it from Wellington to the campsite?

About _____ miles

② About how many steps would a hiker take to walk from Wellington to the campsite? Show your work below.

About _____ steps

Practice

③ $2\frac{2}{3} * 4\frac{1}{5} = ?$

④ $9\frac{1}{2} * 3\frac{5}{6} = ?$

$2\frac{2}{3} * 4\frac{1}{5} =$ _____

$9\frac{1}{2} * 3\frac{5}{6} =$ _____

How Many Blueberries?

Home Link 8-9

NAME DATE TIME

SRB 103, 215-216, 328

(1) Fill in the blanks.

1 pint = _____ cups 1 quart = _____ pints

(2) About 75 blueberries fill a 1-cup container.

Use this information and your answers to Problem 1 to help you complete the table.

Hint: If 75 blueberries are in 1 cup, how can you find how many are in 2 cups?

Measurement	Number of Blueberries
1 cup	
1 pint	
1 quart	

(3) One blueberry plant can produce 4 quarts of blueberries in 1 year. How many blueberries does one plant produce in 1 year? Explain how you know.

_____

_____

_____

(4) A farmer can fit about 1,100 blueberry plants in a 1-acre field. About how many blueberries would a well-tended blueberry field produce in 1 year?

About _____ blueberries

(5) With proper maintenance, a blueberry plant can live for 20 years.

a. Suppose you have one blueberry plant in your backyard. About how many blueberries would it produce in its lifetime?

About _____ blueberries

b. Suppose a farmer had a 1-acre blueberry field. About how many blueberries would the field produce in the plants' lifetime?

About _____ blueberries

Practice

Estimate. Then multiply. Show your work on the back of this page.

(6) 23.3 * 1.28 = _____

Estimate: _____

(7) 326.2 * 0.52 = _____

Estimate: _____

Cardiac Output

Home Link 8-10

NAME DATE TIME

Today you learned that *cardiac output* is the amount of blood a heart pumps in 1 minute. You can find your cardiac output using your heart rate and the amount of blood your heart pumps with each heartbeat.

SRB 134, 217, 328

Cardiac output = heart rate * amount of blood pumped with each heartbeat

(1) The typical resting heart rate for a healthy adult is about 72 beats per minute. A healthy adult heart pumps about 2.4 fluid ounces of blood per heartbeat.

a. What is the cardiac output of a healthy adult?

_____ beats per minute * _____ fluid ounces of blood per heartbeat =

_____ fluid ounces of blood per minute

b. How many fluid ounces of blood will a healthy adult's heart pump in one hour?

About _____ fluid ounces

c. How many cups of blood is that? About _____ cups

(2) A newborn baby's heart beats about 135 times per minute, but it pumps only about 0.25 fluid ounce of blood per heartbeat.

a. What is the cardiac output of a newborn baby?

_____ beats per minute * _____ fluid ounces of blood per heartbeat =

_____ fluid ounces of blood per minute

b. How many fluid ounces of blood will a newborn baby's heart pump in one hour?

About _____ fluid ounces

c. How many cups of blood is that? About _____ cups

Practice

Estimate. Then divide. Show your work.

(3) 361.2 ÷ 14 = ?

Estimate: _____

361.2 ÷ 14 = _____

(4) 7.28 ÷ 0.8 = ?

Estimate: _____

7.28 ÷ 0.8 = _____

Latitude and Temperature

Home Link 8-11

NAME DATE TIME

Latitude is a measure of how far north or south a location is from the equator. This table shows the approximate latitude and average high temperature in April for five cities.

SRB 55-56, 275-276

City	Latitude (°N)	Average High Temperature (°F)
Singapore, Singapore	1	89
Acapulco, Mexico	17	87
Cairo, Egypt	30	83
Amsterdam, Netherlands	52	53
Helsinki, Finland	60	43

(1) Write the data as ordered pairs. The latitudes are the *x*-coordinates. The average high temperatures for April are the *y*-coordinates. Graph the points and use line segments to connect them.

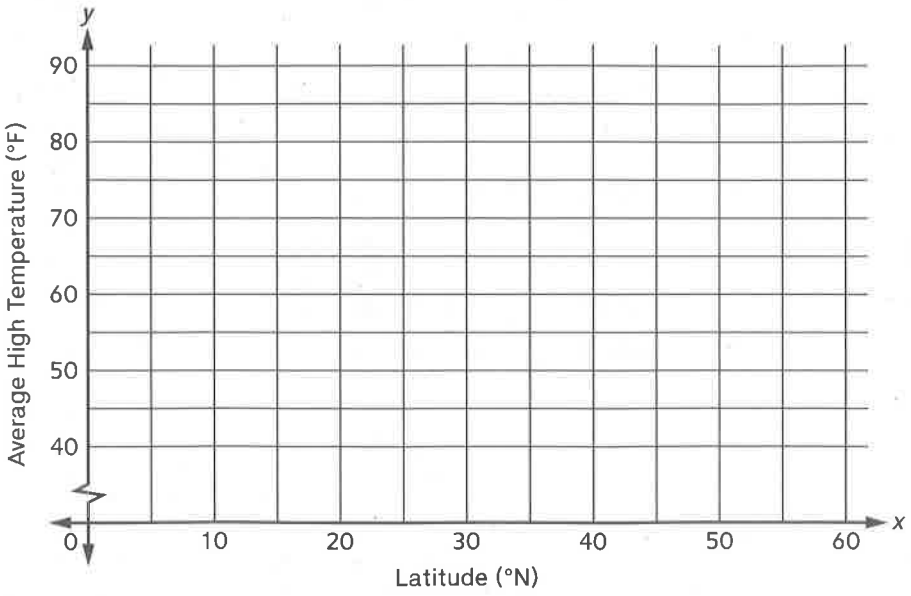
_____

_____

_____

_____

_____



(2) The city of Nassau, Bahamas, is located at latitude 25°N. Based on your graph, what would you predict for the average high temperature in Nassau in April?

_____

(3) Does latitude seem to have an effect on average high temperature? Explain your answer.

_____

_____

_____

The Boiling Point

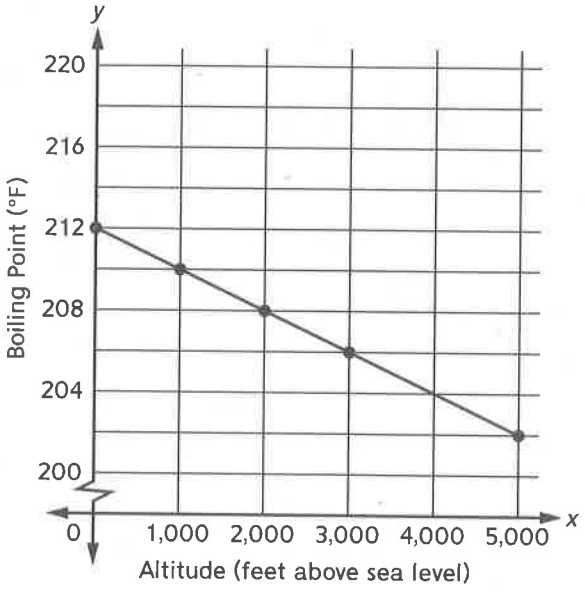
Home Link 8-12

NAME DATE TIME

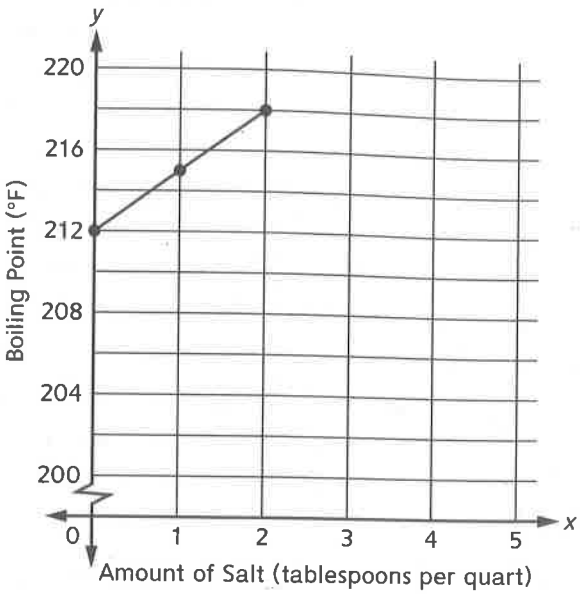
The *boiling point* of water is the temperature at which it boils. The graphs show how altitude and salt affect the boiling point of water. (*Altitude* is the measure of how high a location is.) Study the graphs. Then use them to answer the questions.

SRB 55-56 275

Boiling Points of Water at Different Altitudes



Boiling Points of Water with Different Amounts of Salt



① What would you expect the boiling point of water to be at an altitude of 2,500 feet above sea level?

About _____

② What would you expect the boiling point of a quart of water to be if it contained $\frac{1}{2}$ tablespoon of salt?

About _____

③ How does altitude affect the boiling point of water?

_____

_____

④ How does salt affect the boiling point of water?

_____

_____

Practice

Divide using the common denominator method. Show your work on the back of this page.

⑤ $\frac{1}{4} \div 6 =$ _____

⑥ $5 \div \frac{1}{10} =$ _____