Lesson 4

Subtract Mixed Numbers

Students have performed addition and subtraction with fractions, and they have added mixed numbers. They round out their experience with these concepts by learning to subtract with mixed numbers. The number sense that students build in these activities will serve them when they multiply with fractions.

Vocabulary/ELL Support

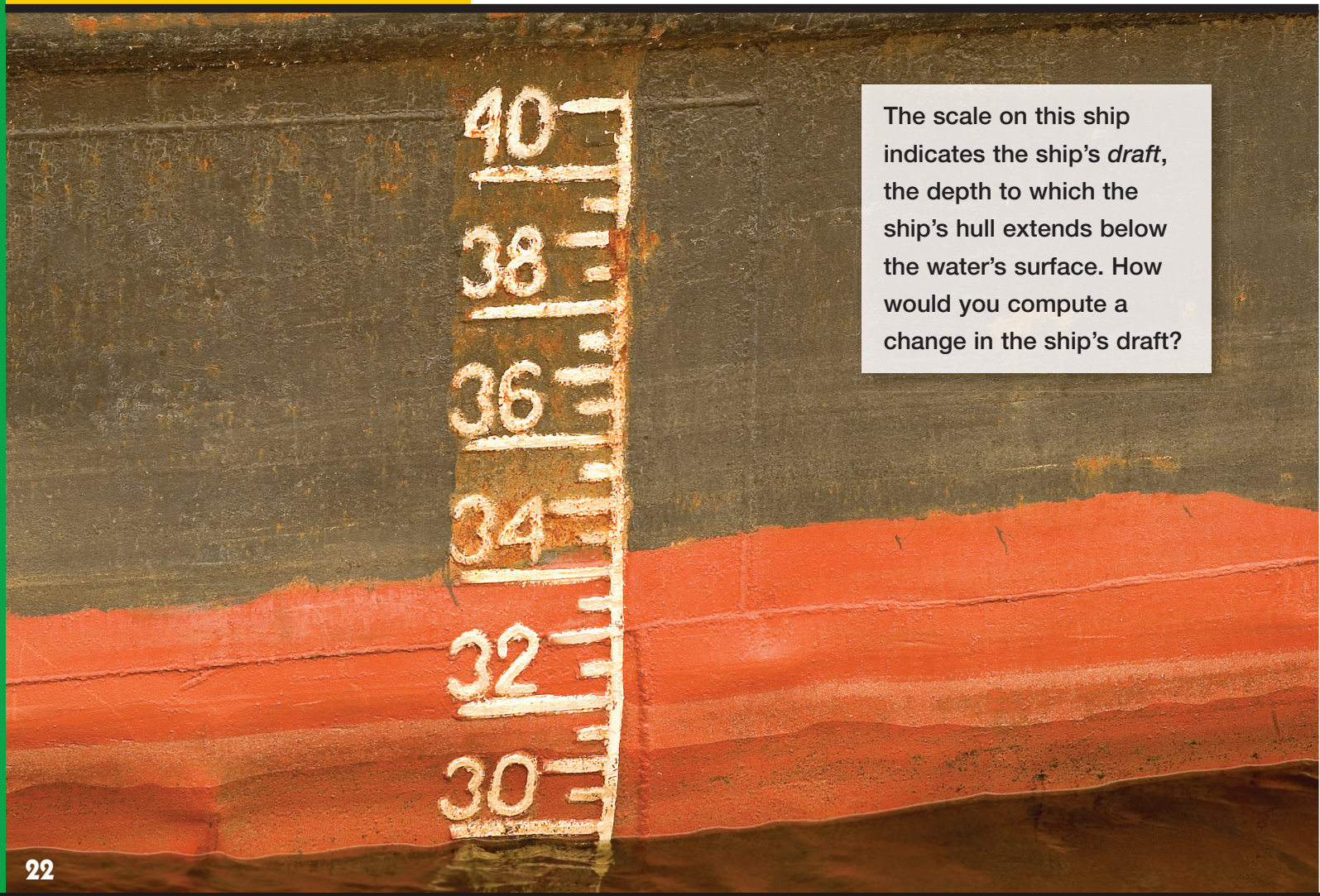
Write the following problem on the board: Paula makes 2 peanut butter sandwiches and cuts each one into fourths. She eats 3 pieces. How much does Paula have left?

Give students two squares of construction paper.

- **Ask:** *How can you model this problem using the paper?* [Sample: Cut each square into fourths; remove $\frac{3}{4}$ from one.]
- **Ask:** *How much does Paula have left?* [$\frac{5}{4}$, or $1\frac{1}{4}$]

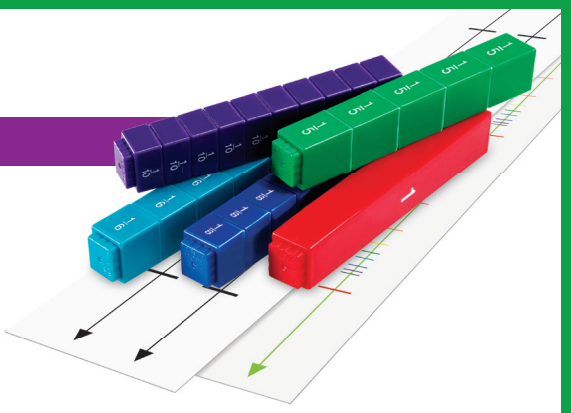
Elicit from students the two different ways of expressing the answer. Note that because $1\frac{1}{4}$ is a combination, or mix, of a whole number with a fraction, the number is called a **mixed number**.

- A **mixed number** (such as $2\frac{3}{4}$) has a whole-number part (2) and a fraction part ($\frac{3}{4}$); it represents the sum of the parts.



The scale on this ship indicates the ship's *draft*, the depth to which the ship's hull extends below the water's surface. How would you compute a change in the ship's draft?

Set the Stage



Build Background

WHOLE CLASS

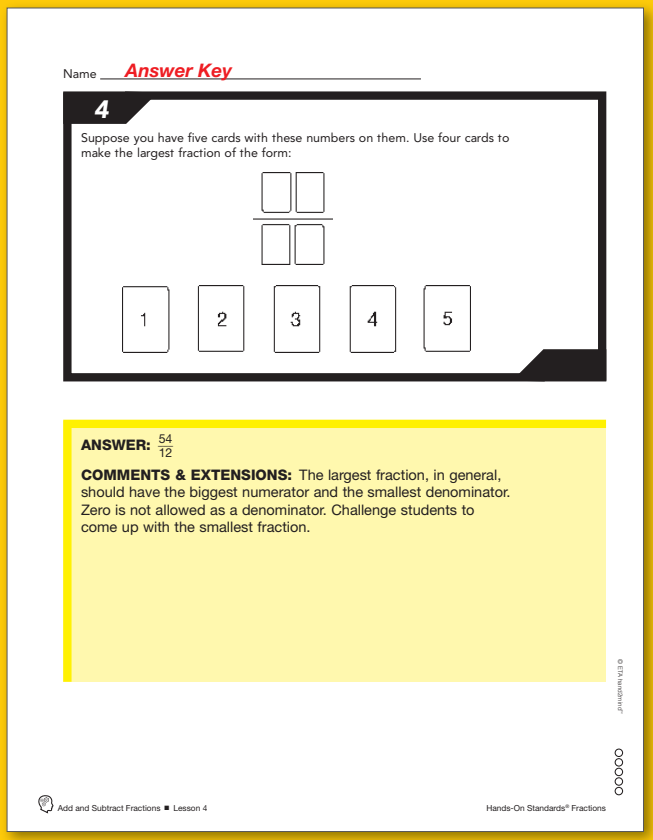
Distribute 11 x 17-inch paper and markers to groups of students. Assign each group a different mixed number.

Ask students to write different ways of representing their mixed number using number sentences. For example, for $2\frac{3}{5}$, the students could write $2 + \frac{3}{5}$ or $2 + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$. Then, have students draw visual representations of their number sentences, such as shading circles divided into fifths. Have students locate their mixed number on a number line.

- **Ask:** *Why is it important to know different ways of representing mixed numbers?* [Sample: Knowing what mixed numbers represent helps us add or subtract their parts to find sums or differences.]

Warm-Up Activity

Use this short thinking exercise to jump-start the instructional session.



Name Answer Key

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Suppose you have five cards with these numbers on them. Use four cards to make the largest fraction of the form:

$\frac{\square\square}{\square\square}$

1 2 3 4 5

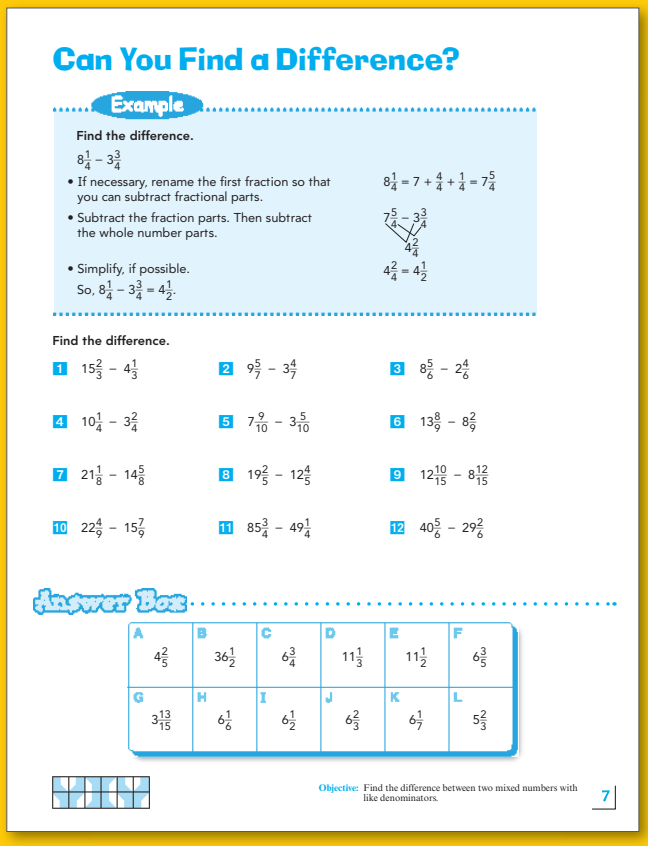
ANSWER: $\frac{54}{12}$

COMMENTS & EXTENSIONS: The largest fraction, in general, should have the biggest numerator and the smallest denominator. Zero is not allowed as a denominator. Challenge students to come up with the smallest fraction.

Online resource available at **hand2mind.com/hosfractionsgr5**

Foundation Skill Practice

Use this VersaTiles® activity to help students activate their prior knowledge.



Can You Find a Difference?

Example

Find the difference.

$8\frac{1}{4} - 3\frac{3}{4}$

- If necessary, rename the first fraction so that you can subtract fractional parts. $8\frac{1}{4} = 7 + \frac{4}{4} + \frac{1}{4} = 7\frac{5}{4}$
- Subtract the fraction parts. Then subtract the whole number parts. $7\frac{5}{4} - 3\frac{3}{4} = 4\frac{2}{4}$
- Simplify, if possible. $4\frac{2}{4} = 4\frac{1}{2}$

So, $8\frac{1}{4} - 3\frac{3}{4} = 4\frac{1}{2}$.

Find the difference.

1. $15\frac{2}{3} - 4\frac{1}{3}$
2. $9\frac{5}{7} - 3\frac{4}{7}$
3. $8\frac{5}{6} - 2\frac{4}{6}$
4. $10\frac{1}{4} - 3\frac{2}{4}$
5. $7\frac{9}{10} - 3\frac{5}{10}$
6. $13\frac{8}{9} - 8\frac{2}{9}$
7. $21\frac{1}{8} - 14\frac{5}{8}$
8. $19\frac{2}{5} - 12\frac{4}{5}$
9. $12\frac{10}{15} - 8\frac{12}{15}$
10. $22\frac{4}{9} - 15\frac{7}{9}$
11. $85\frac{3}{4} - 49\frac{1}{4}$
12. $40\frac{5}{6} - 29\frac{2}{6}$

Answer Box

A $4\frac{2}{5}$	B $36\frac{1}{2}$	C $6\frac{3}{4}$	D $11\frac{1}{3}$	E $11\frac{1}{2}$	F $6\frac{3}{5}$
G $3\frac{13}{15}$	H $6\frac{1}{6}$	I $6\frac{1}{2}$	J $6\frac{2}{3}$	K $6\frac{1}{7}$	L $5\frac{2}{3}$

Objective: Find the difference between two mixed numbers with like denominators.

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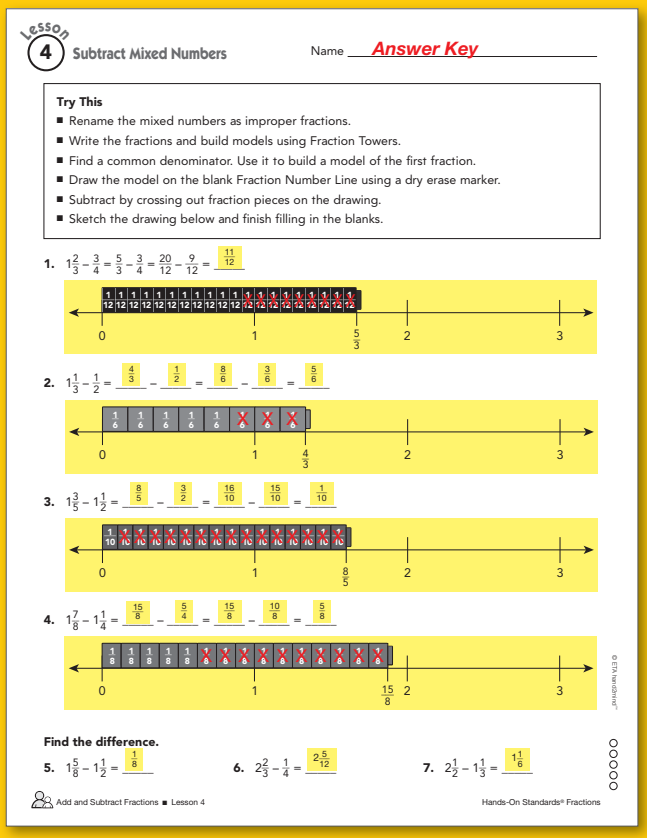
Introduce the Concept

Materials

- Fraction Tower® Equivalency Cubes
- Fraction Number Lines (Number 3, the blank line)
- dry erase markers
- squares of construction paper
- 11 x 17-inch paper, dry erase markers

Guided Practice



LESSON 4 Subtract Mixed Numbers

Name Answer Key

Try This

- Rename the mixed numbers as improper fractions.
- Write the fractions and build models using Fraction Towers.
- Find a common denominator. Use it to build a model of the first fraction.
- Draw the model on the blank Fraction Number Line using a dry erase marker.
- Subtract by crossing out fraction pieces on the drawing.
- Sketch the drawing below and finish filling in the blanks.

1. $1\frac{2}{3} - \frac{3}{4} = \frac{5}{3} - \frac{3}{4} = \frac{20}{12} - \frac{9}{12} = \frac{11}{12}$

2. $1\frac{1}{3} - \frac{1}{2} = \frac{4}{3} - \frac{1}{2} = \frac{8}{6} - \frac{3}{6} = \frac{5}{6}$

3. $1\frac{3}{5} - 1\frac{1}{2} = \frac{8}{5} - \frac{3}{2} = \frac{16}{10} - \frac{15}{10} = \frac{1}{10}$

4. $1\frac{7}{8} - 1\frac{1}{4} = \frac{15}{8} - \frac{5}{4} = \frac{15}{8} - \frac{10}{8} = \frac{5}{8}$

Find the difference.

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

6. $2\frac{2}{3} - \frac{1}{4} = 2\frac{5}{12}$

7. $2\frac{1}{2} - 1\frac{1}{3} = 1\frac{1}{6}$

Add and Subtract Fractions ■ Lesson 4 Hands-On Standards® Fractions

Online resource available at **hand2mind.com/hosfractionsgr5**

Model the Activity WHOLE CLASS

Distribute Fraction Tower Equivalency Cubes, Fraction Number Lines (Number 3, the blank line), and dry erase markers. Have students work along with you in small groups as you model the lesson.

Write $1\frac{1}{2} - 1\frac{1}{3} =$ ____ on the board.

- **Ask:** *How do you rename these mixed numbers as fractions?* [$1\frac{1}{2} = \frac{3}{2}$, $1\frac{1}{3} = \frac{4}{3}$]

To model $\frac{3}{2}$, build a tower using three pink fraction tower pieces. To model $\frac{4}{3}$, use four orange tower pieces.

Locate $\frac{3}{2}$ on the number line using the pink tower. Mark and label 0, $\frac{1}{2}$, 1, and $\frac{3}{2}$.

- **Say:** *We need to subtract $\frac{4}{3}$ from $\frac{3}{2}$. It helps to have common denominators.*
- **Ask:** *What is a good common denominator?* [6] *Why? How many sixths are in $\frac{3}{2}$?* [9]

Have students build a $\frac{9}{6}$ tower using teal fraction tower pieces and lay it on the blank Fraction Number Line to show that $\frac{9}{6}$ equals $\frac{3}{2}$. Have them trace the tower (using the dry erase marker) and draw the sixths.

- **Say:** *Now let's subtract $\frac{4}{3}$.*
- **Ask:** *How many sixths are in $\frac{4}{3}$?* [8]

Students can compare an 8-piece teal tower to the 4-piece orange tower to confirm. Have students cross out 8 of the sixths they drew on their number lines.

- **Ask:** *What is the difference?* [$\frac{1}{6}$]

Guided Practice SMALL GROUPS

Prepare ahead Each small group will need two sets of Fraction Tower Equivalency Cubes, a Fraction Number Line (Number 3, the blank line), and a dry erase marker.

Students model subtraction with mixed numbers on the blank Fraction Number Line. They rename the mixed numbers as improper fractions and find a common denominator. They model and draw the minuend (renamed using the common denominator) on the number line. Students find the difference by removing (crossing out) the number of fraction pieces indicated by the subtrahend.

Reinforce the Concept

Check for Understanding WHOLE CLASS

- **Ask:** *What if the number you're subtracting is just a fraction less than 1, not a mixed number? Does that change the way you do the problem? If so, how?* [Sample: It doesn't change the way I do the problem. The only difference is I don't need to rename the number except to write it with a common denominator, if necessary.]

Summarize WHOLE CLASS

- **Ask:** *How is subtracting with mixed numbers the same as subtracting with fractions?* [Sample: Both involve subtracting fractional parts.]

Review with students what they did in the activity. Have them describe in writing what they know about subtracting with mixed numbers.

Independent Practice

Use this VersaTiles® activity to give students more practice with the skills they learned in the lesson.

Name Changes

Example

Subtract.

$4\frac{1}{2} - 1\frac{6}{8}$

- Write the fractions using the least common denominator. $4\frac{4}{8} - 1\frac{6}{8}$
- Regroup, as needed, to subtract the fractions. $4\frac{4}{8} = 3\frac{12}{8}$
- Subtract the fractions, then the whole numbers. $3\frac{12}{8} - 1\frac{6}{8} = 2\frac{6}{8}$
- Simplify, if possible. $2\frac{6}{8} = 2\frac{3}{4}$

So, $4\frac{1}{2} - 1\frac{6}{8} = 2\frac{3}{4}$.

Subtract.

1. $9\frac{2}{5} - 6\frac{3}{5}$
2. $7\frac{1}{3} - 2\frac{2}{3}$
3. $12\frac{1}{5} - 7\frac{2}{3}$
4. $11\frac{3}{8} - 8\frac{5}{6}$
5. $9 - 5\frac{6}{7}$
6. $13\frac{1}{9} - 10\frac{2}{3}$
7. $8\frac{1}{8} - 7\frac{3}{4}$
8. $16\frac{2}{9} - 7\frac{1}{3}$
9. $12\frac{2}{5} - 9\frac{1}{8}$
10. $6 - 2\frac{5}{6}$
11. $5\frac{1}{4} - 4\frac{2}{3}$
12. $7\frac{1}{6} - 1\frac{1}{4}$

Answer Box

A $2\frac{13}{24}$	B $3\frac{1}{6}$	C $4\frac{8}{15}$	D $3\frac{11}{40}$	E $5\frac{11}{12}$	F $4\frac{2}{3}$
G $\frac{3}{8}$	H $2\frac{4}{5}$	I $3\frac{1}{7}$	J $\frac{7}{12}$	K $2\frac{4}{9}$	L $8\frac{8}{9}$

8 Objective: Find the difference between two mixed numbers with like and unlike denominators.

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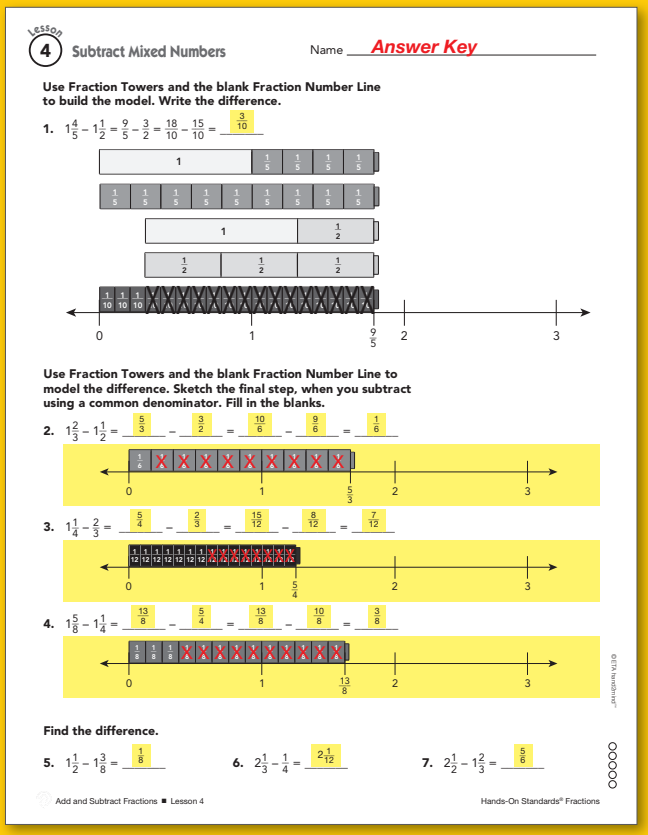
Remediation

Use this page to give students additional concrete-to-abstract practice.



LESSON 4 Subtract Mixed Numbers Name Answer Key

Use Fraction Towers and the blank Fraction Number Line to build the model. Write the difference.

1. $1\frac{4}{5} - 1\frac{1}{2} = \frac{9}{5} - \frac{3}{2} = \frac{18}{10} - \frac{15}{10} = \frac{3}{10}$

Use Fraction Towers and the blank Fraction Number Line to model the difference. Sketch the final step, when you subtract using a common denominator. Fill in the blanks.

2. $1\frac{2}{3} - 1\frac{1}{2} = \frac{5}{3} - \frac{3}{2} = \frac{10}{6} - \frac{9}{6} = \frac{1}{6}$
3. $1\frac{1}{4} - \frac{2}{3} = \frac{5}{4} - \frac{2}{3} = \frac{15}{12} - \frac{8}{12} = \frac{7}{12}$
4. $1\frac{5}{8} - 1\frac{1}{4} = \frac{13}{8} - \frac{5}{4} = \frac{13}{8} - \frac{10}{8} = \frac{3}{8}$

Find the difference.

5. $1\frac{1}{2} - 1\frac{3}{8} = \frac{1}{8}$
6. $2\frac{1}{3} - \frac{1}{4} = 2\frac{1}{12}$
7. $2\frac{1}{2} - 1\frac{2}{3} = \frac{5}{6}$

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