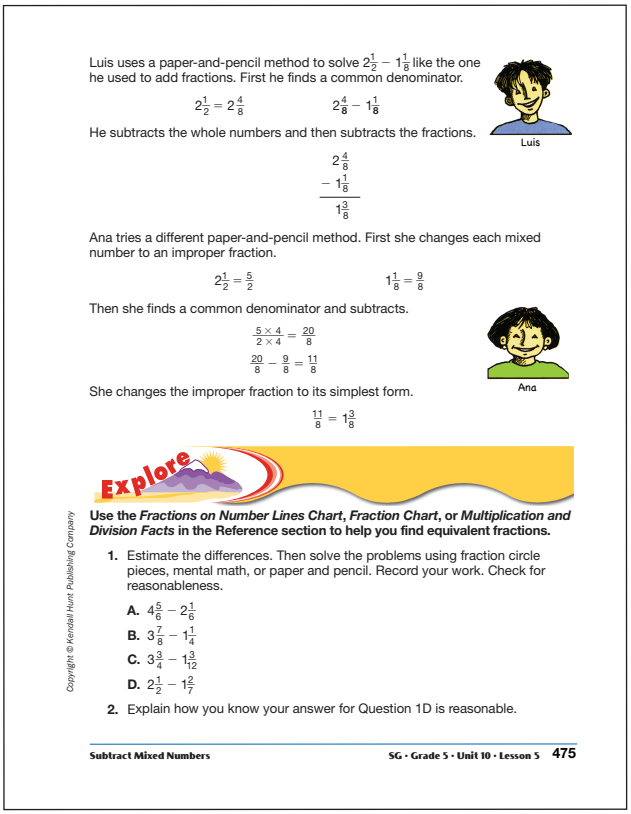
Student Guide

Subtract Mixed Numbers (SG pp. 475–476)
Questions 1–11

1. Estimates and strategies will vary. Possible solution strategies provided.
   - **A.** $4\frac{5}{6} - 2\frac{1}{6} = 2\frac{4}{6} = 2\frac{2}{3}$; I solved it with mental math. $4 - 2 = 2$ and $\frac{5}{6} - \frac{1}{6} = \frac{4}{6}$.
   - **B.** $3\frac{7}{8} - 1\frac{1}{4}$; I used a ruler like a number line. $3\frac{7}{8}$ inches – 1 inch = $2\frac{7}{8}$ inches. Then $2\frac{7}{8}$ inches $- \frac{1}{4}$ inch = $2\frac{5}{8}$ inches.
   - **C.** $3\frac{3}{4} - 1\frac{3}{12} = 2\frac{1}{2}$; I used fraction circle pieces. First I did the fractions. $\frac{3}{4}$ of the whole is like 9 black pieces. Take away 3 black pieces ($\frac{3}{12}$) and there are 6 black pieces ($\frac{6}{12}$) or $\frac{1}{2}$ left. Then I thought about the whole numbers. $3 - 1 = 2$. $2\frac{1}{2}$ is the answer.
   - **D.** $2\frac{1}{2} - 1\frac{2}{7} = 1\frac{3}{14}$; I used paper and pencil. I found a common denominator by multiplying 2×7. $2\frac{7}{14} - 1\frac{4}{14} = 1\frac{3}{14}$.
2. Explanations will vary. Possible response: I know my answer for Question 1D is reasonable because I estimated $2\frac{1}{2}$ minus a little more than 1 should be a little less than $1\frac{1}{2}$, like $1\frac{3}{14}$.
3. **A.** $3\frac{3}{4} - 1\frac{1}{2} = 2\frac{1}{4}$ liters
   B. $2\frac{1}{4} + 1\frac{1}{2} = 3\frac{3}{4}$
4. **A.** $4\frac{4}{6} - 3\frac{1}{3} = 1\frac{2}{6} = 1\frac{1}{3}$ more hours
   B. $1\frac{1}{3} + 3\frac{1}{3} = 4\frac{2}{3}$
5. **A.** $7\frac{2}{5} - 2\frac{1}{4} = 5\frac{3}{20}$ miles
   B. $5\frac{3}{20} + 2\frac{1}{4} = 5\frac{3}{20} + 2\frac{5}{20} = 7\frac{8}{20} = 7\frac{2}{5}$
6. $3\frac{2}{3} - 2\frac{1}{8} = 1\frac{13}{24}$ miles
7. $3\frac{7}{8} - 3\frac{5}{6} = \frac{1}{24}$ feet
8. $1\frac{1}{3}$
9. $3\frac{1}{9}$
10. $3\frac{7}{18}$
11. Explanations will vary. Possible explanation: I know my answer to Question 9 is reasonable because $6\frac{7}{9}$ is about 7 and $3\frac{2}{3}$ is about 4. $7 - 4 = 3$, and $3\frac{1}{9}$ is just a little bit bigger than 3.



Luis uses a paper-and-pencil method to solve $2\frac{1}{2} - 1\frac{1}{8}$ like the one he used to add fractions. First he finds a common denominator.

$2\frac{1}{2} = 2\frac{4}{8}$ $\quad$ $2\frac{4}{8} - 1\frac{1}{8}$

He subtracts the whole numbers and then subtracts the fractions.

$$\begin{array}{r} 2\frac{4}{8} \\ -\ 1\frac{1}{8} \\ \hline 1\frac{3}{8} \end{array}$$

Luis

Ana tries a different paper-and-pencil method. First she changes each mixed number to an improper fraction.

$2\frac{1}{2} = \frac{5}{2}$ $\quad$ $1\frac{1}{8} = \frac{9}{8}$

Then she finds a common denominator and subtracts.

$\frac{5 \times 4}{2 \times 4} = \frac{20}{8}$

$\frac{20}{8} - \frac{9}{8} = \frac{11}{8}$

Ana

She changes the improper fraction to its simplest form.

$\frac{11}{8} = 1\frac{3}{8}$

Explore

Use the *Fractions on Number Lines Chart*, *Fraction Chart*, or *Multiplication and Division Facts* in the Reference section to help you find equivalent fractions.

1. Estimate the differences. Then solve the problems using fraction circle pieces, mental math, or paper and pencil. Record your work. Check for reasonableness.
   - **A.** $4\frac{5}{6} - 2\frac{1}{6}$
   - **B.** $3\frac{7}{8} - 1\frac{1}{4}$
   - **C.** $3\frac{3}{4} - 1\frac{3}{12}$
   - **D.** $2\frac{1}{2} - 1\frac{2}{7}$
2. Explain how you know your answer for Question 1D is reasonable.

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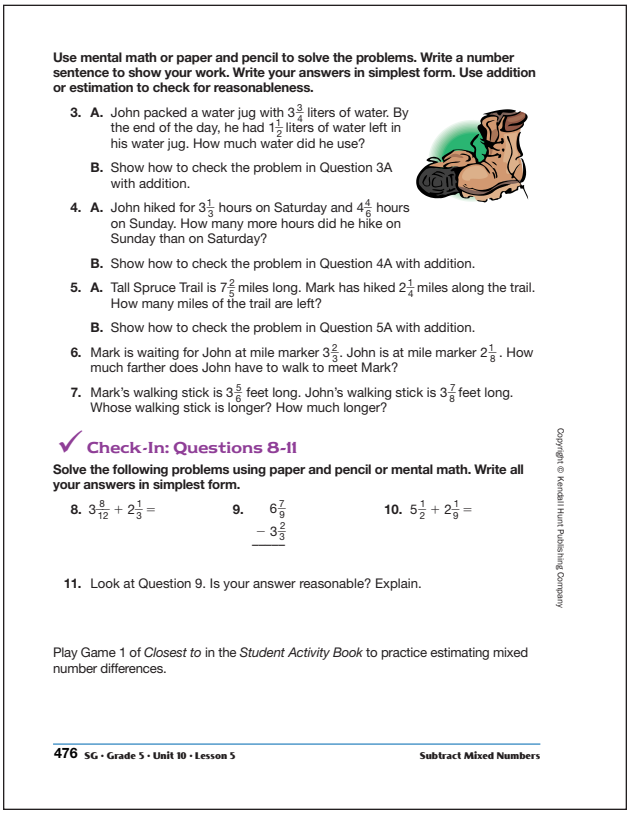

Use mental math or paper and pencil to solve the problems. Write a number sentence to show your work. Write your answers in simplest form. Use addition or estimation to check for reasonableness.

3. **A.** John packed a water jug with $3\frac{3}{4}$ liters of water. By the end of the day, he had $1\frac{1}{2}$ liters of water left in his water jug. How much water did he use?
   B. Show how to check the problem in Question 3A with addition.
4. **A.** John hiked for $3\frac{1}{3}$ hours on Saturday and $4\frac{4}{6}$ hours on Sunday. How many more hours did he hike on Sunday than on Saturday?
   B. Show how to check the problem in Question 4A with addition.
5. **A.** Tall Spruce Trail is $7\frac{2}{5}$ miles long. Mark has hiked $2\frac{1}{4}$ miles along the trail. How many miles of the trail are left?
   B. Show how to check the problem in Question 5A with addition.
6. Mark is waiting for John at mile marker $3\frac{2}{3}$. John is at mile marker $2\frac{1}{8}$. How much farther does John have to walk to meet Mark?
7. Mark's walking stick is $3\frac{5}{6}$ feet long. John's walking stick is $3\frac{7}{8}$ feet long. Whose walking stick is longer? How much longer?

Check-In: Questions 8–11

Solve the following problems using paper and pencil or mental math. Write all your answers in simplest form.

8. $3\frac{8}{12} + 2\frac{1}{3} =$
9. $6\frac{7}{9} - 3\frac{2}{3}$
10. $5\frac{1}{2} + 2\frac{1}{9} =$
11. Look at Question 9. Is your answer reasonable? Explain.

Play Game 1 of *Closest to* in the *Student Activity Book* to practice estimating mixed number differences.

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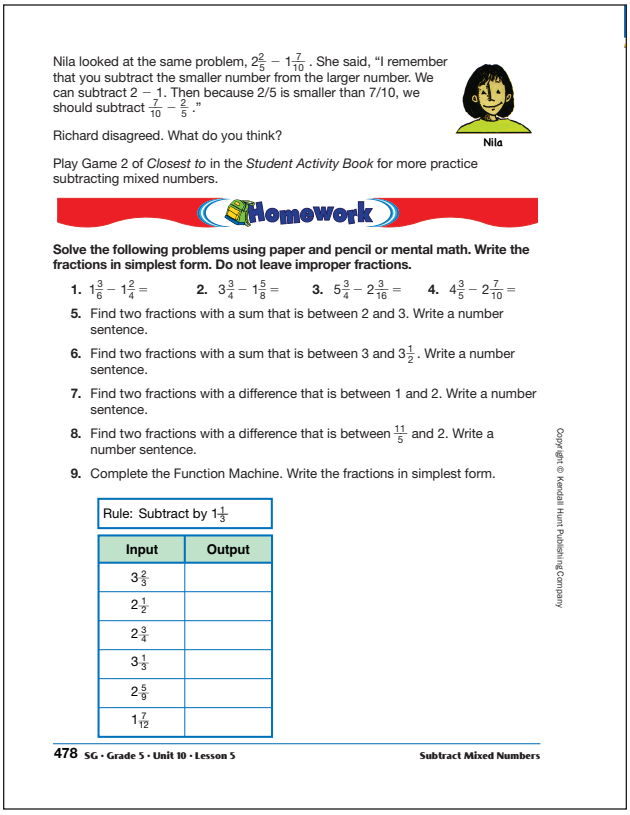

Nila looked at the same problem, $2\frac{2}{5} - 1\frac{7}{10}$. She said, "I remember that you subtract the smaller number from the larger number. We can subtract 2 − 1. Then because 2/5 is smaller than 7/10, we should subtract $\frac{7}{10} - \frac{2}{5}$."

Nila

Richard disagreed. What do you think?

Play Game 2 of *Closest to* in the *Student Activity Book* for more practice subtracting mixed numbers.

Homework

Solve the following problems using paper and pencil or mental math. Write the fractions in simplest form. Do not leave improper fractions.

1. $1\frac{3}{6} - 1\frac{2}{4} =$ 2. $3\frac{3}{4} - 1\frac{5}{8} =$ 3. $5\frac{3}{4} - 2\frac{3}{16} =$ 4. $4\frac{3}{5} - 2\frac{7}{10} =$
5. Find two fractions with a sum that is between 2 and 3. Write a number sentence.
6. Find two fractions with a sum that is between 3 and $3\frac{1}{2}$. Write a number sentence.
7. Find two fractions with a difference that is between 1 and 2. Write a number sentence.
8. Find two fractions with a difference that is between $\frac{11}{5}$ and 2. Write a number sentence.
9. Complete the Function Machine. Write the fractions in simplest form.

Rule: Subtract by $1\frac{1}{3}$

Input	Output
$3\frac{2}{3}$	
$2\frac{1}{2}$	
$2\frac{3}{4}$	
$3\frac{1}{3}$	
$2\frac{5}{9}$	
$1\frac{7}{12}$	

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Homework (SG p. 478)
Questions 1–9

1. 0
2. $2\frac{1}{8}$
3. $3\frac{9}{16}$
4. $2\frac{1}{2}$

Answers for Questions 5–8 will vary. One possible answer given for each.

5. $1\frac{3}{8} + 1\frac{1}{4} = 2\frac{5}{8}$
6. $2\frac{1}{16} + 1\frac{1}{2} = 3\frac{9}{16}$
7. $3\frac{1}{4} + 2\frac{1}{8} = 1\frac{1}{8}$
8. $2\frac{1}{2} + 1\frac{3}{4} = 1\frac{3}{4}$
9. Rule: Subtract $1\frac{1}{3}$

Input	Output
$3\frac{2}{3}$	$2\frac{1}{3}$
$2\frac{1}{2}$	$1\frac{1}{6}$
$2\frac{3}{4}$	$1\frac{5}{12}$
$3\frac{1}{3}$	2
$2\frac{5}{9}$	$1\frac{2}{9}$
$1\frac{7}{12}$	$\frac{1}{4}$