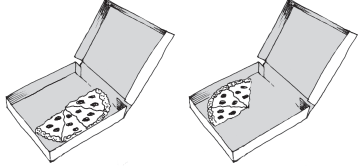## Estimate Fraction Sums

Estimate Fraction Sums with Circle Pieces

Mr. Moreno's class has $\frac{1}{2}$ of a pizza left in one box and $\frac{3}{8}$ of a pizza left in a second box.

1. Mr. Moreno suggested that Kathy take home the leftover pizza. As she packed up the pizza, she wondered whether it would all fit in one box.
   A. If the pieces are combined, will they make more or less than one pizza?
   B. Use fraction circle pieces to model the problem. Is $\frac{1}{2} + \frac{3}{8}$ more than 1 or less than 1? Explain your reasoning.

2. Kathy and Romesh each received a large chocolate chip cookie. Each cookie was as large as a cake. Kathy gave her friend Irma $\frac{1}{3}$ of her cookie. Later, Romesh gave Irma $\frac{1}{4}$ of his cookie.

   A. Did Irma receive more or less than $\frac{1}{2}$ cookie altogether? How did you decide?
   B. Use fraction circle pieces to model $\frac{1}{3} + \frac{1}{4}$. Is $\frac{1}{3} + \frac{1}{4}$ more or less than $\frac{1}{2}$?

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3. Look at each problem. Decide if you think the sums are greater than or less than 1. Use fraction circle pieces to check your thinking.
   A. $\frac{2}{3} + \frac{1}{8}$ **B.** $\frac{3}{4} + \frac{1}{3}$
   C. $\frac{1}{4} + \frac{7}{8}$ **D.** $\frac{3}{4} + \frac{3}{6}$
   E. $\frac{7}{8} + \frac{1}{6}$ **F.** $\frac{1}{3} + \frac{3}{8}$
   G. $\frac{7}{8} + \frac{2}{3}$ **H.** $\frac{1}{4} + \frac{2}{3}$

4. Look at each problem. Decide if you think the sums are greater than or less than $\frac{1}{2}$. Use fraction circle pieces to check your thinking.
   A. $\frac{3}{4} + \frac{1}{8}$ **B.** $\frac{1}{4} + \frac{1}{8}$
   C. $\frac{2}{3} + \frac{1}{4}$ **D.** $\frac{3}{8} + \frac{1}{6}$
   E. $\frac{1}{6} + \frac{1}{4}$ **F.** $\frac{1}{3} + \frac{1}{3}$
   G. $\frac{3}{8} + \frac{1}{3}$ **H.** $\frac{3}{4} + \frac{1}{8}$

Use Strategies to Estimate Fraction Sums

Kathy did not have fraction circle pieces. This is how she figured out whether $\frac{1}{2}$ pizza from one box and $\frac{3}{8}$ pizza from the other box would fit in one box:

> The first box has $\frac{1}{2}$ pizza in it. It has room to put in one half more. I know $\frac{3}{8}$ is less than half because it takes four eighths to make one half. So the $\frac{3}{8}$ pizza from the other box will fit into the first box too. All the leftover pizza will fit into one box.
>
> $\frac{1}{2} = \frac{4}{8}, \frac{4}{8} + \frac{3}{8} = \frac{7}{8}; \frac{7}{8} < 1$

Kathy

Use Kathy's strategy to solve the following problems.

5. Describe how you could solve Question 2A, about whether Irma ate more or less than $\frac{1}{2}$ cookie, without using fraction circle pieces.

6. Choose one of the problems in Question 3. Explain how you could solve the problem without using fraction circle pieces.

7. Choose one of the problems in Question 4. Explain how you could solve the problem without using fraction circle pieces.

Use the *Estimate Fraction Sums with Number Lines* pages in the *Student Activity Book* for more practice estimating fraction sums.

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

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Questions 1–9

1. **A.** less than 1 pizza; Possible response: I know that $\frac{3}{8}$ is a little less than $\frac{1}{2}$ because it takes $\frac{4}{8}$ to equal $\frac{1}{2}$. That means that $\frac{1}{2}$ pizza $+ \frac{3}{8}$ pizza will be a little less than 1 whole pizza.
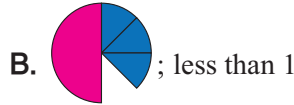
   B. ; less than 1

2. **A.** more than $\frac{1}{2}$ a cookie; Possible response: I thought about circle pieces. The yellow piece for $\frac{1}{4}$ is smaller than the orange piece for $\frac{1}{3}$. If it takes only 2 yellow pieces to equal $\frac{1}{2}$, then 1 yellow and 1 orange will be bigger than $\frac{1}{2}$.

   B. ; more than $\frac{1}{2}$
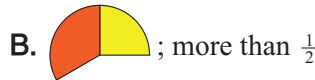
3. **A.*** less than 1   **B.** less than 1
   C.* greater than 1   **D.** greater than 1
   E. greater than 1   **F.** less than 1
   G.* greater than 1   **H.** less than 1

4. **A.** greater than $\frac{1}{2}$ **B.*** less than $\frac{1}{2}$
   C. greater than $\frac{1}{2}$ **D.** greater than $\frac{1}{2}$
   E. less than $\frac{1}{2}$ **F.*** greater than $\frac{1}{2}$
   G. greater than $\frac{1}{2}$ **H.** greater than $\frac{1}{2}$

5. ***** Explanations may vary. I know $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$. I know $\frac{1}{3}$ is greater than $\frac{1}{4}$, so I can say that $\frac{1}{3} + \frac{1}{4}$ is greater than $\frac{1}{2}$.

6. ***** Examples and explanations will vary. Possible response for A: $\frac{2}{3} + \frac{1}{8}$ is less than 1 whole. $\frac{3}{3} = 1$ whole. I already have $\frac{2}{3}$. $\frac{1}{8}$ is smaller than $\frac{1}{3}$. So $\frac{2}{3} + \frac{1}{8}$ is less than 1 whole.

7. ***** Examples and explanations will vary. Possible response for F: $\frac{1}{4} + \frac{1}{4}$ is exactly $\frac{1}{2}$. Thirds are greater than fourths. That means $\frac{2}{3}$ is greater than $\frac{1}{2}$.

8. A. Yes; $\frac{3}{3}$ makes 1 whole. After you add $\frac{2}{3}$ cup of milk to the cup, there will still be room for $\frac{1}{3}$ cup more. $\frac{1}{8}$ is smaller than $\frac{1}{3}$, so it will fit.

B. less than 1; Possible response: I thought about the fraction circle pieces. I used two orange pieces to show $\frac{2}{3}$ and then added one blue piece to show $\frac{1}{8}$. These three pieces did not fill the red circle so $\frac{2}{3} + \frac{1}{8}$ is less than 1 whole.

9. A. No; Possible response: Rosa's answer is not reasonable because $\frac{3}{11}$ is smaller than $\frac{2}{3}$. If you are adding $\frac{2}{3}$ and $\frac{1}{8}$, your answer can't be less than either of the two numbers you are adding.

B. No; When Rosa added the fractions, she added the numerators and then added the denominators. When you add fractions you don't add denominators. You have to find common denominators. Eleven is not a common denominator for thirds and eighths. A common denominator would be 24.

Homework (SG p. 88)
Questions 1–3

1. more than an hour; Possible response: $\frac{2}{3}$ is larger than $\frac{1}{2}$. It is close to 1 whole. Since it takes $\frac{2}{2}$ to equal 1, $\frac{1}{2} + \frac{2}{3}$ will be greater than 1.

2. Yes; I know that $\frac{1}{4} = \frac{2}{8}$ so $\frac{3}{4} = \frac{6}{8}$. $\frac{6}{8} + \frac{7}{8} = \frac{13}{8}$ or $1\frac{5}{8}$. Since $\frac{1}{2} = \frac{4}{8}$, Ana will have an extra $\frac{1}{8}$ yard of ribbon.

3. A. less than 1

B. greater than 1

C. greater than 1

D. less than 1

E. Answers will vary. Possible response for Question 3C: $\frac{3}{4} + \frac{1}{4} = 1$ whole; $\frac{2}{6} = \frac{1}{3}$. $\frac{1}{3}$ is greater than $\frac{1}{4}$, so $\frac{2}{6} + \frac{3}{4}$ is greater than 1.

Kathy's Hot Chocolate

✓ **Check-In: Questions 8-9**

Choose a strategy to solve each problem. Use fraction circle pieces or the *Fractions on Number Lines Chart* in the *Student Guide* Reference section.

8. Kathy wants to make hot chocolate. The recipe calls for $\frac{2}{3}$ cup milk and $\frac{1}{8}$ cup chocolate syrup. She wonders if the recipe will make more or less than one cup.

A. Will $\frac{2}{3}$ cup milk and $\frac{1}{8}$ cup chocolate syrup fit into a one-cup measuring cup? Explain your reasoning.

B. Use another strategy to show whether $\frac{2}{3} + \frac{1}{8}$ is more or less than 1.

9. Rosa thought about Kathy's recipe. "I think $\frac{2}{3} + \frac{1}{8} = \frac{3}{11}$," said Rosa. "That is less than half. So your recipe will make less than half a cup of hot chocolate."

A. Do you agree that Kathy's recipe will make less than $\frac{1}{2}$ cup? Why or why not?

B. Do you agree with Rosa's method of adding fractions? Why or why not?

Homework

Solve each problem. Use the *Fractions on Number Lines Chart* in the Reference section.

1. Frank practiced his violin for $\frac{1}{2}$ of an hour on Monday morning. He practiced for $\frac{2}{3}$ of an hour on Monday afternoon. Did Frank practice for less than an hour or for more than an hour on Monday? Show or tell your reasoning.

2. Ann needs $1\frac{1}{2}$ yards of ribbon to complete a project. Her mother gave her two pieces of ribbon to use. One piece was $\frac{3}{4}$ of a yard long and the other was $\frac{7}{8}$ of a yard long. Will Ana have enough ribbon for her project? Show or tell how you decided.

3. Estimate each of the following sums. Decide if the sum will be greater or less than 1.

A. $\frac{1}{2} + \frac{1}{3} =$ **B.** $\frac{5}{6} + \frac{1}{4} =$

C. $\frac{2}{6} + \frac{3}{4} =$ **D.** $\frac{2}{8} + \frac{3}{6} =$

E. Choose one problem in Question 3 and show or tell your reasoning.

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