

Additional Practice**Investigation 1****Let's Be Rational**

1. Suppose you roll a red number cube and a green number cube and form a fraction with the number on the red number cube as the numerator and the number on the green number cube as the denominator.

a. List all the possible fractions.

b. List all the fractions that are between $\frac{2}{3}$ and $1\frac{1}{2}$.

c. List all the fractions that are between $2\frac{1}{3}$ and $3\frac{2}{3}$.

2. For each part, state whether the sum of the fractions is less than, greater than, or equal to 1. Explain your thinking.

a. $\frac{3}{8} + \frac{2}{5}$

b. $\frac{5}{10} + \frac{3}{4}$

c. $\frac{3}{12} + \frac{3}{6}$

d. $\frac{1}{2} + \frac{4}{8}$

Additional Practice *(continued)***Investigation 1****Let's Be Rational**

e. $\frac{4}{7} + \frac{7}{12}$

f. $\frac{4}{3} + \frac{1}{100}$

g. $\frac{1}{4} + \frac{2}{3}$

h. $\frac{9}{20} + \frac{5}{11}$

3. “Close to One” is a game that uses the “Getting Close” game cards that show fractions less than 1. The object of “Close to One” is to estimate a sum of two fractions that is as close to 1 as possible without exceeding 1. On each turn, the player draws one card. This is the starting value. Then, the player draws three more cards and chooses the one that will make the sum as close to 1 as possible without exceeding 1.

In each sample turn below, the starting value is followed by the value of three game cards. Choose the fraction that will make the sum as close to 1 as possible without exceeding 1. Explain the reasoning for your choice.

a. $\frac{1}{3}$ $\frac{1}{8}, \frac{1}{4}, \frac{1}{2}$

b. $\frac{3}{4}$ $\frac{1}{8}, \frac{1}{3}, \frac{1}{2}$

c. $\frac{2}{5}$ $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$

d. $\frac{9}{10}$ $\frac{7}{10}, \frac{3}{4}, \frac{2}{3}$

e. $\frac{1}{10}$ $\frac{1}{8}, \frac{1}{5}, \frac{1}{4}$

f. $\frac{3}{8}$ $\frac{4}{9}, \frac{5}{6}, \frac{9}{10}$

Additional Practice *(continued)***Investigation 1****Let's Be Rational**

4. For each set of fractions, list all the possible pairs whose sum is between 1 and $1\frac{1}{2}$.

a. $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}$

b. $\frac{1}{3}, \frac{9}{10}, \frac{6}{5}$

c. $\frac{3}{4}, \frac{7}{8}, \frac{9}{10}$

d. $\frac{1}{4}, \frac{1}{2}, \frac{3}{5}$

e. $\frac{1}{10}, \frac{2}{3}, \frac{5}{4}$

f. $\frac{1}{2}, \frac{3}{5}, \frac{7}{10}$

5. Rosa and Tony need to estimate how much it will cost to purchase the following supplies for their class project.

4 pieces of posterboard at \$2.89 each

1 bottle of glue at \$1.19

2 booklets of construction paper at \$4.99 each

2 pairs of scissors at \$0.59 each

- a. Estimate the cost of the supplies that Rosa and Tony need to buy.
- b. In this situation, would it be better to overestimate or underestimate? Explain.

Additional Practice *(continued)***Investigation 1****Let's Be Rational**

6. Jack and Helen are making cookies. The recipe says to combine $\frac{1}{2}$ cup of butter with $\frac{3}{4}$ cup chocolate chips and $\frac{3}{8}$ cup chopped nuts.
- a. When these three ingredients are mixed together, how many cups of the mixture will Jack and Helen have? Show your work.
- b. Jack and Helen decide to triple the recipe.
- How many cups of butter will be needed?
 - How many cups of chocolate chips will be needed?
 - How many cups of chopped nuts will be needed?
- c. When the ingredients for the tripled recipe are combined, how many cups of the mixture will Jack and Helen have?

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7. Mr. Larson is planning the seating for a school recital. He needs to reserve $\frac{1}{3}$ of the seats for students and $\frac{1}{6}$ of the seats for parents.
- After reserving seats for students and parents, what fraction of the seats in the auditorium are left?

 - Mr. Larson's principal tells him that he also needs to reserve $\frac{1}{8}$ of the seats for teachers and school officials. The remainder can be used for open seating. What fraction of the seats are now left for open seating?

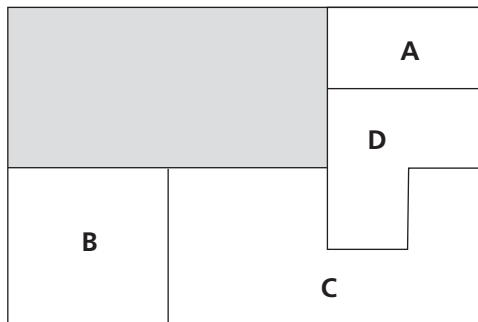
 - Later, Mr. Larson's principal says he should reserve $\frac{1}{4}$ of the seats for students from other middle schools. Are there enough seats left? If not, explain why not; otherwise, state what fraction of the seats will be available for open seating.

Additional Practice *(continued)*

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8. The shaded region represents one whole unit.



- a. What fraction of the whole is each of the other four regions A, B, C, D?
- b. Based on your answers to part (a), find the area of each of the following:
- i. region A + region B
 - ii. region C + region D
 - iii. region B – region D
 - iv. region C – region A
- c. If the entire outer rectangle is considered the whole, what fraction of the whole would the shaded gray area be? Explain your reasoning.

Additional Practice *(continued)***Investigation 1****Let's Be Rational**

9. Find each sum. Describe any patterns you see.

a. $\frac{1}{2} + \frac{1}{3}$

b. $\frac{1}{3} + \frac{1}{4}$

c. $\frac{1}{4} + \frac{1}{5}$

d. $\frac{1}{5} + \frac{1}{6}$

e. $\frac{1}{6} + \frac{1}{7}$

f. $\frac{1}{7} + \frac{1}{8}$

Additional Practice: Digital Assessments

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10. Circle the number that makes each statement true.

a. $\frac{1}{6} + \frac{2}{3} = \left[\begin{array}{c} \frac{1}{3} \\ \frac{5}{6} \\ \frac{7}{6} \end{array} \right]$

b. $5 - 2\frac{2}{3} = \left[\begin{array}{c} 2\frac{1}{3} \\ 3\frac{2}{3} \\ 4\frac{1}{3} \end{array} \right]$

11. To follow a recipe, Jared has to mix the

following liquids: $\frac{3}{4}$ cup of water, $\frac{1}{8}$ cup of coconut oil, and $\frac{3}{8}$ cup of eggs. Which represent how many cups of liquid are in the mixture? *Select all that apply.*

$\frac{7}{20}$

$\frac{7}{8}$

$\frac{5}{4}$

$1\frac{1}{4}$

$1\frac{1}{2}$

12. Write each expression in the box with the correct category.

$\frac{3}{10} + \frac{1}{2}$

$\frac{2}{5} + \frac{2}{7}$

$\frac{1}{2} + \frac{3}{5}$

$\frac{1}{6} + \frac{3}{4}$

$\frac{2}{7} + \frac{2}{9}$

$\frac{1}{4} + \frac{5}{6}$

Sum Greater than 1

Sum Less than 1

Skill: Estimating With Fractions**Investigation 1****Let's Be Rational**

Write the fraction shown by each model. Then determine whether the number is closest to 0 , $\frac{1}{2}$, or 1 .



Estimate each sum. Use the benchmarks 0 , $\frac{1}{2}$, and 1 .

3. $\frac{5}{16} + \frac{5}{8}$

4. $\frac{10}{12} + \frac{4}{5}$

5. $\frac{1}{10} + \frac{1}{2}$

6. $\frac{3}{4} + \frac{3}{8}$

7. $\frac{1}{12} + \frac{6}{11}$

8. $\frac{8}{14} + \frac{4}{7}$

9. $\frac{1}{6} + \frac{5}{8}$

10. $\frac{1}{10} + \frac{5}{6}$

11. $\frac{9}{10} + \frac{7}{8}$

12. $\frac{1}{12} + \frac{9}{10}$

13. $\frac{15}{16} + \frac{11}{12}$

14. $\frac{1}{8} + \frac{9}{10}$

15. Name three fractions whose benchmark is $\frac{1}{2}$.

16. Name three fractions whose benchmark is 1 .

Skill: Estimating With Mixed Numbers**Investigation 1****Let's Be Rational****Estimate each sum.**

1. $2\frac{1}{6} + 7\frac{1}{9}$

2. $4\frac{7}{8} + 8\frac{1}{5}$

3. $2\frac{7}{9} + 4\frac{1}{8}$

4. $14\frac{3}{4} + 9\frac{7}{8}$

5. $6\frac{7}{8} + \frac{11}{12}$

6. $1\frac{7}{8} + 1\frac{1}{5}$

7. $2\frac{1}{6} + 1\frac{9}{10}$

8. $4\frac{9}{10} + 4\frac{7}{8}$

9. $5\frac{6}{7} + \frac{2}{3}$

10. $\frac{1}{7} + 2\frac{7}{8}$

11. $2\frac{4}{5} + 1\frac{5}{8}$

12. $\frac{2}{13} + 3\frac{1}{18}$

13. $42\frac{1}{6} + 6\frac{1}{16}$

14. $6\frac{2}{15} + 1\frac{3}{4}$

15. $19\frac{5}{6} + 20\frac{1}{12}$

16. $2\frac{1}{4} + 3\frac{15}{16}$

17. $\frac{2}{9} + 2\frac{7}{8}$

18. $7\frac{1}{8} + 2\frac{3}{11}$

19. $3\frac{4}{5} + 2\frac{1}{8}$

20. $\frac{3}{5} + \frac{7}{8}$

21. Julia bought stock at $\$28\frac{1}{8}$ per share. The value of each share increased by $\$6\frac{5}{8}$. How much is each share of stock now worth?

Skill: Adding and Subtracting Fractions**Investigation 1****Let's Be Rational**

Find each sum or difference.

1. $\frac{1}{4} + \frac{2}{4}$

2. $\frac{7}{10} - \frac{4}{10}$

3. $\frac{5}{8} - \frac{3}{8}$

4. $\frac{1}{8} + \frac{5}{8}$

5. $\frac{5}{8} + \frac{2}{8}$

6. $\frac{3}{10} + \frac{6}{10}$

7. $\frac{2}{5} - \frac{1}{10}$

8. $\frac{5}{8} - \frac{1}{4}$

9. $\frac{3}{10} + \frac{4}{5}$

10. $\frac{11}{16} + \frac{5}{8}$

11. $\frac{2}{3} - \frac{1}{6}$

12. $\frac{3}{5} + \frac{7}{10}$

Skill: Adding and Subtracting Fractions *(continued)***Investigation 1****Let's Be Rational**

13. What is the total amount of sugar in the recipe at the right?

Martha's Cookie Recipe
1 cup shortening
2 eggs
$\frac{1}{4}$ cup white sugar
$\frac{1}{4}$ cup brown sugar
$1\frac{1}{2}$ cups flour
1 teaspoon vanilla

14. Martha decides to double the recipe. How much brown sugar will she use?

15. At the tea shop, $\frac{5}{15}$ of the customers purchased green tea, $\frac{2}{15}$ of the customers purchased jasmine tea, and $\frac{5}{15}$ of the customers purchased herbal tea. What portion of the customers purchased another type of tea?

16. A piece of fabric is $\frac{7}{9}$ yard long. A piece of ribbon is $\frac{2}{9}$ yard long. How many more yards of ribbon do you need to have equal lengths of fabric and ribbon?

Skill: Adding and Subtracting Mixed Numbers**Investigation 1****Let's Be Rational**

Find each sum or difference.

1. $4\frac{3}{10} + 5\frac{2}{5}$

2. $3\frac{7}{8} + 2\frac{1}{2}$

3. $5\frac{2}{3} + 3\frac{1}{4}$

4. $6\frac{3}{4} + 2\frac{1}{2}$

5. $1\frac{1}{12} + 3\frac{1}{6}$

6. $9\frac{2}{5} + 10\frac{3}{10}$

7. $7\frac{1}{3} + 5\frac{11}{12}$

8. $11\frac{7}{10} + 4$

9. $2\frac{2}{3} + 4\frac{3}{4}$

10. $10\frac{11}{16} - 3\frac{7}{8}$

11. $8\frac{1}{3} - 2\frac{3}{8}$

12. $9 - 3\frac{2}{5}$

Skill: Adding and Subtracting Mixed Numbers *(continued)***Investigation 1****Let's Be Rational**

13. $5\frac{3}{16} - 2\frac{3}{8}$

14. $8\frac{1}{6} - 3\frac{2}{5}$

15. $7\frac{1}{2} - 3$

16. $2\frac{3}{4} - 1\frac{1}{8}$

17. $4\frac{1}{8} - 2\frac{1}{16}$

18. $9\frac{2}{3} - 3\frac{5}{6}$

19. Sam grew three pumpkins for the pumpkin growing contest. The pumpkins weighed $24\frac{1}{8}$ pounds, $18\frac{2}{4}$ pounds, and $32\frac{5}{16}$ pounds. Find the combined total weight of Sam's pumpkins.

20. Robbie needs to buy fencing for his square vegetable garden that measures $16\frac{3}{4}$ feet on a side. One side borders the back of the garage. The fencing costs \$4 per feet. Estimate how much the fencing will cost.

Additional Practice

Investigation 2

Let's Be Rational

1. Phyllis is training for a marathon and wants to keep track of how far she runs each week. This week she ran $3\frac{1}{4}$ miles. She ran $\frac{2}{3}$ of them on Saturday. How many miles did Phyllis run on Saturday?

a. Estimate the answer.

b. Draw a model or diagram to find the exact answer.

c. Write a number sentence for this situation.

Additional Practice *(continued)***Investigation 2****Let's Be Rational**

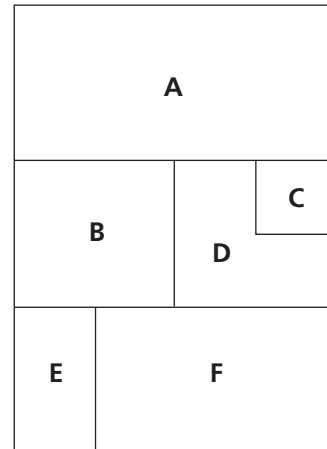
2. In a recent survey of 440 people, $\frac{1}{4}$ said that they watched television every evening, $\frac{2}{5}$ said they watched five or six nights each week, and the remainder said they watched four nights a week or less.
- How many people in the survey watched television every evening? Explain how you found your answer.
 - How many people surveyed watched television five or six nights each week?
 - What fraction of the people surveyed watched television four nights each week or less? Explain how you found your answer.
 - How many people surveyed watch television four nights each week or less?

Additional Practice *(continued)*

Investigation 2

Let's Be Rational

3. Jack and Phil are selling advertisements for the yearbook. A full-page ad will cost \$240. Advertisers who want only a fraction of a page will be charged that fraction of \$240. Jack and Phil's layout for one page is shown at the right.



a. What fraction of the whole page does each of the six regions occupy?

b. How much should Jack and Phil charge an advertiser who wants to place an ad that fills area A? Explain how you found your answer.

c. How much should Jack and Phil charge an advertiser who wants to place an ad that fills area D?

d. How much should an ad that fills area F cost?

e. Jack and Phil have sold advertising space in areas B, E, and C.

i. How much did they collect for the three ads?

ii. What fraction of the page is left for other advertisers?

Additional Practice *(continued)***Investigation 2****Let's Be Rational**

4. A recipe for granola cookies calls for $\frac{1}{2}$ cup of butter and $\frac{1}{4}$ cup of chopped nuts. Because Jane likes moist cookies without too many nuts, she decides to increase the amount of butter by half and decrease the amount of chopped nuts by half.
- How much butter is required for Jane's new recipe? Explain how you got your answer.
 - What amount of chopped nuts is required for Jane's new recipe? Explain your reasoning.
 - Since Jane increased the butter by half and decreased the nuts by half, is the combined amount of butter and nuts the same as in the original recipe? Explain why or why not.
5. Paul has $\frac{3}{5}$ of a roll of speaker wire left. His sister uses $\frac{1}{4}$ of it to set up speakers in her room.
- How much of the whole roll of speaker wire did Paul's sister use?
 - What fraction of the whole roll is left? Explain your answer.

Additional Practice *(continued)***Investigation 2****Let's Be Rational**

6. For each set of multiplication problems, determine whether the products are equal or whether one product is greater. Describe any patterns you see.

a. $\frac{1}{3} \times \frac{2}{5}$ and $\frac{2}{3} \times \frac{1}{5}$

b. $\frac{7}{8} \times \frac{6}{5}$ and $\frac{6}{8} \times \frac{7}{5}$

c. $\frac{3}{10} \times \frac{5}{9}$ and $\frac{5}{10} \times \frac{3}{9}$

d. $\frac{3}{7} \times \frac{5}{8}$ and $\frac{5}{7} \times \frac{3}{8}$

7. If each person in North America throws away $3\frac{2}{3}$ pounds of garbage each day, how many pounds of garbage does each person throw away in a year?

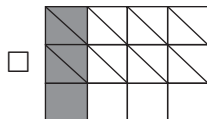
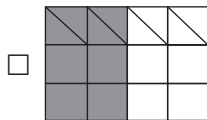
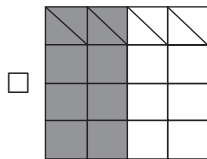
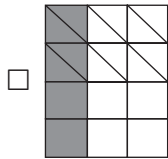
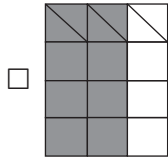
Additional Practice: Digital Assessments

Investigation 2

Let's Be Rational

8. Which models can be used to find $\frac{1}{4} \times \frac{2}{3}$?

Select all that apply.



9. Circle the number that makes each statement true.

a. $\frac{4}{5} \times \frac{1}{3} =$ $\left[\begin{array}{c} \frac{5}{8} \\ \frac{4}{15} \\ \frac{5}{15} \\ \frac{12}{5} \end{array} \right]$

b. $1\frac{1}{4} \times 2\frac{1}{6} =$ $\left[\begin{array}{c} 2\frac{5}{12} \\ 2\frac{17}{24} \\ 3\frac{1}{10} \end{array} \right]$

c. $\frac{2}{3}$ of 5 = $\left[\begin{array}{c} \frac{10}{15} \\ 2\frac{5}{3} \\ 3\frac{1}{3} \end{array} \right]$

10. Write one of the symbols from the tiles on each line to create true statements.



$\frac{2}{5} \times \frac{1}{2}$ $\frac{1}{3} \times \frac{3}{5}$ $\frac{1}{3} \times \frac{1}{2}$ $\frac{1}{3} \times \frac{1}{3}$

$\frac{3}{7} \times \frac{4}{5}$ $\frac{4}{9} \times \frac{2}{5}$ $\frac{1}{5} \times \frac{2}{5}$ $\frac{3}{5} \times \frac{2}{5}$

Skill: Multiplying Fractions**Investigation 2****Let's Be Rational****Draw a model to find each product.**

1. $\frac{1}{6} \times \frac{3}{4}$

2. $\frac{2}{5} \times \frac{1}{2}$

Find each product.

3. $\frac{3}{5}$ of 10

4. $\frac{1}{4}$ of 12

5. $\frac{2}{3}$ of 6

6. $\frac{4}{5}$ of $\frac{5}{8}$

7. $\frac{5}{6}$ of $\frac{3}{8}$

8. $\frac{3}{5}$ of $\frac{1}{2}$

9. $\frac{3}{4}$ of 12

10. $\frac{2}{5}$ of 15

Skill: Multiplying Fractions *(continued)***Investigation 2****Let's Be Rational**

11. $\frac{3}{5}$ of $\frac{3}{4}$

12. $\frac{1}{2} \times \frac{1}{3}$

13. $\frac{1}{8} \times \frac{3}{4}$

14. $\frac{2}{5} \times \frac{7}{11}$

15. $\frac{2}{3}$ of $\frac{1}{4}$

16. $\frac{2}{5} \times \frac{1}{2}$

17. $\frac{1}{4}$ of $\frac{4}{5}$

18. $\frac{5}{6} \times \frac{2}{5}$

19. A kitten eats $\frac{1}{4}$ cup of cat food. Another cat in the same household eats 6 times as much. How much food does the cat eat?

Skill: Multiplying Mixed Numbers**Investigation 2****Let's Be Rational****Find each product.**

1. $2\frac{5}{6} \times 1\frac{3}{4}$

2. $3\frac{3}{8} \times 7\frac{1}{4}$

3. $5\frac{3}{8} \times 2\frac{7}{8}$

4. $\frac{1}{4} \times 5\frac{2}{5}$

5. $1\frac{1}{2} \times 5\frac{1}{3}$

6. $\frac{3}{4} \times 1\frac{3}{5}$

7. $3\frac{1}{3} \times 3\frac{3}{10}$

8. $5\frac{1}{2} \times \frac{2}{5}$

9. $1\frac{2}{3} \times 3\frac{3}{4}$

Skill: Multiplying Mixed Numbers *(continued)***Investigation 2****Let's Be Rational**

10. Ken used all of a piece of lumber to build a bookshelf. If he made three shelves that are each $2\frac{1}{2}$ feet long, how long was the piece of lumber?

11. Deanna's cake recipe needs to be doubled for a party. How much of each ingredient should Deanna use?

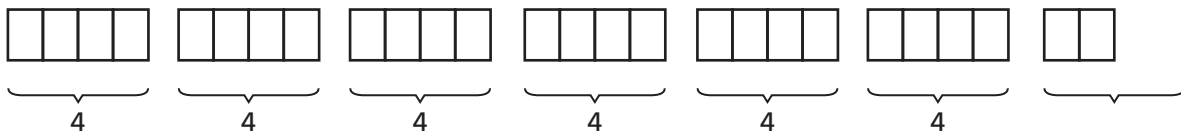
Cake Recipe		
<i>Ingredient</i>	<i>Amount</i>	<i>Doubled amount</i>
flour	$2\frac{1}{4}$ cups	
sugar	$1\frac{3}{4}$ cups	
butter	$1\frac{1}{2}$ cups	
milk	$\frac{3}{4}$ cup	

Additional Practice

Investigation 3

Let's Be Rational

1. Deb has 26 ounces of shredded cheese. She is making 4 small loaves of garlic cheese bread. Use the model below to help answer exercises (a)–(b).



- a. How many ounces of cheese can Deb use in each loaf of bread? Explain your reasoning.
- b. Write a number sentence showing your calculations.

2. LiAnn works in the Olde Tyme Soda Shoppe. The shop sells milkshakes, double milkshakes, and triple milkshakes. A shake uses $\frac{1}{8}$ cup of syrup, a double shake uses $\frac{1}{4}$ cup of syrup, and a triple shake uses $\frac{3}{8}$ cup of syrup. How many shakes of each kind could she make with 3 cups of syrup?

Additional Practice *(continued)***Investigation 3****Let's Be Rational**

3. Three groups of students are sharing leftover pizza (all the same size originally). In which group does each student get the most pizza? Explain your choice.

Group 1: Six students equally share $\frac{3}{4}$ of a pizza.

Group 2: Three students equally share $\frac{1}{3}$ of a pizza.

Group 3: Four students equally share $\frac{2}{3}$ of a pizza.

4. Find each quotient.

a. $12 \div \frac{1}{2}$

b. $12 \div \frac{1}{3}$

c. $3 \div \frac{2}{3}$

d. $\frac{7}{8} \div 4$

e. $1\frac{2}{3} \div 6$

f. $\frac{5}{6} \div \frac{1}{3}$

g. $1\frac{1}{4} \div 2\frac{1}{2}$

h. $\frac{8}{5} \div \frac{3}{10}$

i. $1\frac{1}{2} \div \frac{3}{4}$

Additional Practice *(continued)***Investigation 3****Let's Be Rational**

5. Max noticed a pattern in some fraction division problems that he computed.

$$\frac{6}{8} \div \frac{3}{8} \text{ gives the same answer as } 6 \div 3.$$

$$\frac{7}{10} \div \frac{3}{10} \text{ gives the same answer as } 7 \div 3.$$

$$\frac{9}{5} \div \frac{2}{5} \text{ gives the same answer as } 9 \div 2.$$

$$\frac{4}{7} \div \frac{5}{7} \text{ gives the same answer as } 4 \div 5.$$

Describe the pattern that Max found. Explain why it works.

6. Sam, Trish, and Shanti are making signs for the spring dance. Sam can make a sign in $\frac{3}{4}$ of an hour, Trish can make a sign in $\frac{2}{3}$ of an hour, and Shanti can make a sign in $\frac{3}{5}$ of an hour.
- How many complete signs can each person make in 4 hours?
 - Who has the most time left over after finishing his or her last complete sign? How do you know?
7. How many bows can you make from 5 meters of ribbon if making a bow takes $\frac{1}{4}$ of a meter of ribbon?

Additional Practice: Digital Assessments

Investigation 3

Let's Be Rational

8. Circle the number that makes each statement true.

a. $\frac{2}{5} \div \frac{2}{3} = \left[\begin{array}{c} \frac{5}{3} \\ \frac{3}{5} \\ \frac{4}{15} \end{array} \right]$

b. $4\frac{2}{7} \div 2 = \left[\begin{array}{c} 2\frac{1}{7} \\ 2\frac{2}{7} \\ 8\frac{4}{7} \end{array} \right]$

c. $3\frac{4}{5} \div 2\frac{1}{5} = \left[\begin{array}{c} 1\frac{3}{5} \\ 1\frac{8}{11} \\ 6\frac{4}{25} \end{array} \right]$

9. Each step that Brooke takes is $\frac{2}{3}$ of a meter.

Which expressions can be used to find how many steps she will take if she walks 50 meters? *Select all that apply.*

$\frac{2}{3} \div 50$

$50 \div \frac{2}{3}$

$\frac{2}{3} \times 50$

$50 \times \frac{2}{3}$

10. Write each expression in the box with the correct category.

$\frac{5}{9} \div \frac{2}{9}$

$\frac{9}{5} \div \frac{9}{2}$

$\frac{10}{7} \div \frac{4}{7}$

$\frac{5}{6} \div \frac{1}{3}$

$\frac{3}{4} \div \frac{15}{8}$

$\frac{5}{2}$

$\frac{2}{5}$

Skill: Dividing Fractions**Investigation 3****Let's Be Rational**

1. Draw a diagram to show how many $\frac{3}{4}$ -foot pieces of string can be cut from a piece of string $4\frac{1}{2}$ feet long.

Find each quotient.

2. $\frac{1}{12} \div \frac{5}{6}$

3. $4 \div \frac{1}{3}$

4. $6 \div \frac{3}{4}$

5. $5 \div \frac{9}{10}$

6. $8 \div \frac{2}{3}$

7. $\frac{4}{5} \div 2$

8. $\frac{7}{8} \div 3$

9. $\frac{5}{6} \div 5$

10. $\frac{4}{9} \div 8$

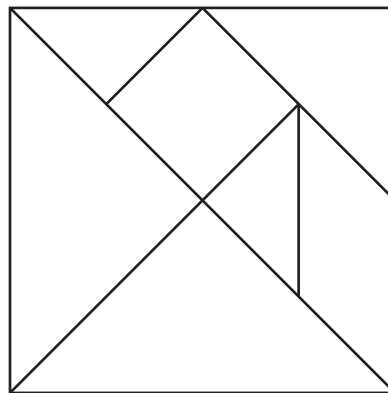
11. $\frac{3}{4} \div \frac{1}{4}$

12. $\frac{7}{8} \div \frac{1}{4}$

13. $\frac{5}{6} \div \frac{1}{12}$

14. How many $\frac{3}{4}$ -cup servings are there in a 6-cup package of rice?

15. Study the tangram pieces at the right. If the entire square is 1, find the fractional value of each piece. You can copy the tangram and cut the pieces to compare them.



Skill: Dividing Mixed Numbers**Investigation 3****Let's Be Rational****Find each quotient.**

1. $1\frac{1}{2} \div \frac{2}{3}$

2. $1\frac{1}{2} \div \frac{3}{2}$

3. $\frac{3}{4} \div 1\frac{1}{3}$

4. $2\frac{1}{2} \div 1\frac{1}{4}$

5. $2\frac{1}{2} \div 2\frac{1}{4}$

6. $1\frac{3}{4} \div \frac{3}{4}$

7. $1\frac{7}{10} \div \frac{1}{2}$

8. $3\frac{1}{4} \div 1\frac{1}{3}$

9. $4\frac{1}{2} \div 2\frac{1}{2}$

10. $6 \div 3\frac{4}{5}$

11. $4\frac{3}{4} \div \frac{7}{8}$

12. $5\frac{5}{6} \div 1\frac{1}{3}$

13. Rosa makes $2\frac{1}{2}$ cups of pudding. How many $\frac{1}{3}$ -cup servings can she get from the pudding?

14. One type of lightning bug glows once every $1\frac{1}{2}$ seconds. How many times can it glow in 1 minute?

15. Bea can run $\frac{1}{6}$ mile in 2 minutes. How long should it take her to run 2 miles?

Additional Practice**Investigation 4****Let's Be Rational**

1. For each number sentence, write a complete fact family.

a. $\frac{3}{7} + \frac{1}{3} = \frac{16}{21}$

b. $\frac{11}{12} - \frac{3}{8} = \frac{13}{24}$

c. $\frac{1}{6} + N = \frac{11}{12}$

d. $\frac{13}{15} - N = \frac{1}{6}$

e. $N + 1\frac{1}{4} = 3\frac{5}{8}$

f. $N - \frac{5}{2} = \frac{7}{6}$

Additional Practice *(continued)***Investigation 4****Let's Be Rational**

2. For each number sentence, find the value of N .

a. $N + \frac{2}{5} = \frac{7}{10}$

b. $N - \frac{1}{3} = \frac{3}{11}$

c. $\frac{3}{4} + N = \frac{8}{5}$

d. $\frac{17}{12} - N = \frac{2}{3}$

e. $1\frac{3}{8} + N = 2\frac{1}{4}$

f. $4\frac{4}{9} - N = 3\frac{1}{3}$

g. $1\frac{1}{2} + N + \frac{3}{4} = 3\frac{1}{3}$

h. $N - \frac{5}{6} = \frac{8}{15} - \frac{1}{9}$

Additional Practice *(continued)***Investigation 4****Let's Be Rational**

3. For each number sentence, write a complete fact family.

a. $\frac{2}{5} \times \frac{3}{4} = \frac{3}{10}$

b. $\frac{8}{9} \div \frac{2}{3} = \frac{4}{3}$

c. $N \times \frac{1}{2} = \frac{4}{5}$

d. $N \div \frac{3}{5} = \frac{2}{3}$

e. $\frac{2}{3} \times N = 1\frac{1}{6}$

f. $1\frac{1}{12} \div N = \frac{13}{8}$

Additional Practice *(continued)***Investigation 4****Let's Be Rational**

4. Find the value of N that makes each number sentence true.

a. $N \times \frac{5}{6} = \frac{10}{3}$

b. $N \div \frac{2}{7} = \frac{3}{2}$

c. $\frac{5}{8} \times N = \frac{5}{4}$

d. $\frac{35}{12} \div N = \frac{5}{3}$

e. $N \times \frac{4}{5} = 2\frac{4}{5}$

f. $2\frac{1}{24} \div N = 1\frac{1}{6}$

g. $N \times \frac{1}{3} \times \frac{2}{3} = \frac{4}{9}$

h. $\frac{3}{5} \times \frac{1}{2} = \frac{9}{10} \div N$

Additional Practice *(continued)***Investigation 4****Let's Be Rational**

5. A hare can travel $\frac{3}{4}$ mile in one minute. The fastest recorded speed of a tortoise is $\frac{1}{12}$ mile per minute.
- How much farther can a hare travel in one minute than a tortoise?
 - How far will the hare travel in $4\frac{1}{2}$ minutes?
 - How long will it take the tortoise to travel $\frac{4}{5}$ mile?
6. A recipe for the dressing of a large fruit salad calls for $\frac{1}{2}$ cup apple cider vinegar, $\frac{1}{3}$ cup lemon juice, and $\frac{1}{4}$ cup honey.
- How much dressing is made from 1 batch of the recipe?
 - There is $\frac{5}{8}$ cup of honey left in the jar. How much apple cider vinegar and lemon juice should be added to create some of the fruit salad dressing?

Additional Practice *(continued)***Investigation 4****Let's Be Rational**

7. Jill has a photograph that is a $3\frac{1}{2}$ -inch square. She wants to attach it to a square piece of paper that is $8\frac{1}{2}$ inches on each side.
- How far from each edge should Jill align the edges of the photograph to center it exactly?

 - What is the area of paper not covered by the photograph?

Additional Practice: Digital Assessments

Investigation 4

Let's Be Rational

8. Circle the correct solution for N .

a. $\frac{4}{3} - N = \frac{11}{12}$ $N = \left[\begin{array}{c} \frac{1}{3} \\ \frac{16}{11} \\ \frac{5}{12} \\ \frac{27}{12} \end{array} \right]$

b. $N \times \frac{8}{15} = \frac{2}{3}$ $N = \left[\begin{array}{c} \frac{4}{5} \\ \frac{5}{4} \\ \frac{18}{15} \\ \frac{45}{16} \end{array} \right]$

9. Choose the expressions that belong to the fact family of $\frac{2}{3} - \frac{1}{5} = \frac{7}{15}$. *Select all that apply.*

$\frac{2}{3} - \frac{7}{15} = \frac{1}{5}$

$\frac{2}{3} + \frac{1}{5} = \frac{7}{15}$

$\frac{2}{3} = \frac{7}{15} - \frac{1}{5}$

$\frac{2}{3} = \frac{1}{5} + \frac{7}{15}$

$\frac{2}{3} = \frac{7}{15} + \frac{1}{5}$

10. Chase's soccer ball is $\frac{5}{8}$ full with air. Chase wants to know how much more of the ball must be filled with air for the ball to be $\frac{3}{4}$ filled with air. Using only the numbers and symbols on the tiles provided below, fill in each space to write an equation that can be used to model this situation.

N

$\frac{5}{8}$

$\frac{3}{4}$

+

-

\times

\div

=

Skill: Writing Number Sentences *(continued)***Investigation 4****Let's Be Rational**

5. Water flows through the pipe at a rate of $\frac{2}{5}$ gallon per minute. How much water has traveled through the pipe after 10 minutes?
6. The cat weighs $7\frac{3}{4}$ pounds. The cat's weight is $\frac{2}{3}$ the weight of the dog. How much does the dog weigh?
7. The recipe calls for $3\frac{1}{3}$ cups of flour. The bag has $2\frac{1}{4}$ cups of flour. How much more flour is needed?
8. A large piece of fabric measures 20 square yards. It is divided into sections that are $1\frac{1}{2}$ square yards each. How many whole sections are there?