

Student Guide

Using Ratios (SG pp. 224–227)

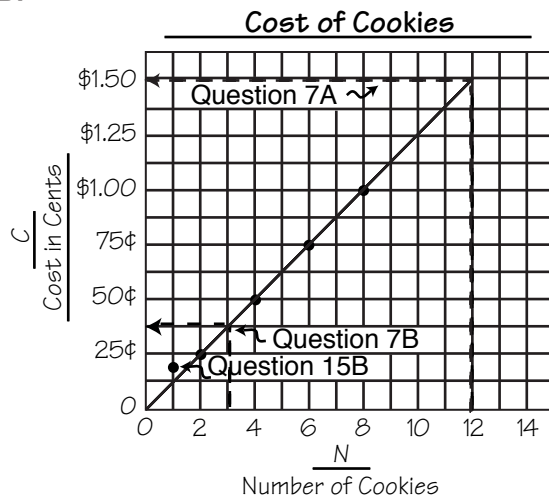
Questions 1–17

- 1.* Answers will vary. Some possible patterns include: the numbers in the second column are multiples of 30¢, the cost of the muffins is 30¢ times the number of muffins, doubling the number of muffins doubles the cost, etc.
- 2.* Answers will vary. Students can double the number of muffins, which doubles the cost or they can multiply the number of muffins by 30¢.
- 3.* Answers will vary. The table and graph show that as the number of muffins increases by one, the cost of the muffins increases by 30¢.
4. A.* \$2.10; See the graph in Figure 2 in the Lesson.
B.* 5 muffins; See the graph in Figure 2 in the Lesson.

5. A. Cost of Cookies

Number of Cookies	Cost
2	25¢
4	50¢
6	75¢
8	\$1.00

B.



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*Answers and/or discussion are included in the lesson.

Discuss

1. What patterns do you see in Edward's table?
2. How could you continue the table by using multiplication?
3. What patterns do you think Edward sees in both the table and graph? Describe the patterns in your own words.
4. A. Use the graph to find the cost of seven muffins.
B. If a customer has \$1.50, how many muffins can he or she buy?
5. A. Copy and complete the table for the cost of cookies.

Cost of Cookies

Number of Cookies	Cost
2	25¢
6	
	\$1.00



- B. Make a graph of the data. Graph the number of cookies on the horizontal axis and the cost on the vertical axis. Use *Centimeter Graph Paper*.
6. A. What patterns do you see in the table in Question 5?
B. What patterns do you see in the graph?
C. Describe any patterns you see in both the table and graph.
7. A. Use your graph in Question 5B to find the cost of 12 dozen (12) cookies.
B. What is the cost of three cookies?

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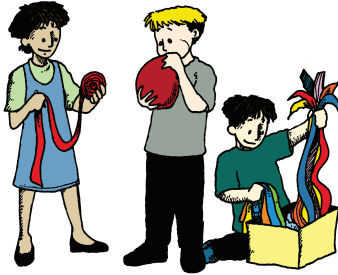
6. A. Answers will vary. Some possible patterns include: the numbers in the second column are multiples of 25¢, doubling the number of cookies doubles the cost, etc.
B. Answers will vary. Students should see similar patterns in the graph as in the table. As the number of cookies increases by two, the cost increases by 25¢.
C. Answers will vary. The table and graph show that as the number of cookies doubles, so does the cost. As the number of cookies increases by two, the cost increases by 25¢.
7. A.* \$1.50; See graph in Q# 5B.
B.* 37½ cents; or more practically, 38¢

Ratios

Edward and Frank used ratios to help them with the prices for the bake sale. A ratio is a way to compare two numbers or quantities. When they were finding out prices of muffins, they used the ratio "1 muffin costs 30 cents." They found equal ratios: "2 muffins cost 60 cents" and "3 muffins cost 90 cents."

8. Use your table or graph in Question 5 to name two ratios equal to the ratio "2 cookies for 25¢."

The decorating committee plans to decorate the gym with crepe paper, ribbon, and balloons.



The committee measured the length and width of the gym in yards and the height of the booths in feet. When they went to the store, they found that ribbon is sold by the yard and the measurements on the packages of crepe paper are given in feet. One way to convert feet to yards and yards to feet is by making and using a graph. The students made a graph that compares feet to yards and yards to feet.

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8. Answers will vary. Two possible ratios include: 4 cookies for 50¢ and 6 cookies for 75¢.

9. **Comparison of Yards to Feet**

Number of Yards	Number of Feet
2	6
5	15
6	18
7	21
8	24
10	30

10. 7 yards
11. Answers will vary. Two possible ratios include: $\frac{9 \text{ feet}}{3 \text{ yards}}$ and $\frac{18 \text{ feet}}{6 \text{ yards}}$.
12. Answers will vary. Two possible ratios include: $\frac{2 \text{ yards}}{6 \text{ feet}}$ and $\frac{4 \text{ yards}}{12 \text{ feet}}$.
13. 30 yards; $\frac{3 \text{ feet}}{1 \text{ yard}} = \frac{90 \text{ feet}}{30 \text{ yards}}$
14. 90 feet; $\frac{1 \text{ yard}}{3 \text{ feet}} = \frac{30 \text{ yards}}{90 \text{ feet}}$
15. A.* No, 1 cookie for 15¢ means 2 cookies for 30¢.
 B.* No, the point falls on the line only if the ratio is equal.

Comparison of Yards to Feet

9. Copy the table below and use the graph to fill in the missing values.

Comparison of Yards to Feet	
Number of Yards	Number of Feet
2	
6	15
	21
10	24

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*Answers and/or discussion are included in the lesson.

Ratios can be written as fractions. To compare feet and yards, we can write the ratio $\frac{3 \text{ feet}}{1 \text{ yard}}$. We can write number sentences using fractions that show ratios are equal. When the fractions are equal, the ratios are equal:

$$\frac{3 \text{ feet}}{1 \text{ yard}} = \frac{6 \text{ feet}}{2 \text{ yards}} \text{ and } \frac{3 \text{ feet}}{1 \text{ yard}} = \frac{15 \text{ feet}}{5 \text{ yards}}$$

10. Complete the following number sentence: $\frac{3 \text{ feet}}{1 \text{ yard}} = \frac{21 \text{ feet}}{7 \text{ yards}}$.

You can also compare feet to yards by looking at the ratio of yards to feet. For example:

$$\frac{1 \text{ yard}}{3 \text{ feet}} = \frac{2 \text{ yards}}{6 \text{ feet}} = \frac{5 \text{ yards}}{15 \text{ feet}}$$

11. Using fractions, write two other ratios that are equal to $\frac{3 \text{ feet}}{1 \text{ yard}}$.

12. Using fractions, write two other ratios that are equal to $\frac{1 \text{ yard}}{3 \text{ feet}}$.

13. Ninety feet of crepe paper is needed to decorate one wall of the gym. How many yards are needed to decorate that wall?

14. Frank decided to decorate each booth with 10 lengths of ribbon. Each length of ribbon is 3 yards long. How many feet of ribbon are needed to decorate each booth?

15. Edward and Frank decided to sell 1 cookie for 15¢.

A. Are the following two ratios equal? Why or why not?

$$\frac{25¢}{2 \text{ cookies}} \text{ and } \frac{15¢}{1 \text{ cookie}}$$

B. Add a point to the graph you made for Question 5 that shows that 1 cookie costs 15¢. Is this point on your line? Why or why not?

16. Using fractions, write two ratios that are equal to $\frac{30¢}{1 \text{ muffin}}$.

17. Using fractions, write two ratios equal to $\frac{25¢}{2 \text{ cookies}}$.

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Use the *Cost of Brownies* pages in the *Student Activity Book* to practice using ratios.

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16. Answers will vary. Two possible ratios include:

$$\frac{60¢}{2 \text{ muffins}} \text{ and } \frac{90¢}{3 \text{ muffins}}$$

17. Answers will vary. Two possible ratios include:

$$\frac{50¢}{4 \text{ cookies}} \text{ and } \frac{75¢}{6 \text{ cookies}}$$

Homework (SG pp. 228–229)
Questions 1–4

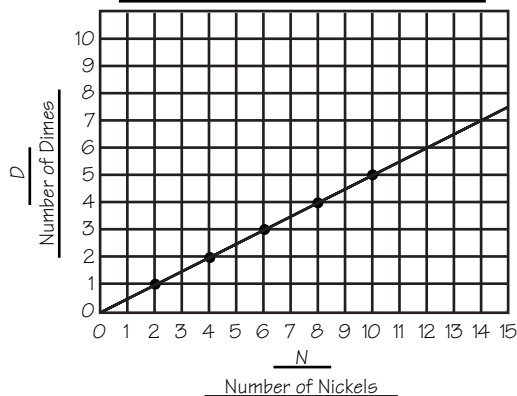
I. A. **Nickles to Dimes**

Number of Nickels	Number of Dimes
2	1
4	2
6	3
8	4
10	5

Quarters to Dimes

Number of Quarters	Number of Dimes
2	5
4	10
6	15
8	20
10	25

B. **Ratio of Dimes to Nickels**



Homework

Graphs and Ratios

You will need enough graph paper to make three or four graphs.

1. A. The fifth graders decided to make data tables to help the first graders use coins to pay for games and food at the fun fair. Copy and complete the tables on your paper. Fill in at least 5 rows in each table.

Nickles to Dimes		Quarters to Dimes	
Number of Nickels	Number of Dimes	Number of Quarters	Number of Dimes
2	1	2	5
		4	

- B. Make a graph that compares the value of dimes to the value of nickels. (Put the number of nickels on the horizontal axis and the number of dimes on the vertical axis.) Draw a best-fit line.

- C. Use fractions to write three ratios equal to $\frac{1 \text{ dime}}{2 \text{ nickels}}$.

- D. Make a graph that compares the value of dimes to the value of quarters. (Put quarters on the horizontal axis.) Draw a best-fit line.

- E. Use fractions to write three ratios equal to $\frac{5 \text{ dimes}}{2 \text{ quarters}}$.



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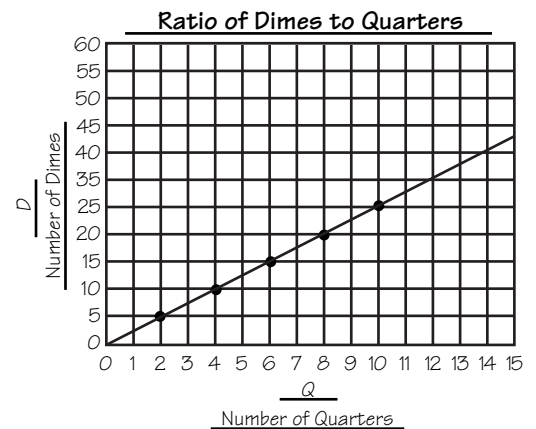
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C. Answers will vary. Three possible ratios

include: $\frac{2 \text{ dimes}}{4 \text{ nickels}}$, $\frac{3 \text{ dimes}}{6 \text{ nickels}}$, and $\frac{4 \text{ dimes}}{8 \text{ nickels}}$

D.



E. Answers will vary. Three possible ratios

include: $\frac{10 \text{ dimes}}{4 \text{ quarters}}$, $\frac{15 \text{ dimes}}{6 \text{ quarters}}$, and $\frac{20 \text{ dimes}}{8 \text{ quarters}}$

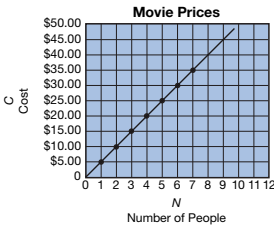
Solve Problems with Ratios

Use tools and strategies to solve each problem.

2. There are four quarts in a gallon.
 - A. Make a table with at least 5 rows that can be used to convert quarts to gallons.
 - B. Write three ratios equal to $\frac{4 \text{ quarts}}{1 \text{ gallon}}$.
3. The poster for the bake sale says that one dozen rolls costs \$2.40.
 - A. How much will three dozen rolls cost?
 - B. How much will six rolls cost? Explain how you found your answer.

Use the graph below to answer the following questions.

4.
 - A. What is the cost for three people to see a movie?
 - B. What is the cost for six people to see a movie?
 - C. A customer paid the ticket seller \$35.00. How many tickets did he buy?
 - D. Choose a point on the graph and write a ratio that shows the cost to the number of people.
 - E. Write two other ratios equal to the ratio you wrote in Question 4D.



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2. A.

Quarts to Gallons

Quarts	Gallons
4	1
8	2
12	3
16	4
20	5

B. Answers will vary. Three possible ratios include: $\frac{8 \text{ quarts}}{2 \text{ gallons}}$, $\frac{12 \text{ quarts}}{3 \text{ gallons}}$, and $\frac{16 \text{ quarts}}{4 \text{ gallons}}$.

3. A. \$7.20

B. \$1.20; Explanations will vary. One possible explanation is to take half of \$2.40 since 6 rolls is half of one dozen.

4. A. \$15.00

B. \$30.00

C. 7 tickets

D. Answers will vary. One possible ratio is $\frac{\$5.00}{1 \text{ person}}$.

E. Answers will vary. Two possible ratios include: $\frac{\$10.00}{2 \text{ people}}$ and $\frac{\$15.00}{3 \text{ people}}$.

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Student Activity Book

Cost of Brownies (SAB pp. 207–209)

Questions 1–5

- 1. A.* See Figure 4 in the lesson.
- B.* See Figure 5 in the lesson.
- C.* Answers will vary. Possible response:

$$\frac{\$1}{2 \text{ brownies}} = \frac{\$2}{4 \text{ brownies}} = \frac{\$4}{8 \text{ brownies}}$$

D.* \$6. Possible response: Show dotted lines on the graph as shown on the graph in Figure 5.

- 2. A.* See Figure 4 in the lesson.
- B.* See Figure 5 in the lesson.
- C.* Answers will vary. Possible response:

$$\frac{\$3}{8 \text{ brownies}} = \frac{\$6}{16 \text{ brownies}} = \frac{\$9}{24 \text{ brownies}}$$

D.* \$18. Possible response: I saw a doubling pattern in the table. The table shows that 24 brownies cost \$9, so 48 brownies will cost \$18.

3.* The two lines are straight and start at (0, 0). They go uphill. The one for 50¢ brownies is steeper.

4. $\frac{\$4}{8 \text{ brownies}}$ and $\frac{\$3}{8 \text{ brownies}}$. Possible response: The ratio of $\frac{\$4}{8 \text{ brownies}}$ is larger than the ratio of $\frac{\$3}{8 \text{ brownies}}$.


5.* Possible response: If I want a few brownies, I would spend 50¢ each, but if I want more than six, I would buy them by the box. Six brownies would cost \$3.00 if bought individually, so I might as well buy a box of 8 for \$3.00.

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Name _____ Date _____

Cost of Brownies

The poster for the bake sale says that brownies cost 50¢ each or \$3.00 for eight.



1. A. Complete the data table to show the cost if brownies are sold for 50¢ each.

Cost of Brownies	
Number of Brownies	Cost (in Dollars)
2	\$1
4	
8	
16	

B. Use the data table to make a graph that shows Cost vs. Number of Brownies. Scale the horizontal axis by twos and the vertical axis by ones. If the points form a line, draw a line through them.

C. Write three equal ratios that compare the Cost to the Number of Brownies. Write the ratios as fractions.

D. How much will 12 brownies cost? Show or tell how you know.

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Name _____ Date _____

2. A. Complete the data table to show the cost if brownies are sold for \$3.00 for a box of eight.

Cost of Brownies in a Box	
Number of Brownies	Cost (in Dollars)
8	\$3
16	
24	

B. Use the data table to make a graph that shows Cost vs. Number of Brownies. Use the same graph paper that you used for Question 1B. If the points form a line, draw a line through them.

C. Write three equal ratios that compare the Cost to the Number of Brownies. Write the ratios as fractions.

D. How much will 48 brownies cost? Show or tell how you know.

E. How do you know your answer to Question 2D is reasonable?

3. Describe the two lines on your graph. How do they compare?

4. Write a ratio for the Cost to the Number of Brownies for each line when the Number of Brownies is 8. How do the two ratios compare?

5. Would you rather buy brownies individually or in boxes of eight? Explain your thinking.

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*Answers and/or discussion are included in the lesson.