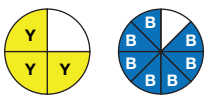
Student Guide

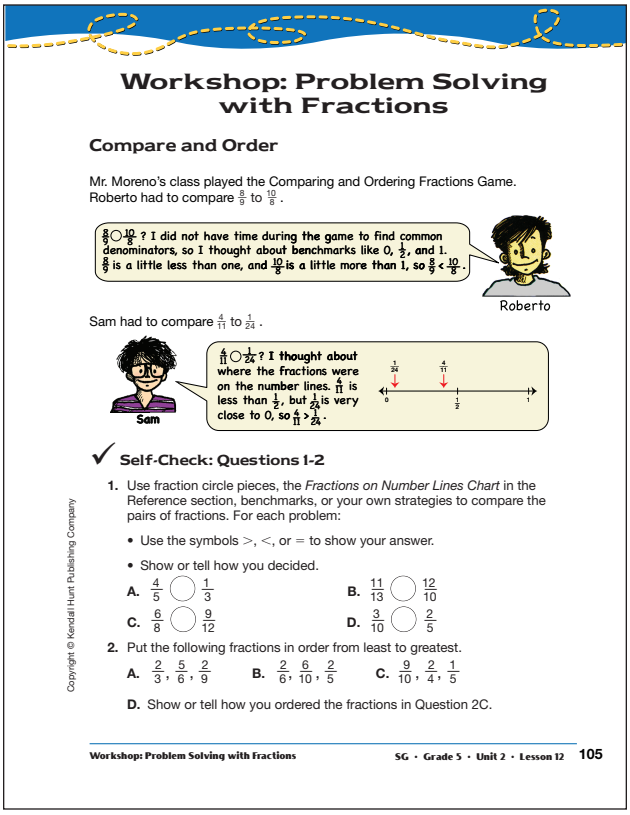
Workshop: Problem Solving with Fractions (SG pp. 105–118) Questions 1–47

1. **A.** $\frac{4}{5} > \frac{1}{3}$; Possible explanation: I know $\frac{4}{5}$ is almost 1, and $\frac{1}{3}$ is closer to 0.
   B. $\frac{11}{13} < \frac{12}{10}$; Possible explanation: $\frac{11}{13}$ is almost 1, but $\frac{12}{10}$ is $1\frac{2}{10}$.
   C. $\frac{6}{8} = \frac{9}{12}$; Possible explanation: I used circle pieces. 6 blue pieces cover the same part of the circle as 9 black pieces.
   D. $\frac{3}{10} < \frac{2}{5}$; Possible explanation: I renamed $\frac{2}{5}$ as tenths. $\frac{2}{5} = \frac{4}{10}$ and $\frac{3}{10} < \frac{4}{10}$.
2. **A.** $\frac{2}{9}, \frac{2}{3}, \frac{5}{6}$ **B.** $\frac{2}{6}, \frac{2}{5}, \frac{6}{10}$ **C.** $\frac{1}{5}, \frac{2}{4}, \frac{9}{10}$
   D. Responses will vary. Possible response: $\frac{1}{5}$ is closest to 0, and $\frac{2}{4}$ is the same as $\frac{1}{2}$. $\frac{9}{10}$ is closest to 1.
3. **A.** There are 8 equal parts.
   B. We are interested in 7 of the 8 parts.
   C. $\frac{7}{8}$ is closer to 1; Possible explanation: It is only $\frac{1}{8}$ away from 1.
   D. Possible response: $\frac{9}{10}$ is close to 1.
   E. $\frac{1}{12}$ is closer to 0; Possible explanation: If there are 12 equal pieces, $\frac{1}{12}$ is just a little bit of the whole.
   F. Possible response: $\frac{1}{25}$
   G. Possible response: $\frac{5}{12}$ is close to $\frac{1}{2}$. I looked on the *Fractions on Number Lines Chart*.
4. **A.** $\frac{5}{6} > \frac{2}{3}$ **B.** $\frac{3}{5} > \frac{2}{10}$
   C. $\frac{9}{12} = \frac{3}{4}$ **D.** $\frac{3}{8} < \frac{7}{12}$
   E. $\frac{4}{8} < \frac{4}{6}$ **F.** $\frac{5}{6} > \frac{7}{10}$
5. **A.** $\frac{4}{5} > \frac{1}{3}$

   B. $\frac{3}{4} < \frac{7}{8}$



   C. $\frac{1}{3} < \frac{5}{6}$; $\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$
   D. Possible response: $\frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$. $\frac{9}{10} > \frac{3}{5}$
   E. Possible response: I used circle pieces. $\frac{3}{12}$ is 3 blacks. $\frac{2}{8}$ is 2 blues. They cover the same amount of the red circle, so $\frac{3}{12} = \frac{2}{8}$.



Workshop: Problem Solving with Fractions

Compare and Order

Mr. Moreno's class played the Comparing and Ordering Fractions Game. Roberto had to compare $\frac{8}{9}$ to $\frac{10}{8}$.

Sam had to compare $\frac{4}{11}$ to $\frac{1}{24}$.

Self-Check: Questions 1-2

1. Use fraction circle pieces, the *Fractions on Number Lines Chart* in the Reference section, benchmarks, or your own strategies to compare the pairs of fractions. For each problem:
   - Use the symbols >, <, or = to show your answer.
   - Show or tell how you decided.

   A. $\frac{4}{5} \bigcirc \frac{1}{3}$ **B.** $\frac{11}{13} \bigcirc \frac{12}{10}$
   C. $\frac{6}{8} \bigcirc \frac{9}{12}$ **D.** $\frac{3}{10} \bigcirc \frac{2}{5}$
2. Put the following fractions in order from least to greatest.
   A. $\frac{2}{3}, \frac{5}{6}, \frac{2}{9}$ **B.** $\frac{2}{6}, \frac{6}{10}, \frac{2}{5}$ **C.** $\frac{9}{10}, \frac{2}{4}, \frac{1}{5}$
   D. Show or tell how you ordered the fractions in Question 2C.

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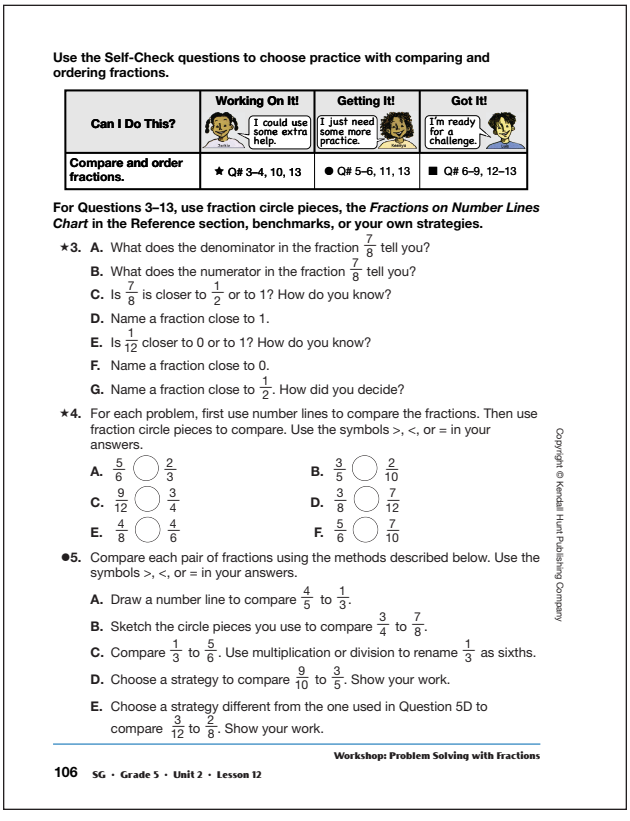

Use the Self-Check questions to choose practice with comparing and ordering fractions.

Can I Do This?	Working On It!	Getting It!	Got It!
	I could use some extra help.	I just need some more practice.	I'm ready for a challenge.
Compare and order fractions.	★ Q# 3–4, 10, 13	● Q# 5–6, 11, 13	■ Q# 6–9, 12–13

For Questions 3–13, use fraction circle pieces, the *Fractions on Number Lines Chart* in the Reference section, benchmarks, or your own strategies.

★3. **A.** What does the denominator in the fraction $\frac{7}{8}$ tell you?
B. What does the numerator in the fraction $\frac{7}{8}$ tell you?
C. Is $\frac{7}{8}$ is closer to $\frac{1}{2}$ or to 1? How do you know?
D. Name a fraction close to 1.
E. Is $\frac{1}{12}$ closer to 0 or to 1? How do you know?
F. Name a fraction close to 0.
G. Name a fraction close to $\frac{1}{2}$. How did you decide?

★4. For each problem, first use number lines to compare the fractions. Then use fraction circle pieces to compare. Use the symbols >, <, or = in your answers.
A. $\frac{5}{6} \bigcirc \frac{2}{3}$ **B.** $\frac{3}{5} \bigcirc \frac{2}{10}$
C. $\frac{9}{12} \bigcirc \frac{3}{4}$ **D.** $\frac{3}{8} \bigcirc \frac{7}{12}$
E. $\frac{4}{8} \bigcirc \frac{4}{6}$ **F.** $\frac{5}{6} \bigcirc \frac{7}{10}$

●5. Compare each pair of fractions using the methods described below. Use the symbols >, <, or = in your answers.
A. Draw a number line to compare $\frac{4}{5}$ to $\frac{1}{3}$.
B. Sketch the circle pieces you use to compare $\frac{3}{4}$ to $\frac{7}{8}$.
C. Compare $\frac{1}{3}$ to $\frac{5}{6}$. Use multiplication or division to rename $\frac{1}{3}$ as sixths.
D. Choose a strategy to compare $\frac{9}{10}$ to $\frac{3}{5}$. Show your work.
E. Choose a strategy different from the one used in Question 5D to compare $\frac{3}{12}$ to $\frac{2}{8}$. Show your work.

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●■6. Write the fractions in order from least to greatest.

A. $\frac{4}{9}, \frac{2}{3}, \frac{5}{6}$ B. $\frac{3}{8}, \frac{1}{3}, \frac{1}{4}$

C. $\frac{5}{6}, \frac{11}{12}, \frac{6}{9}$ D. $\frac{7}{8}, \frac{2}{3}, \frac{3}{4}$

E. $\frac{11}{16}, \frac{7}{12}, \frac{5}{8}$ F. $\frac{3}{5}, \frac{3}{2}, \frac{7}{10}$

■7. A. Choose two fractions with unlike denominators. Compare them by using the symbols >, <, or =.

B. Choose three fractions with unlike denominators. Order them from least to greatest. Show or tell how you decided.

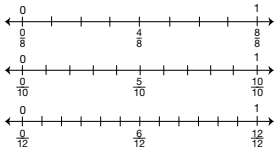
C. Find two fractions greater than 1 but less than 2. Compare them by using the symbols >, <, or =.

D. Find two fractions greater than $\frac{3}{5}$ but less than $\frac{3}{4}$. Compare them by using the symbols >, <, or = .

■8. Darius hiked $\frac{4}{10}$ of a mile and Richard hiked $\frac{7}{20}$ of a mile. Whose hike was longer? Show or tell how you know by sketching a number line.

■9. After their hikes, Darius drank $\frac{8}{5}$ liter of water and Richard drank $1\frac{8}{10}$ liter of water. Who drank more water? Show or tell how you know and include a number sentence.

★10. This is the fraction set: $\frac{6}{12}, \frac{1}{10}, \frac{7}{8}, \frac{7}{12}$. Use the number lines to answer the questions below.



A. Which fraction is closest to 0?

B. Which fraction is closest to 1 ?

C. Which fraction is equal to $\frac{1}{2}$?

D. Which fraction is close to $\frac{1}{2}$?

E. Put the fractions in order from least to greatest.

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●■11. This is the fraction set: $\frac{5}{12}, \frac{12}{24}, \frac{10}{11}, \frac{2}{3}$.

A. Which fraction is largest?

B. Which fraction is smallest?

C. Which fraction is equal to $\frac{1}{2}$?

D. Which fraction is close to $\frac{1}{2}$?

E. Put the fractions in order from least to greatest.

■12. This is the fraction set: $\frac{12}{20}, \frac{19}{36}, \frac{7}{10}, \frac{25}{100}, \frac{4}{5}$.

A. Which fraction is largest?

B. Which fraction is smallest?

C. Which fraction is equivalent to $\frac{3}{5}$?

D. Which fraction is closest to $\frac{1}{2}$?

E. Put the fractions in order from least to greatest.

★●■13. Name three fractions between:

A. 0 and $\frac{1}{2}$ B. $\frac{1}{2}$ and 1

C. $\frac{1}{4}$ and $\frac{3}{4}$ D. $\frac{1}{4}$ and $\frac{1}{2}$

E. $\frac{2}{3}$ and 1 F. 1 and 2

Estimate, Add, and Subtract

✓ **Self-Check: Question 14**

14. For each problem, use the *Fractions on Number Lines Chart* in the Reference section, fraction circle pieces, or another strategy to estimate whether the sum or difference is greater than or less than $\frac{1}{2}$. Then solve the problem.

A. $\frac{1}{4} + \frac{1}{8} =$

B. $\frac{2}{3} - \frac{2}{6} =$

C. $\frac{1}{5} + \frac{7}{10} =$

D. $\frac{3}{4} - \frac{2}{6} =$

E. Show or tell how you solved Question 14D.

F. Were your estimates close to your calculations?

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6. A. $\frac{4}{9}, \frac{2}{3}, \frac{5}{6}$ B. $\frac{1}{4}, \frac{1}{3}, \frac{3}{8}$

C. $\frac{6}{9}, \frac{5}{6}, \frac{11}{12}$ D. $\frac{2}{3}, \frac{3}{4}, \frac{7}{8}$

E. $\frac{7}{12}, \frac{5}{8}, \frac{11}{16}$ F. $\frac{3}{5}, \frac{7}{10}, \frac{3}{2}$

7. Responses will vary. Sample responses:

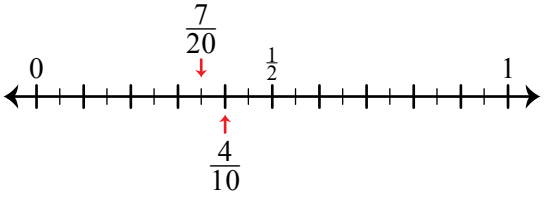
A. $\frac{2}{3} > \frac{1}{12}$

B. $\frac{1}{8}, \frac{1}{5}, \frac{1}{2}$

C. $\frac{3}{2} > \frac{9}{8}$

D. $\frac{13}{20} < \frac{14}{20}$

8. Darius's hike was longer.



9. Richard drank more water. Possible response: Richard drank $\frac{18}{10}$ liter. $\frac{18}{10} \div \frac{2}{2} = \frac{9}{5}$. Darius drank $\frac{8}{5}$ litter. $\frac{9}{5} > \frac{8}{5}$.

10. A. closest to 0: $\frac{1}{10}$

B. closest to 1: $\frac{7}{8}$

C. equal to $\frac{1}{2}$: $\frac{6}{12}$

D. close to $\frac{1}{2}$: $\frac{7}{12}$

E. $\frac{1}{10}, \frac{6}{12}, \frac{7}{12}, \frac{7}{8}$

11. A. $\frac{10}{11}$

B. $\frac{5}{12}$

C. $\frac{12}{24}$

D. $\frac{5}{12}$

E. $\frac{5}{12}, \frac{12}{24}, \frac{2}{3}, \frac{10}{11}$

12. A. $\frac{4}{5}$

B. $\frac{25}{100}$

C. $\frac{12}{20}$

D. $\frac{19}{36}$

E. $\frac{25}{100}, \frac{19}{36}, \frac{12}{20}, \frac{7}{10}, \frac{4}{5}$

13. Answers will vary. Sample responses:

A. $\frac{1}{4}, \frac{1}{5}, \frac{1}{6}$ B. $\frac{2}{3}, \frac{4}{5}, \frac{5}{6}$

C. $\frac{2}{4}, \frac{1}{2}, \frac{4}{6}$ D. $\frac{3}{8}, \frac{5}{12}, \frac{1}{3}$

E. $\frac{5}{6}, \frac{3}{4}, \frac{7}{8}$ F. $1\frac{1}{4}, 1\frac{1}{2}, 1\frac{3}{4}$

14. A. less than $\frac{1}{2}$; $\frac{3}{8}$

B. less than $\frac{1}{2}$; $\frac{2}{6}$

C. greater than $\frac{1}{2}$; $\frac{9}{10}$

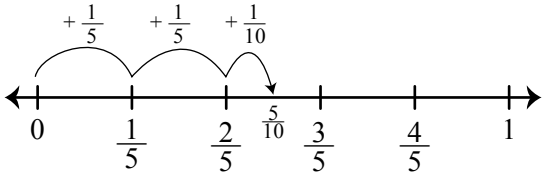
D. less than $\frac{1}{2}$; $\frac{5}{12}$

E. Possible response: $\frac{3}{4} = \frac{9}{12}$ and $\frac{2}{6} = \frac{4}{12}$, so $\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$

F. Answers will vary.

15. Nicholas is not correct. Possible explanation: $\frac{3}{4}$ is close to 1 and $\frac{7}{8}$ is close to 1, so a better estimate is a sum close to 2. His sum, $\frac{10}{12}$, is less than 1.

16. A.



She put a mark at $\frac{2}{5}$ and then added $\frac{1}{10}$ which is half of $\frac{1}{5}$, so the mark is halfway between $\frac{2}{5}$ and $\frac{3}{5}$.

B. 2 green pieces and 1 purple piece is half of a red circle.

C. Yes, her estimate was reasonable.

17. A. close to 1 **B.** close to $\frac{1}{2}$

C. close to 0 or $\frac{1}{2}$ **D.** close to 0

E. close to $\frac{1}{2}$ **F.** close to 1

G. Students will choose different problems to solve, and their evaluations of their estimates will vary. The sums and differences for Questions 17A–F are A. $\frac{9}{8}$; B. $\frac{5}{12}$; C. $\frac{1}{4}$; D. $\frac{1}{8}$; E. $\frac{4}{10}$; F. $\frac{9}{10}$

18. A. close to 1 **B.** close to $\frac{1}{2}$

C. close to 0 or $\frac{1}{2}$ **D.** more than 2

E. more than 2 **F.** close to 2

G. close to $\frac{1}{2}$ **H.** close to 1

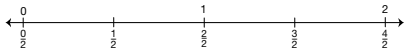
I. Students will choose different problems to solve, and their evaluations of their estimates will vary. The sums and differences for Questions 18A–H are A. $\frac{9}{8}$; B. $\frac{5}{12}$; C. $\frac{1}{4}$; D. $\frac{22}{10} = 2\frac{2}{10}$; E. $\frac{29}{12} = 2\frac{5}{12}$; F. $1\frac{5}{6}$; G. $\frac{1}{2}$; H. $\frac{15}{16}$

Use the Self-Check questions and the menu to choose practice with estimating, adding, and subtracting fractions.

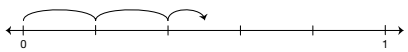
Can I Do This?	Working On It! (I could use some extra help.)	Getting It! (I just need some more practice.)	Got It! (I'm ready for a challenge.)
Estimate sums and differences in fraction problems.	★ Q# 15, 17	● Q# 16–17	■ Q# 18
Solve problems involving the addition and subtraction of fractions with like and unlike denominators.	★ Q# 19, 22–27, 29, 34–35, 37–38, 41–42	● Q# 20, 23–27, 29, 34–35, 37–39, 41–43	■ Q# 21, 28–33, 35–36, 40, 43–47

Solve the following problems. Use tools such as number lines, two sets of fraction circle pieces, pictures, and your own strategies. Show all your work.

★**15.** Nicholas says, "$\frac{3}{4} + \frac{7}{8} = \frac{10}{12}$." Use the number line below to estimate the sum. Decide if you think Nicholas's answer is correct. Show or tell why you think so.



●**16.** Mara used the number line below to estimate the sum of $\frac{2}{5} + \frac{1}{10}$. She forgot to label her hops and the number line.



A. Sketch and label the number line to show how Mara estimated $\frac{2}{5} + \frac{1}{10}$.

B. Show how to solve $\frac{2}{5} + \frac{1}{10}$ using circle pieces.

C. Was her estimate reasonable?

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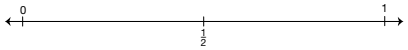
★●**17.** Estimate the sum or difference for each problem below. Choose the closest benchmark.



Close to 0	Close to $\frac{1}{2}$	Close to 1
A. $\frac{1}{4} + \frac{7}{8} =$	**B.** $\frac{2}{12} + \frac{1}{4} =$	
C. $\frac{3}{3} - \frac{3}{4} =$	**D.** $\frac{1}{2} - \frac{3}{8} =$	
E. $\frac{6}{10} - \frac{1}{5} =$	**F.** $\frac{1}{5} + \frac{7}{10} =$	

G. Choose 3 problems from Questions 17A–F and find exact answers. Show all of your work. For each problem, tell if your estimate is close to your calculation.

■**18.** Estimate the sum or difference for each problem below. Choose the closest benchmark.

Close to 0	Close to $\frac{1}{2}$	Close to 1	Close to 2	More than 2

A. $\frac{1}{4} + \frac{7}{8} =$ **B.** $\frac{2}{12} + \frac{1}{4} =$

C. $\frac{3}{3} - \frac{3}{4} =$ **D.** $\frac{9}{10} + \frac{4}{5} + \frac{1}{2} =$

E. $\frac{2}{3} + \frac{5}{6} + \frac{11}{12} =$ **F.** $\frac{5}{2} - \frac{4}{6} =$

G. $\frac{8}{4} - 1\frac{1}{2} =$ **H.** $1 - \frac{1}{16} =$

I. Choose 3 problems from Questions 18A–H and find exact answers. For each problem, use a different strategy or tool, show your work, and tell if your estimate is close to your calculation.

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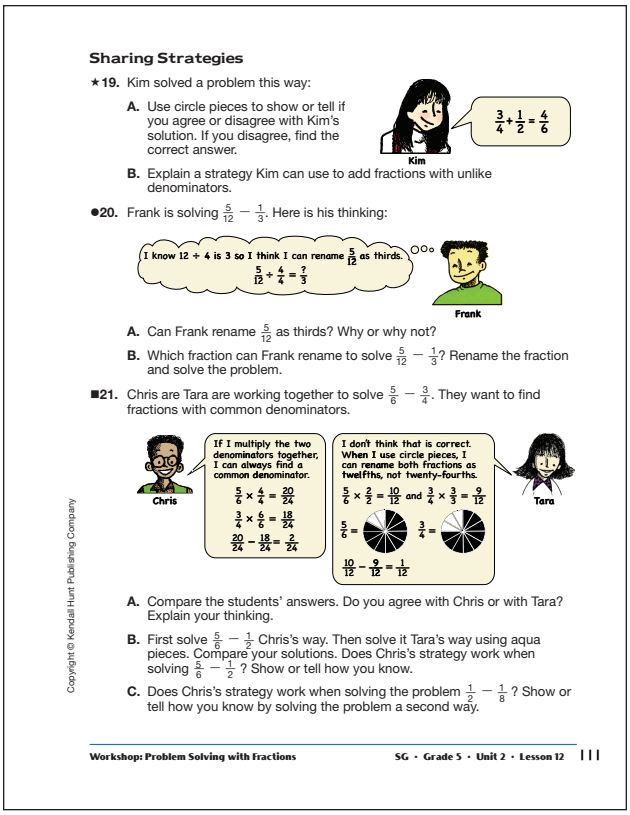

Sharing Strategies

★19. Kim solved a problem this way:

A. Use circle pieces to show or tell if you agree or disagree with Kim's solution. If you disagree, find the correct answer.

B. Explain a strategy Kim can use to add fractions with unlike denominators.

●20. Frank is solving $\frac{5}{12} - \frac{1}{3}$. Here is his thinking:

A. Can Frank rename $\frac{5}{12}$ as thirds? Why or why not?

B. Which fraction can Frank rename to solve $\frac{5}{12} - \frac{1}{3}$? Rename the fraction and solve the problem.

■21. Chris are Tara are working together to solve $\frac{5}{6} - \frac{3}{4}$. They want to find fractions with common denominators.

A. Compare the students' answers. Do you agree with Chris or with Tara? Explain your thinking.

B. First solve $\frac{5}{6} - \frac{1}{2}$ Chris's way. Then solve it Tara's way using aqua pieces. Compare your solutions. Does Chris's strategy work when solving $\frac{5}{6} - \frac{1}{2}$? Show or tell how you know.

C. Does Chris's strategy work when solving the problem $\frac{1}{2} - \frac{1}{8}$? Show or tell how you know by solving the problem a second way.

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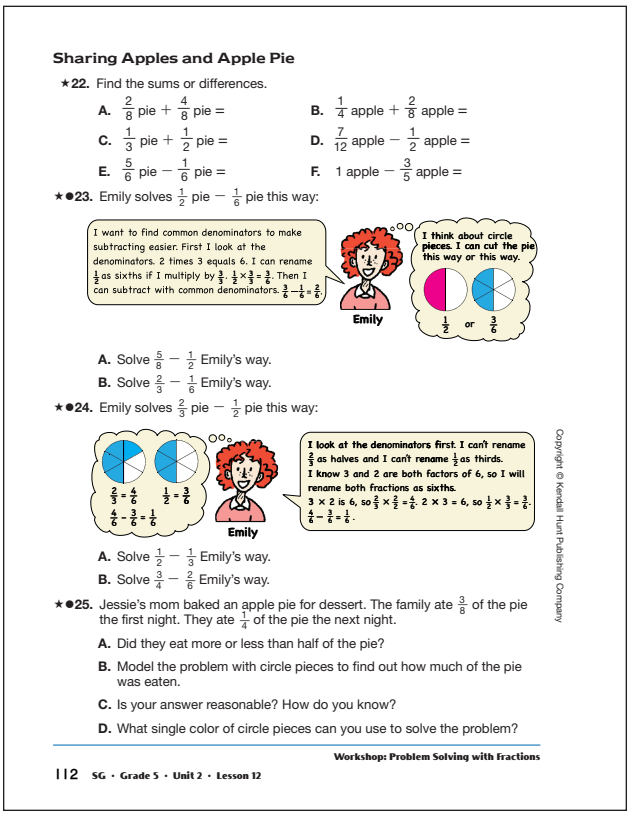

Sharing Apples and Apple Pie

★22. Find the sums or differences.

A. $\frac{2}{8}$ pie + $\frac{4}{8}$ pie =

B. $\frac{1}{4}$ apple + $\frac{2}{8}$ apple =

C. $\frac{1}{3}$ pie + $\frac{1}{2}$ pie =

D. $\frac{7}{12}$ apple − $\frac{1}{2}$ apple =

E. $\frac{5}{6}$ pie − $\frac{1}{6}$ pie =

F. 1 apple − $\frac{3}{5}$ apple =

★●23. Emily solves $\frac{1}{2}$ pie − $\frac{1}{6}$ pie this way:

A. Solve $\frac{5}{8} - \frac{1}{2}$ Emily's way.

B. Solve $\frac{2}{3} - \frac{1}{6}$ Emily's way.

★●24. Emily solves $\frac{2}{3}$ pie − $\frac{1}{2}$ pie this way:

A. Solve $\frac{1}{2} - \frac{1}{3}$ Emily's way.

B. Solve $\frac{3}{4} - \frac{2}{6}$ Emily's way.

★●25. Jessie's mom baked an apple pie for dessert. The family ate $\frac{3}{8}$ of the pie the first night. They ate $\frac{1}{4}$ of the pie the next night.

A. Did they eat more or less than half of the pie?

B. Model the problem with circle pieces to find out how much of the pie was eaten.

C. Is your answer reasonable? How do you know?

D. What single color of circle pieces can you use to solve the problem?

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19. **A.** Kim is incorrect; $\frac{3}{4} + \frac{1}{2} = \frac{5}{4}$

B. Possible response: Kim is adding unlike denominators. She needs to find circle pieces that are all the same color like yellows or multiply to find an equivalent fraction with a common denominator like $\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$.

20. **A.** Frank cannot rename $\frac{5}{12}$ as thirds. 12 divided by 4 is 3, but 5 divided by 4 is not a whole number.

B. Possible response: Frank could rename $\frac{1}{3}$ as $\frac{4}{12}$. $\frac{5}{12} - \frac{4}{12} = \frac{1}{12}$

21. **A.** Both Chris and Tara are correct. $\frac{2}{24}$ is the same as $\frac{1}{12}$.

B. Chris's way: $\frac{5}{6}$ is the same as $\frac{10}{12}$ and $\frac{1}{2}$ is the same as $\frac{6}{12}$, so $\frac{10}{12} - \frac{6}{12} = \frac{4}{12}$.

Tara's way using circle pieces: 5 aquas minus 3 aquas is 2 aquas or $\frac{2}{6}$ of the circle. The solutions are equivalent, $\frac{2}{6} = \frac{4}{12}$. Yes, Chris's strategy works.

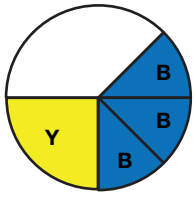
C. Yes, Chris's strategy works. $\frac{1}{2} - \frac{1}{8}$ is the same as $\frac{8}{16} - \frac{2}{16} = \frac{6}{16}$. $\frac{6}{16} \div \frac{2}{2} = \frac{3}{8}$. Using circle pieces, 4 blue pieces ($\frac{1}{2}$) minus 1 blue piece ($\frac{1}{8}$) is 3 blue pieces ($\frac{3}{8}$).

22. **A.** $\frac{6}{8}$ pie **B.** $\frac{4}{8}$ apple
C. $\frac{5}{6}$ pie **D.** $\frac{1}{12}$ apple
E. $\frac{4}{6}$ pie **F.** $\frac{2}{5}$ apple

23. **A.** $\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$; $\frac{5}{8} - \frac{4}{8} = \frac{1}{8}$
B. $\frac{2}{3} \times \frac{2}{2} = \frac{4}{6}$; $\frac{4}{6} - \frac{1}{6} = \frac{3}{6}$

24. **A.** $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$ and $\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$; $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$
B. $\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$ and $\frac{2}{6} \times \frac{2}{2} = \frac{4}{12}$; $\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$

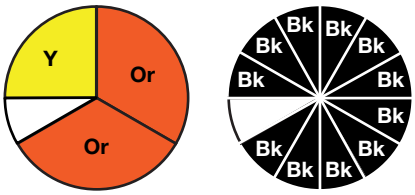
25. **A.** more than $\frac{1}{2}$
B. $\frac{5}{8}$ of the pie



C. Possible response: Yes, because I estimated more than $\frac{1}{2}$.

D. blue

26. A. $\frac{11}{12}$;

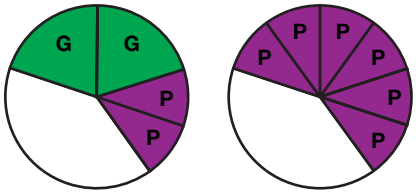


B. black

C. $\frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$ and $\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$; $\frac{3}{12} + \frac{8}{12} = \frac{11}{12}$

27. A. about half of the apple

B. $\frac{6}{10}$;

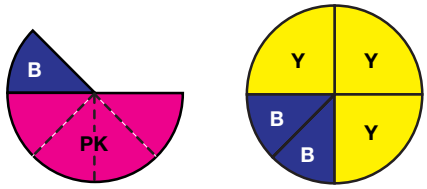


C. $\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$; $\frac{4}{10} + \frac{2}{10} = \frac{6}{10}$

D. Possible response: Yes, because I got the same answer in both solutions.

E. $\frac{10}{10} - \frac{6}{10} = \frac{4}{10}$

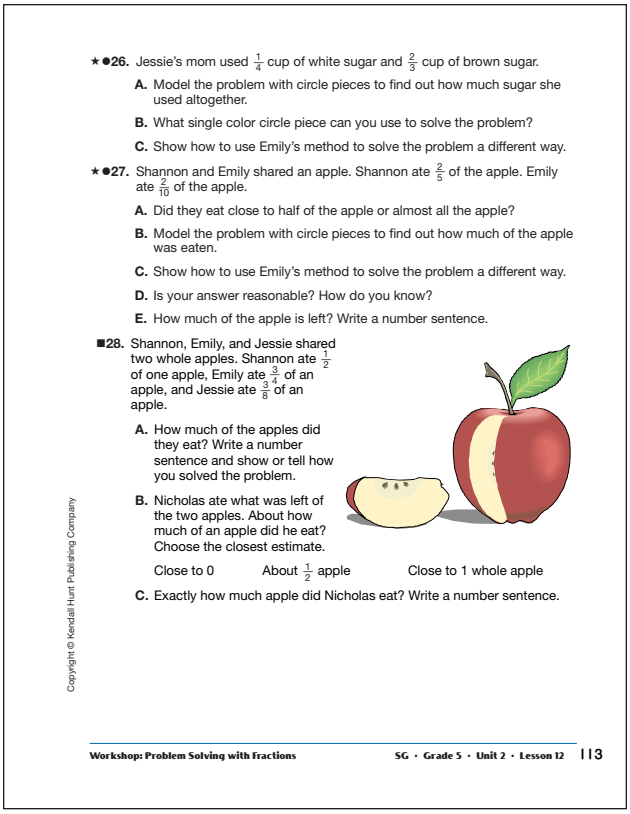
28. A. $1\frac{5}{8}$ apples. $\frac{1}{2} + \frac{3}{4} + \frac{3}{8} = 1\frac{5}{8}$. Possible strategy: When I added the pieces I got:



That is 1 whole apple and $\frac{5}{8}$ of another apple. I covered the pink with 4 blue pieces and counted.

B. About $\frac{1}{2}$ apple

C. $2 - 1\frac{5}{8} = \frac{3}{8}$ apple



★●**26.** Jessie's mom used $\frac{1}{4}$ cup of white sugar and $\frac{2}{3}$ cup of brown sugar.

A. Model the problem with circle pieces to find out how much sugar she used altogether.

B. What single color circle piece can you use to solve the problem?

C. Show how to use Emily's method to solve the problem a different way.

★●**27.** Shannon and Emily shared an apple. Shannon ate $\frac{2}{5}$ of the apple. Emily ate $\frac{2}{10}$ of the apple.

A. Did they eat close to half of the apple or almost all the apple?

B. Model the problem with circle pieces to find out how much of the apple was eaten.

C. Show how to use Emily's method to solve the problem a different way.

D. Is your answer reasonable? How do you know?

E. How much of the apple is left? Write a number sentence.

■**28.** Shannon, Emily, and Jessie shared two whole apples. Shannon ate $\frac{1}{2}$ of one apple, Emily ate $\frac{3}{4}$ of an apple, and Jessie ate $\frac{5}{8}$ of an apple.

A. How much of the apples did they eat? Write a number sentence and show or tell how you solved the problem.

B. Nicholas ate what was left of the two apples. About how much of an apple did he eat? Choose the closest estimate.

Close to 0 About $\frac{1}{2}$ apple Close to 1 whole apple

C. Exactly how much apple did Nicholas eat? Write a number sentence.

Workshop: Problem Solving with Fractions SG • Grade 5 • Unit 2 • Lesson 12 113

***Student Guide* - Page 113**

Snack Mix

★●■29. Professor Peabody wants to make a snack mix. He has three bowls and three recipes. Which recipe should he mix in which bowl? How did you decide?

Trail Mix
- 1/4 cup peanuts
- 1/8 cup pretzels
- 1/6 cup raisins
- 1/6 cup cereal Os
- 1/5 cup chocolate candy

Monkey Mix
- 1/2 cup banana chips
- 1/4 cup nuts
- 3/4 cup dried apples
- 1/2 cup coconut

Cereal Mix
- 3/8 cup rice cereal squares
- 1/4 cup corn cereal squares
- 2/3 cup pretzels
- 1/8 cup dried apricots

■30. Professor Peabody had 1/2 cup of pretzels he wanted to use to make a snack mix. Which snack mix can he make? Explain your reasoning.

■31. Professor Peabody brought one batch of Monkey Mix to a party. One-half cup mix was eaten. How many cups are left?

■32. Professor Peabody decided to make three batches of Monkey Mix. How much of each ingredient will he need?

■33. Invent a new recipe for snack mix using the measurements and ingredients given in the three recipes above.

A. What is the name of your new snack mix?

B. Write a number sentence to show how much your recipe makes.

***Student Guide* - Page 114**

The Deli

★●34. Blanca and Lin bought one sandwich at the deli. Blanca ate 2/4 of the sandwich and Lin ate 3/8 of it.

A. Did the girls eat close to a half or close to the whole sandwich?

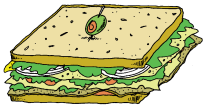
B. Model the problem with circle pieces to find out how much of the whole sandwich the two girls ate. Write a number sentence.

C. Is your answer reasonable? How do you know?

D. What single color circle piece can you use to solve the problem?

E. How much of the sandwich was left? Show how you know.

★●■35. Blanca and Lin's deli sandwich was made with the following ingredients:



- 1/4 pound of turkey
- 1/4 pound of cheese
- 1/6 pound of mustard and onions
- 1/6 pound of bread

A. Estimate the weight of the sandwich. Choose one.

About 1/2 pound Less than 1 pound More than 1 pound

B. How much does the deli sandwich weigh?

■36. Lin and Blanca also bought a 1 pound container of potato salad. Blanca ate 1/4 pound of the salad and Lin ate 1/6 pound.

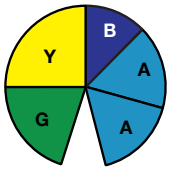
A. How much of the salad did the girls eat?

B. How much potato salad is left?

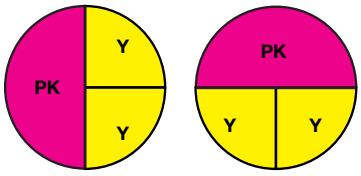
C. Could the girls have bought a 1/2 pound container rather than the pound container of potato salad? Explain your thinking.

***Student Guide* - Page 115**

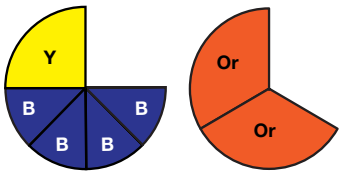
29. 1 cup: Trail Mix; $1\frac{1}{2}$ cups: Cereal Mix;
2 cups: Monkey Mix.
Possible strategy: I used fraction circle pieces to show each recipe and compared them to the bowl size.



Trail Mix: About 1 cup



Monkey Mix: About 2 cups



Cereal Mix: About $1\frac{1}{2}$ cups

30. He can make up to 4 batches of Trail Mix assuming he has the other ingredents. There are no pretzels in Monkey Mix and he does not have enough pretzels to make Cereal Mix.

31. $1\frac{1}{2}$ cups left; 2 cups $- \frac{1}{2}$ cup $= 1\frac{1}{2}$ cups

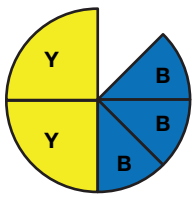
32. Banana Chips $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 1\frac{1}{2}$ cups
Nuts $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$ cup
Dried apples $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} = 2\frac{1}{4}$ cups
Coconut $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 1\frac{1}{2}$ cups

33. A. Answers will vary.

B. Answers will vary.

34. A. Close to the whole sandwich

B. $\frac{2}{4} + \frac{3}{8} = \frac{7}{8}$



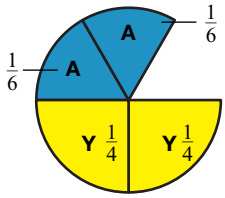
C. Possible response: Yes, because $\frac{7}{8}$ is close to a whole sandwich.

D. blue

E. $\frac{1}{8}$ of the sandwich was left. Possible response: $\frac{8}{8} - \frac{7}{8} = \frac{1}{8}$

35. A. Less than 1 pound.

B. $\frac{5}{6}$ of a pound.



$\frac{1}{6}$ less than a whole pound.

36. A. $\frac{5}{12}$ of a pound; $\frac{1}{4}+\frac{1}{6}$; I traded the yellow for 3 blacks and the aqua for 2 blacks. 5 blacks is equal to $\frac{5}{12}$.

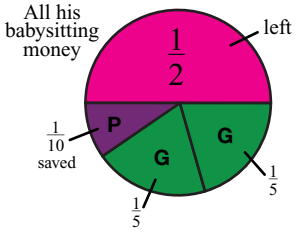
B. $\frac{7}{12}$ of a pound is left; $\frac{12}{12}-\frac{5}{12}=\frac{7}{12}$

C. Yes, $\frac{1}{2}$ pound would have been enough. The girls ate $\frac{5}{12}$. Half a pound would be $\frac{6}{12}$.

37. A. $\frac{9}{10}$ of his earnings.

B. Close to half his earnings left.

C. $\frac{1}{2}$ of his earnings are left to spend.



38. A. All of her allowance; $\frac{1}{3}+\frac{2}{3}=1$ whole

B. She did not save anything because she had nothing left.

39. A. More than $\frac{1}{2}$ of her salary.

B. $\frac{2}{3}$ of her salary is spent.

40. A. Anna spent $\frac{5}{10}$ of her money. $\frac{1}{5}=\frac{2}{10}$, so $\frac{2}{10}+\frac{3}{10}=\frac{5}{10}$. Grace spent $\frac{3}{4}$ or $\frac{6}{8}$ of her money; I put 1 pink ($\frac{1}{2}$) and 2 blue ($\frac{2}{8}$) together and I recognize that as $\frac{3}{4}$ or 3 yellow.

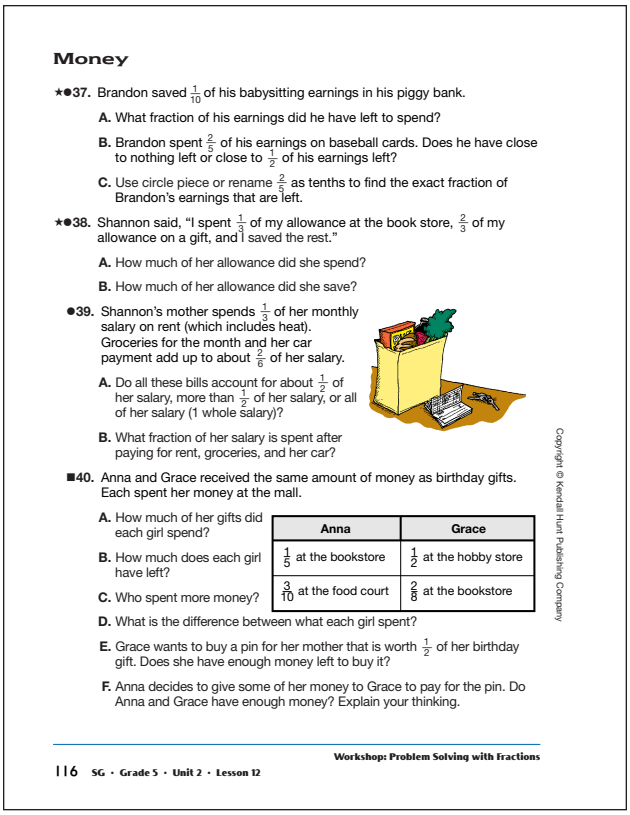
B. Anna has $\frac{1}{2}$ of her money left and Grace has $\frac{1}{4}$ of her money left.

C. Grace; $\frac{3}{4}$ is more than $\frac{1}{2}$.

D. $\frac{1}{4}$; $\frac{3}{4}-\frac{1}{2}=\frac{1}{4}$.

E. No; she has only $\frac{1}{4}$ of her money left.

F. Yes. Anna can give Grace the $\frac{1}{4}$ she needs to buy a gift worth $\frac{1}{2}$ their birthday money.



Money

★●**37.** Brandon saved $\frac{1}{10}$ of his babysitting earnings in his piggy bank.

A. What fraction of his earnings did he have left to spend?

B. Brandon spent $\frac{2}{5}$ of his earnings on baseball cards. Does he have close to nothing left or close to $\frac{1}{2}$ of his earnings left?

C. Use circle piece or rename $\frac{2}{5}$ as tenths to find the exact fraction of Brandon's earnings that are left.

★●**38.** Shannon said, "I spent $\frac{1}{3}$ of my allowance at the book store, $\frac{2}{3}$ of my allowance on a gift, and I saved the rest."

A. How much of her allowance did she spend?

B. How much of her allowance did she save?

●**39.** Shannon's mother spends $\frac{1}{3}$ of her monthly salary on rent (which includes heat). Groceries for the month and her car payment add up to about $\frac{2}{6}$ of her salary.

A. Do all these bills account for about $\frac{1}{2}$ of her salary, more than $\frac{1}{2}$ of her salary, or all of her salary (1 whole salary)?

B. What fraction of her salary is spent after paying for rent, groceries, and her car?

■**40.** Anna and Grace received the same amount of money as birthday gifts. Each spent her money at the mall.

A. How much of her gifts did each girl spend?

B. How much does each girl have left?

C. Who spent more money?

Anna	Grace
$\frac{1}{5}$ at the bookstore	$\frac{1}{2}$ at the hobby store
$\frac{3}{10}$ at the food court	$\frac{2}{8}$ at the bookstore

D. What is the difference between what each girl spent?

E. Grace wants to buy a pin for her mother that is worth $\frac{1}{2}$ of her birthday gift. Does she have enough money left to buy it?

F. Anna decides to give some of her money to Grace to pay for the pin. Do Anna and Grace have enough money? Explain your thinking.

Workshop: Problem Solving with Fractions

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***Student Guide* - Page 116**

Walk and Run

★●41. Roberto's older sister jogs every morning. This morning, after running $\frac{7}{10}$ of a kilometer, she met a friend. She stopped to chat. Then she jogged $\frac{1}{5}$ kilometer more.

A. Did Roberto's sister jog more or less than 1 kilometer?

B. How far did she jog?

★●42. After school, Maria walked $\frac{1}{2}$ mile to the park. She then walked another block, or $\frac{1}{8}$ of a mile farther, to the store.

A. How far did Maria walk?

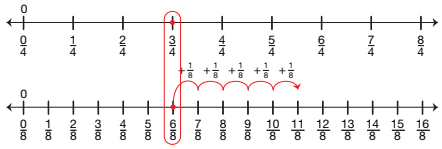
B. Maria tries to walk at least 1 mile each day. How much more does Maria need to walk to meet her goal?

●■43. Shannon ran $\frac{5}{8}$ of a mile. Then she walked $\frac{3}{4}$ mile.

A. Did she go more or less than 1 mile? How do you know?

B. How many miles did Shannon run and walk together?

■44. Jerome used number lines to solve $\frac{3}{4} + \frac{5}{8}$.

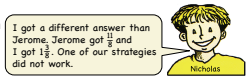


A. Where did Jerome start? Why?

B. Where did Jerome stop on the number line?

C. Compare Jerome's answer to your answer to Question 43B. Are they the same?

D. Nicholas compares his answer to Jerome's. Do you agree with Nicholas? Why or why not?



***Student Guide* - Page 117**

Planning a Garden

■45. Shannon is planning a garden. She is planning a flower section and a vegetable section. Look at the list of the things she would like to plant.

Shannon's Garden Plan

Flower Plants	Vegetable Plants
$\frac{1}{4}$ petunias	$\frac{1}{5}$ peppers
$\frac{1}{10}$ roses	$\frac{1}{10}$ lettuce
	$\frac{1}{4}$ tomatoes

A. Shannon wants at least $\frac{1}{2}$ her garden to be vegetable plants. Does her garden plan have at least $\frac{1}{2}$ vegetable plants?

B. How much of Shannon's garden will be flower plants?

C. How much of Shannon's garden will be vegetable plants?

■46. Shannon would like to plant some lilies.

A. Does Shannon still have space in her garden for the lily plants?

B. How much of her garden is not planned?

■47. Plan your own garden. Your garden should have flower and vegetable plants. Choose plants that fit into each category.

A. How much of your garden is flower plants?

B. How much of your garden is vegetable plants?

C. How much of your garden is not planned?

Use the *Sharing Paper* pages in the *Student Activity Book* to practice solving more problems with fractions.

***Student Guide* - Page 118**

41. A. Less than a kilometer. 1 green and 7 purple are less than one.

B. $\frac{9}{10}$ kilometer; $\frac{7}{10} + \frac{1}{5} = \frac{7}{10} + \frac{2}{10} = \frac{9}{10}$

42. A. $\frac{5}{8}$ mile; $\frac{1}{2}$ is the same as $\frac{4}{8}$, so $\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$

B. $\frac{3}{8}$ mile; $\frac{8}{8} - \frac{5}{8} = \frac{3}{8}$.

43. A. More than a mile; $\frac{3}{4}$ is close to 1 whole and $\frac{5}{8}$ is more than $\frac{1}{2}$, so $\frac{3}{4} + \frac{5}{8}$ is more than 1 mile.

B. $\frac{11}{8}$ mile; I traded $\frac{3}{4}$ for $\frac{6}{8}$. $\frac{6}{8} + \frac{5}{8} = \frac{11}{8}$

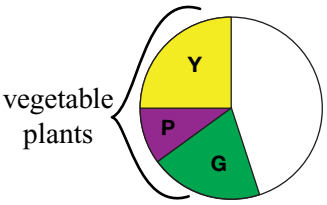
44. A. $\frac{6}{8}$; $\frac{3}{4}$ is the same as $\frac{6}{8}$.

B. $\frac{11}{8}$

C. Responses will vary.

D. I do not agree with Nicholas. $\frac{11}{8}$ and $1\frac{3}{8}$ are the same.

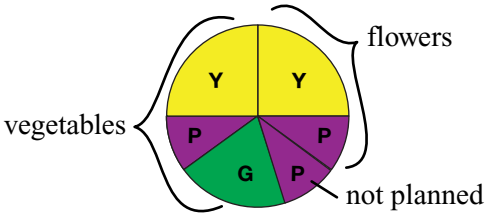
45. A. Yes, one yellow, one green, and one purple are more the $\frac{1}{2}$ of a whole circle.



B. $\frac{7}{20}$; $\frac{1}{4} + \frac{1}{10} = \frac{7}{20}$. Possible strategy: Two greens $\frac{2}{5}$ cover the yellow ($\frac{1}{4}$) and the purple ($\frac{1}{10}$) but by a little piece too much. That little piece is $\frac{1}{20}$. There are $\frac{4}{20}$ in each $\frac{1}{5}$, so $\frac{4}{20} + \frac{4}{20} - \frac{1}{20} = \frac{7}{20}$.

C. $\frac{11}{20}$. Possible strategy: A pink covers most of the pieces. There is a little piece left, smaller than the smallest fraction circle pieces. Two of these little pieces fit in $\frac{1}{10}$ so it must be $\frac{1}{20}$. There are $\frac{10}{20}$ in a pink.
$\frac{1}{20} + \frac{10}{20} = \frac{11}{20}$

46. A. Yes



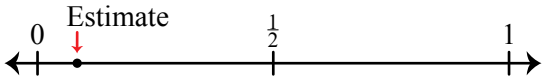
B. $\frac{1}{10}$ is not planned.

47. A–C. Responses will vary.

Student Activity Book

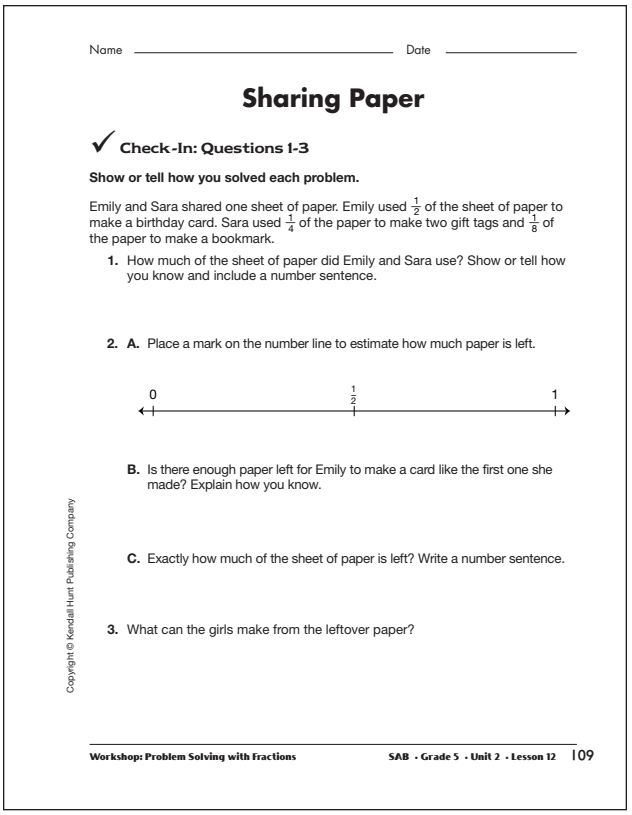
Sharing Paper (SAB pp. 109–110)
Questions 1–3

1. The girls used $\frac{7}{8}$ of the sheet of paper; $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}=\frac{7}{8}$ or $\frac{4}{8}+\frac{2}{8}+\frac{1}{8}=\frac{7}{8}$
2. **A.** Possible response:



   B. No; Possible response: When I look at the number line, there is less than $\frac{1}{2}$ left.

   C. $\frac{1}{8}$; $\frac{8}{8}-\frac{7}{8}=\frac{1}{8}$
3. The girls have $\frac{1}{8}$ of the sheet of paper left, so they could make 1 gift tag or a bookmark.



Name _____ Date _____

Sharing Paper

✓ **Check-In: Questions 1-3**

Show or tell how you solved each problem.

Emily and Sara shared one sheet of paper. Emily used $\frac{1}{2}$ of the sheet of paper to make a birthday card. Sara used $\frac{1}{4}$ of the paper to make two gift tags and $\frac{1}{8}$ of the paper to make a bookmark.

1. How much of the sheet of paper did Emily and Sara use? Show or tell how you know and include a number sentence.

2. **A.** Place a mark on the number line to estimate how much paper is left.

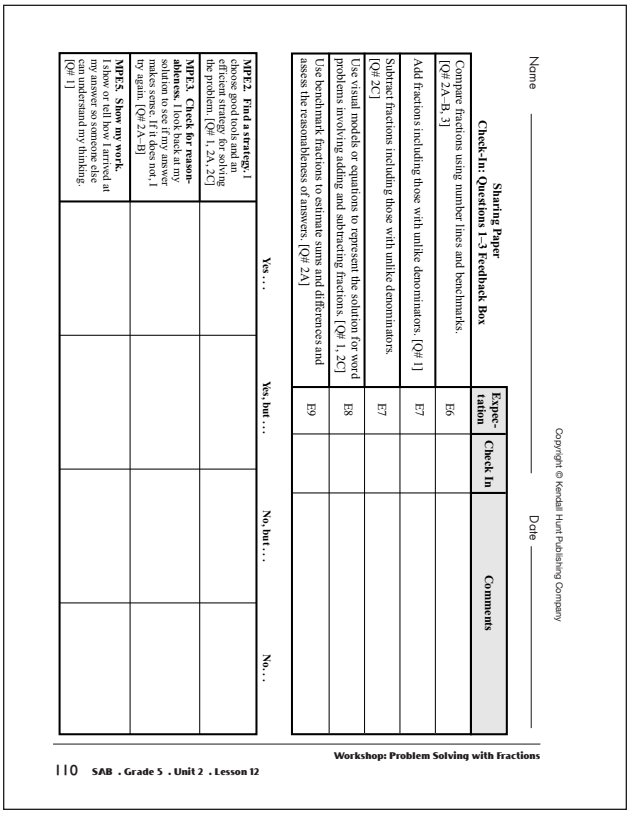
0 1/2 1

   B. Is there enough paper left for Emily to make a card like the first one she made? Explain how you know.

   C. Exactly how much of the sheet of paper is left? Write a number sentence.

3. What can the girls make from the leftover paper?

***Student Activity Book* - Page 109**



Name _____ Date _____

Sharing Paper
Check-In: Questions 1–3 Feedback Box

	Expectation	Check In	Comments
Compare fractions using number lines and benchmarks. [Q# 2A–B, 3]	E6		
Add fractions including those with unlike denominators. [Q# 1]	E7		
Subtract fractions including those with unlike denominators. [Q# 2C]	E7		
Use visual models or equations to represent the solution for word problems involving adding and subtracting fractions. [Q# 1, 2C]	E8		
Use benchmark fractions to estimate sums and differences and assess the reasonableness of answers. [Q# 2A]	E9		

	Yes . . .	Yes, but . . .	No, but . . .	No . . .
MPE2. Find a strategy. I choose good tools and an efficient strategy for solving the problem. [Q# 1, 2A, 2C]				
MPE3. Check for reasonableness. I look back at my solution to see if my answer makes sense. If it does not, I try again. [Q# 2A–B]				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 1]				

***Student Activity Book* - Page 110**