

Student Guide

Solving Fraction Multiplication Problems  
(SG pp. 503–506)

Questions 1–21

- Solution strategies will vary. Possible strategy:  
 $(2 \times \frac{7}{8}) + (\frac{1}{4} \times \frac{7}{8}) = 1\frac{31}{32}$  sq. ft.
- Mark broke the rectangle into a  $2 \times \frac{7}{8}$  rectangle and a  $\frac{1}{4} \times \frac{7}{8}$  rectangle.
  - He jumped  $\frac{7}{8}$  on the number line two times.
  - He broke the problem into  $\frac{1}{4} \times \frac{1}{8} \times 7$ . He multiplied  $\frac{1}{4} \times \frac{1}{8}$  and got  $\frac{1}{32}$ . Then he multiplied that by 7 to get  $\frac{7}{32}$ .
- \*3 more signs
- $\frac{3}{4}$  in.  $\times$   $\frac{3}{4}$  in. =  $\frac{9}{16}$  sq. in.
  - \*  $2\frac{1}{4}$  in.  $\times$   $\frac{1}{2}$  in. = 1 sq. in. +  $\frac{1}{8}$  sq. in. =  $1\frac{1}{8}$  sq. in.
  - \*  $\frac{7}{8}$  in.  $\times$   $1\frac{1}{2}$  in. =  $\frac{7}{8}$  sq. in. +  $\frac{14}{16}$  sq. in. =  $\frac{28}{16}$  =  $1\frac{12}{16}$  =  $1\frac{3}{4}$  sq. in.
- Solution strategies will vary.
  - $15 \times \frac{2}{3} = \frac{30}{3} = 10$
  - $\frac{1}{2} \times \frac{2}{5} = \frac{2}{10} = \frac{1}{5}$
  - $\frac{3}{2} \times \frac{2}{5} = \frac{6}{10} = \frac{3}{5}$
  - $\frac{9}{10} \times \frac{1}{3} = \frac{9}{30} = \frac{3}{10}$

**Solving Fraction Multiplication Problems**  
After the Party Problems

**Discuss**

The Happy Birthday sign at Luis's party was  $2\frac{1}{4}$  feet long and  $\frac{7}{8}$  feet wide.

- Work with a partner to find the area of the sign. Use any strategy you like.
- Mark solved the problem this way.

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A. How did he break apart the  $2\frac{1}{4} \times \frac{7}{8}$  rectangle?

B. How did he find the partial product of  $2 \times \frac{7}{8}$ ?

C. How did he find the partial product of  $\frac{1}{4} \times \frac{7}{8}$ ?

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Mark found a common denominator so he could add the areas of the smaller rectangles together:

$$\frac{14 \times 4}{8 \times 4} = \frac{56}{32}$$

$$\frac{56}{32} \text{ sq. ft.} + \frac{7}{32} \text{ sq. ft.} = \frac{63}{32} \text{ sq. ft.} = 1\frac{31}{32} \text{ sq. ft.}$$

The area of the sign is  $1\frac{31}{32}$  sq. ft.

- Luis's sister had 6 square feet of paper left. How many more signs with the exact area of Luis's can be made from the paper?

**Explore**

- Find the area of the rectangles. Include number sentences and labels.
  - $\frac{3}{4}$  in.
  - $2\frac{1}{4}$  in.
  - $\frac{7}{8}$  in.
- Solve.
  - $15 \times \frac{2}{3} =$
  - $\frac{1}{2} \times \frac{2}{5} =$
  - $\frac{3}{2} \times \frac{3}{5} =$
  - $\frac{9}{10} \times \frac{1}{3} =$

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

# Answer Key • Lesson 9: Solving Fraction Multiplication Problems

Draw pictures, use fraction circle pieces, fold paper, sketch rectangles, or use paper-and-pencil strategies to solve each problem. Include number sentences and labels.

6. Luis used a birthday gift card to buy a toy. The toy was on sale for  $\frac{1}{3}$  off the regular price. The regular price was \$21.
  - A. How much less was the cost of the toy?
  - B. What was the sale price of the toy?
7. At the end of Luis's party, there was  $\frac{2}{3}$  of a case of orange soda left. Luis's father took  $\frac{1}{3}$  of the leftover soda to work.
  - A. What fraction of the whole case did he take to work?
  - B. One case of soda contains 24 cans. How many cans are in  $\frac{1}{3}$  of  $\frac{2}{3}$  of a case? Draw a diagram or picture to help.
8. Luis and his mother shared a whole submarine sandwich after the party. Luis ate  $\frac{2}{5}$  of the sandwich. His mother ate  $\frac{1}{4}$  of what Luis left. How much of the sandwich did Luis's mother eat?
9.  $\frac{7}{8}$  of a 32-ounce bottle of lemonade was gone. How many ounces of lemonade were left in the bottle?
10. There was a fourth of a glass of lemonade sitting on a table until Luis knocked it over. After the spill, there was only about half as much left. About how much of the glass of lemonade did Luis spill?
11. After the party, Luis's father found  $\frac{2}{3}$  of a half-gallon of strawberry ice cream and  $\frac{1}{10}$  of a half-gallon of chocolate ice cream in the freezer.
  - A. What fraction of a gallon of strawberry ice cream was in the freezer?
  - B. What fraction of a gallon of chocolate ice cream was in the freezer?
  - C. If Luis's father puts all the ice cream together in a sundae, will he have closer to a half-gallon or a gallon of ice cream? How do you know?
12. Altogether, Luis's sister took down 24 meters of streamers.  $\frac{3}{4}$  of the streamers were hanging in the kitchen. How many meters of streamers were hanging in the kitchen?
13. Luis mopped the floor for  $\frac{1}{2}$  of an hour. Luis's sister mopped for  $\frac{1}{6}$  of that time.
  - A. What fractional part of an hour did Luis's sister help mop?
  - B. How many minutes did she mop?

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Solving Fraction Multiplication Problems

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6. A.  $\frac{1}{3} \times 21 = \$7$  less  
B.  $21 - 7 = \$14$
7. A.  $\frac{1}{3} \times \frac{2}{3} = \frac{2}{9} = \frac{2}{9} \times 24 = 6$  cans  
B. 6 cans



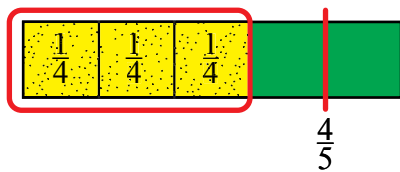
8.  $\frac{1}{4} \times \frac{2}{5} = \frac{2}{20} = \frac{1}{10}$  sandwich
9.  $\frac{1}{8} \times 32 = 4$  ounces
10. about  $\frac{1}{8}$  glass
11. A.  $\frac{2}{3} \times \frac{1}{2} = \frac{2}{6} = \frac{1}{3}$  gallon  
B.  $\frac{1}{10} \times \frac{1}{2} = \frac{1}{20}$  gallon  
C. closer to  $\frac{1}{2}$  gallon; Possible response: He has  $\frac{1}{3}$  of a gallon of strawberry, and  $\frac{1}{12}$  of a gallon is just a little bit more.
- 12.\*  $\frac{3}{4} \times 24 = 18$  meters
13. A.  $\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$  hour  
B.  $\frac{1}{12} \times 60 = 5$  minutes

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14. A.  $21\frac{2}{3} \times 11 =$   
 $(21 \times 11) + (\frac{2}{3} \times 11) =$   
 $231 + \frac{22}{3} =$   
 $231 + 7\frac{1}{3} =$   
 $238\frac{1}{3}$  sq. ft.
- B. about \$80
15.  $\frac{2}{3} \times \frac{1}{3} = \frac{2}{9} = \frac{1}{3}$  of the bins
16. A.  $3 \times \frac{3}{8} = \frac{9}{8} = 1\frac{1}{8}$  gallons
- B. Yes; Possible response: I know because one wall was 9 ft.  $\times$  11 ft. = 99 sq. ft. in area. The other wall was about 20 ft.  $\times$  9 ft. = 180 sq. ft. in area. There was about 280 sq. ft. total. He will have plenty of paint.
17. Half of  $\frac{9}{10}$  of a roll is still close to half because  $\frac{9}{10}$  is so close to 1 whole. He had more than  $\frac{1}{8}$  roll of tape left and did not need to buy another roll of painter's tape.
18.  $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$  of house
19.  $\frac{2}{5} \times \frac{5}{8} = \frac{10}{40} = \frac{1}{4}$  roll
20. Possible response: about 2 ounces of frosting; I estimated by multiplying  $\frac{1}{2}$  ounce by 3 tubes to get  $1\frac{1}{2}$  ounces. Then I added on a little more for the tubes that had closer to  $\frac{3}{4}$  ounce in them.
21. A. less than  $\frac{3}{4}$  and less than  $\frac{4}{5}$
- B.  $\frac{3}{4} \times \frac{4}{5} = \frac{12}{20}$  or  $\frac{3}{5}$ ; Stories and drawings will vary. Sample story and drawing:



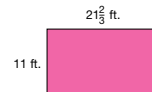
$\frac{4}{5}$  of the submarine sandwich was left.  $\frac{3}{4}$  of the leftover sandwich had pickles on it. How much of the leftover sandwich had pickles on it?

$\frac{3}{4} \times \frac{4}{5} = \frac{12}{20}$  or  $\frac{3}{5}$  of the leftover sandwich had pickles.

- C. Answers are reasonable if the product is less than  $\frac{1}{5}$  and less than  $\frac{5}{6}$ .  $\frac{1}{6}$  is reasonable.

14. Luis's mother wanted the living room carpet cleaned after the party. The carpet was  $21\frac{2}{3}$  feet by 11 feet.

- A. What was the area of the carpet?  
 B. A professional charged \$.32 per square foot to clean carpets. About how much would the family spend to have the living room carpet cleaned professionally?



15. Luis has large recycling bins in his garage.  $\frac{1}{3}$  of the bins were for recycling cans. He filled  $\frac{2}{5}$  of the can bins. What fraction of all of the bins in the garage did he fill?
16. Luis's father wants to repaint the living room. He has 3 cans with  $\frac{3}{8}$  gallon in each can.
- A. How much paint does he have altogether?  
 B. One gallon of paint covers 400 square feet. Does Luis's father have enough paint to cover both a 9 by 11 foot wall and a  $21\frac{2}{3}$  by 9 foot wall? How do you know?
17. There was  $\frac{9}{10}$  of a roll of painter's tape, and Luis's father used about  $\frac{1}{2}$  of it. He needed about  $\frac{1}{8}$  of a roll more to finish the job. Did he need to buy more tape or did he have enough to finish the job? How do you know?
18. By 5:00,  $\frac{2}{5}$  of the house had been cleaned. After dinner, the family cleaned  $\frac{1}{10}$  of the amount they had left to clean. How much of the whole house did they clean after dinner?

✓ **Check-In: Questions 19-21**

For Questions 19-21, show or tell how you solved each problem. Include number sentences and labels.

19. When Luis's family began to clean up after the party, they had  $\frac{2}{5}$  of a roll of paper towels. When they were done, there was only  $\frac{1}{5}$  of that amount left on the roll. How much of the roll was left?
20. Luis's mother used 3 tubes of frosting to decorate part of Luis's cake. Each tube held between  $\frac{1}{2}$  to  $\frac{3}{4}$  ounces of frosting. About how many ounces of frosting did she use? How do you know?
21. A. Will the product of  $\frac{3}{5} \times \frac{4}{5}$  be greater than or less than  $\frac{3}{4}$ ? Will it be greater than or less than  $\frac{4}{5}$ ?  
 B. Write a story, draw a picture, and solve the problem for  $\frac{3}{4} \times \frac{4}{5}$ .  
 C. Explain how you know the answer to your story is reasonable.

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**Homework**

Find the following products. You do not have to write your answers in simplest form. Look for patterns down the columns and across the rows.

1. A.  $\frac{1}{4} \times 8 =$                       B.  $\frac{3}{4} \times 8 =$   
 C.  $\frac{1}{4} \times 16 =$                      D.  $\frac{3}{4} \times 16 =$   
 E.  $\frac{1}{4} \times 32 =$                      F.  $\frac{3}{4} \times 32 =$
2. A.  $\frac{1}{4} \times \frac{6}{10} =$                      B.  $\frac{3}{4} \times \frac{6}{10} =$   
 C.  $\frac{1}{4} \times \frac{10}{10} =$                     D.  $\frac{3}{4} \times \frac{10}{10} =$   
 E.  $\frac{1}{4} \times \frac{10}{10} =$                     F.  $\frac{3}{4} \times \frac{10}{10} =$
3. A.  $\frac{1}{4} \times 10 =$                      B.  $\frac{3}{4} \times 10 =$   
 C.  $\frac{1}{4} \times 12 =$                      D.  $\frac{3}{4} \times 12 =$   
 E.  $\frac{1}{4} \times \frac{6}{10} =$                      F.  $\frac{3}{4} \times \frac{6}{10} =$

Complete the function machines. Write these answers in simplest form.

4. Rule: Multiply by 10

Input	Output
$\frac{2}{3}$	
$\frac{1}{9}$	
$\frac{3}{4}$	
$1\frac{1}{3}$	
$\frac{5}{2}$	
$\frac{4}{5}$	

5. Rule: Multiply by  $\frac{1}{2}$

Input	Output
$\frac{1}{3}$	
$\frac{4}{5}$	
$\frac{3}{4}$	
$\frac{6}{12}$	
$\frac{2}{3}$	
$\frac{8}{10}$	

6. Write a story, draw a picture, and solve the problem for this equation:  $\frac{1}{3} \times \frac{5}{6} =$ . Include a number sentence and labels.

**Homework (SG p. 507)**

**Questions 1–6**

1. A.  $\frac{1}{4} \times 8 = \frac{8}{4}$                       B.  $\frac{3}{4} \times 8 = \frac{24}{4}$   
 C.  $\frac{1}{4} \times 16 = \frac{16}{4}$                      D.  $\frac{3}{4} \times 16 = \frac{48}{4}$   
 E.  $\frac{1}{4} \times 32 = \frac{32}{4}$                      F.  $\frac{3}{4} \times 32 = \frac{96}{4}$
2. A.  $\frac{1}{4} \times \frac{6}{2} = \frac{6}{8}$                      B.  $\frac{3}{4} \times \frac{3}{2} = \frac{9}{8}$   
 C.  $\frac{1}{4} \times \frac{8}{2} = \frac{8}{8}$                      D.  $\frac{3}{4} \times \frac{4}{2} = \frac{12}{8}$   
 E.  $\frac{1}{4} \times \frac{10}{2} = \frac{10}{8}$                     F.  $\frac{3}{4} \times \frac{5}{2} = \frac{15}{8}$
3. A.  $\frac{1}{4} \times 10 = \frac{10}{4}$                      B.  $\frac{3}{4} \times 10 = \frac{30}{4}$   
 C.  $\frac{1}{4} \times 12 = \frac{12}{4}$                      D.  $\frac{3}{4} \times 12 = \frac{36}{4}$   
 E.  $\frac{1}{4} \times \frac{6}{10} = \frac{6}{40}$                      F.  $\frac{3}{4} \times \frac{6}{10} = \frac{18}{40}$

4. Rule: Multiply by 10

Input	Output
$\frac{2}{3}$	$\frac{20}{3} = 6\frac{2}{3}$
$\frac{1}{9}$	$\frac{10}{9} = 1\frac{1}{9}$
$\frac{3}{4}$	$\frac{30}{4} = 7\frac{1}{2}$
$1\frac{1}{3}$	$13\frac{1}{3}$
$\frac{5}{2}$	$\frac{50}{2} = 25$
$\frac{4}{5}$	$\frac{48}{8} = 5$

5. Rule: Multiply by  $\frac{1}{2}$

Input	Output
$\frac{1}{3}$	$\frac{1}{6}$
$\frac{4}{5}$	$\frac{4}{10} = \frac{2}{5}$
$\frac{3}{4}$	$\frac{3}{8}$
$\frac{6}{12}$	$\frac{6}{24} = \frac{1}{4}$
$\frac{2}{3}$	$\frac{2}{6} = \frac{1}{3}$
$\frac{8}{10}$	$\frac{8}{20} = \frac{2}{5}$

6. Stories and drawings will vary. Sample story and drawing:

There was  $\frac{5}{6}$  of a pan of brownies in the kitchen. I ate  $\frac{1}{3}$  of it so I ate  $\frac{5}{18}$  of the pan of brownies.



$\frac{1}{3} \times \frac{5}{6} = \frac{5}{18}$  pan