# Addition with Unlike Denominators

Karen is stringing a necklace with beads. She puts green beads on $\frac{1}{2}$ of the string and purple beads on $\frac{3}{10}$ of the string. How much of the string does Karen cover with beads?

You can use fraction strips to help you add fractions with unlike denominators. Trade fraction strips of fractions with unlike denominators for equivalent strips of fractions with like denominators.

Use fraction strips to find the sum. Write your answer in simplest form.

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

Step 1   Use a $\frac{1}{2}$ strip and three $\frac{1}{10}$ strips to model fractions with unlike denominators.
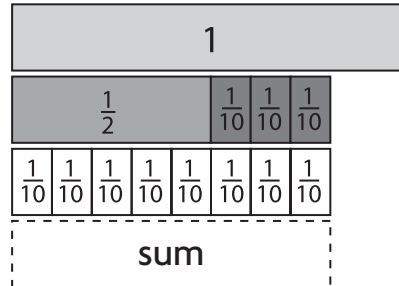
Step 2   Trade the $\frac{1}{2}$ strip for five $\frac{1}{10}$ strips.

$\frac{1}{2} + \frac{3}{10} = \frac{5}{10} + \frac{3}{10}$

Step 3   Add the fractions with like denominators.

$\frac{5}{10} + \frac{3}{10} = \frac{8}{10}$

Step 4   Write the answer in simplest form.

$\frac{8}{10} = \frac{4}{5}$

So, Karen covers $\frac{4}{5}$ of the string with beads.

Use fraction strips to find the sum. Write your answer in simplest form.
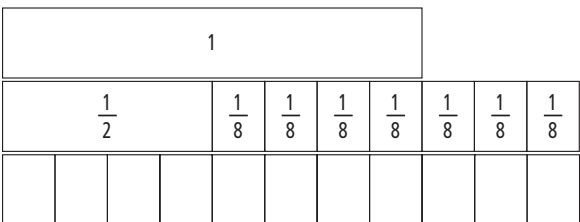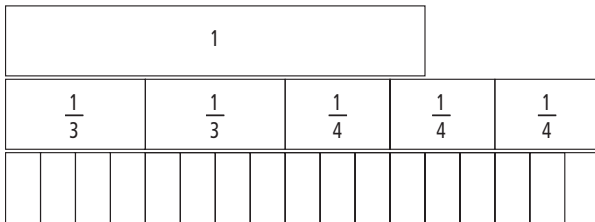
1. $\frac{3}{8} + \frac{3}{4}$

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

3. $\frac{5}{6} + \frac{7}{12}$

A Fraction Strip Above the Rest

Use fraction strips to find the sum. Add the fractions and answer the following questions.

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

1							
$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

1. What fraction represents each fraction strip on the bottom row?

_____

2. Write the total amount shown by the fraction strips on the bottom row.

_____

3. Write the equation shown by the fraction strips in the second row.

_____

4. What fraction represents each fraction strip on the bottom row?

_____

5. Write the total amount shown by the fraction strips on the bottom row.

_____

6. Write the equation shown by the fraction strips in the second row.

_____

7. **Write Math** If you add another $\frac{1}{4}$ to the second row of the model on the left, could you find the sum using the fraction strips in the second row?

_____

_____

8. **Stretch Your Thinking** If you add another $\frac{1}{8}$ to the second row of the model on the right, how would your equation and answer change?

_____

Subtraction with Unlike Denominators

You can use fraction strips to help you subtract fractions with unlike denominators. Trade fraction strips of fractions with unlike denominators for equivalent strips of fractions with like denominators.

Use fraction strips to find the difference. Write your answer in simplest form.

$\frac{1}{2} - \frac{1}{10}$

Step 1 Use a $\frac{1}{2}$ fraction strip to model the first fraction.
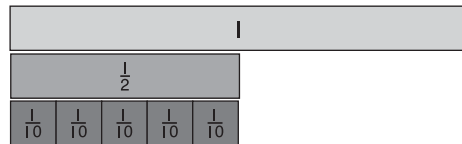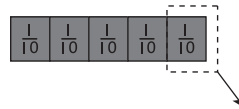
Step 2 Trade the $\frac{1}{2}$ strip for five $\frac{1}{10}$ strips.

$\frac{1}{2} - \frac{1}{10} = \frac{5}{10} - \frac{1}{10}$

Step 3 Subtract by taking away $\frac{1}{10}$.

$\frac{5}{10} - \frac{1}{10} = \frac{4}{10}$

So, $\frac{1}{2} - \frac{1}{10} = \frac{4}{10}$. Written in simplest form, $\frac{4}{10} = \frac{2}{5}$.

Use fraction strips to find the difference. Write your answer in simplest form.

1. $\frac{7}{8} - \frac{1}{2}$

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

3. $\frac{5}{6} - \frac{1}{3}$

_____

_____

_____

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

5. $\frac{9}{10} - \frac{4}{5}$

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

_____

_____

_____
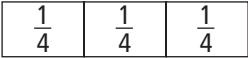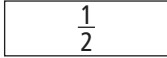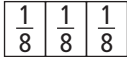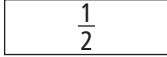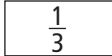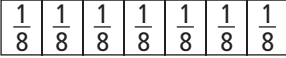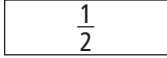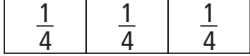
Fraction Strip Subtraction

Find the difference between the fraction shown by the strips in the first column and each of the three fractions shown by the strips in the second column. Write each difference in simplest form in the third column.

1.

$\dfrac{1}{4}$ $\dfrac{1}{4}$ $\dfrac{1}{4}$	$-$ $\boxed{\dfrac{1}{3} \quad \dfrac{1}{3}}$	$=$
	$-$ $\boxed{\dfrac{1}{2}}$	$=$
	$-$ $\boxed{\dfrac{1}{8} \mid \dfrac{1}{8} \mid \dfrac{1}{8}}$	$=$

2.

$\dfrac{1}{6}$ $\dfrac{1}{6}$ $\dfrac{1}{6}$ $\dfrac{1}{6}$ $\dfrac{1}{6}$	$-$ $\boxed{\dfrac{1}{4}}$	$=$
	$-$ $\boxed{\dfrac{1}{2}}$	$=$
	$-$ $\boxed{\dfrac{1}{3}}$	$=$

3.

$\dfrac{1}{8}$ $\dfrac{1}{8}$ $\dfrac{1}{8}$ $\dfrac{1}{8}$ $\dfrac{1}{8}$ $\dfrac{1}{8}$ $\dfrac{1}{8}$	$-$ $\boxed{\dfrac{1}{4}}$	$=$
	$-$ $\boxed{\dfrac{1}{2}}$	$=$
	$-$ $\boxed{\dfrac{1}{4} \quad \dfrac{1}{4} \quad \dfrac{1}{4}}$	$=$

4. Stretch Your Thinking Label the fraction strips to complete the equation.

$$\boxed{} - \boxed{\;} = \dfrac{1}{10}$$

Estimate Fraction Sums and Differences

You can round fractions to 0, to $\frac{1}{2}$, or to 1 to estimate sums and differences.

Estimate the sum. $\frac{4}{6} + \frac{1}{9}$

Step 1 Find $\frac{4}{6}$ on the number line.
Is it closest to 0, $\frac{1}{2}$, or 1?
The fraction $\frac{4}{6}$ is closest to $\frac{1}{2}$.
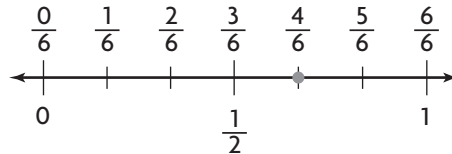
Step 2 Find $\frac{1}{9}$ on the number line.
Is it closest to 0, $\frac{1}{2}$, or 1?
The fraction $\frac{1}{9}$ is closest to 0.
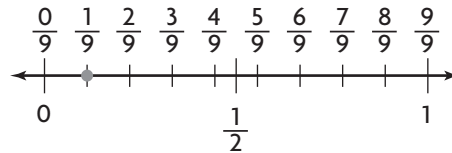
Step 3 To estimate the sum $\frac{4}{6} + \frac{1}{9}$,
add the two rounded numbers.

$$\frac{1}{2} + 0 = \frac{1}{2}$$

So, $\frac{4}{6} + \frac{1}{9}$ is about $\frac{1}{2}$.

Estimate the sum or difference.
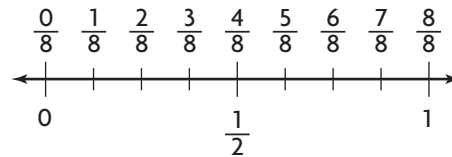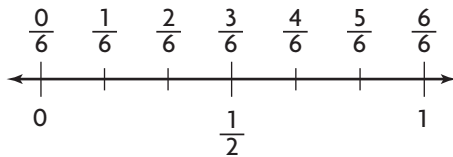
1. $\frac{4}{6} + \frac{1}{8}$

2. $\frac{2}{6} + \frac{7}{8}$

3. $\frac{5}{6} - \frac{3}{8}$

_____

_____

_____

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

5. $\frac{7}{8} - \frac{5}{6}$

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

_____

_____

_____

Name _____

Estimation Comes Full Circle

Estimate each sum or difference. Write your answers in the circle connected to each expression.

1.

$\frac{5}{6}$

$-\frac{1}{4}$ $+\frac{7}{8}$ $+\frac{1}{6}$

○ ○ ○

2.

$\frac{11}{12}$

$+\frac{3}{7}$ $+\frac{1}{5}$ $-\frac{8}{10}$

○ ○ ○

3.

$\frac{8}{9}$

$+\frac{1}{7}$ $-\frac{5}{6}$ $-\frac{2}{5}$

○ ○ ○

4.

$\frac{3}{10}$

$-\frac{2}{9}$ $+\frac{3}{6}$ $+\frac{8}{9}$

○ ○ ○

5. Think About It! Change the fractions in Exercise 2 so that all three answers have the same estimate.

_____

_____

_____

_____

6. Stretch Your Thinking Use two fractions to write an expression with an estimated sum of 2.

_____

_____

_____

_____

Common Denominators and Equivalent Fractions

You can find a common denominator of two fractions.

A **common denominator** of two fractions is a common multiple of their denominators.

Find a common denominator of $\frac{1}{6}$ and $\frac{7}{10}$. Rewrite the pair of fractions using a common denominator.

Step 1   Identify the denominators.
The denominators are 6 and 10.

Step 2   List the multiples of the greater denominator, 10.
Multiples of 10: 10, 20, 30, 40, 50, 60, ...

Step 3   Check if any of the multiples of the greater denominator are evenly divisible by the other denominator.

Both 30 and 60 are evenly divisible by 6.
Common denominators of $\frac{1}{6}$ and $\frac{7}{10}$ are 30 and 60.

Step 4   Rewrite the fractions with a denominator of 30.
Multiply the numerator and the denominator of each fraction by the same number so that the denominator results in 30.

$$\frac{1}{6} = \frac{1 \times 5}{6 \times 5} = \frac{5}{30} \qquad \frac{7}{10} = \frac{7 \times 3}{10 \times 3} = \frac{21}{30}$$

Use a common denominator to write an equivalent fraction for each fraction.

1. $\frac{5}{12}, \frac{2}{9}$
common denominator: _____

_____

2. $\frac{3}{8}, \frac{5}{6}$
common denominator: _____

_____

3. $\frac{2}{9}, \frac{1}{6}$
common denominator: _____

_____

4. $\frac{3}{4}, \frac{9}{10}$
common denominator: _____

_____

Find the Denominators

Find each pair of denominators.

1. The least common denominator of two fractions is 12. If you add the two denominators, their sum is 7. What are the denominators?

_____

2. The least common denominator of two fractions is 24. If you add the two denominators, their sum is 14. What are the denominators?

_____

3. The least common denominator of two fractions is 30. If you add the two denominators, their sum is 17. What are the denominators?

_____

4. The least common denominator of two fractions is 20. If you subtract the two denominators, their difference is 1. What are the denominators?

_____

5. The least common denominator of two fractions is 100. If you subtract the two denominators, their difference is 5. What are the denominators?

_____

6. The least common denominator of two fractions is 28. If you subtract the two denominators, their difference is 10. What are the denominators?

_____

7. Write Math ▶ **Explain** in writing how you found the answer to Exercise 2.

_____

_____

_____

_____

Add and Subtract Fractions

To add or subtract fractions with unlike denominators, you need to rename them as fractions with like denominators. You can do this by making a list of equivalent fractions.

Add. $\frac{5}{12} + \frac{1}{8}$

Step 1 Write equivalent fractions for $\frac{5}{12}$.

$$\frac{5}{12}, \frac{10}{24}, \frac{15}{36}, \frac{20}{48}$$

Step 2 Write equivalent fractions for $\frac{1}{8}$.

$$\frac{1}{8}, \frac{2}{16}, \frac{3}{24}$$

Stop when you find two fractions with the same denominator.

Step 3 Rewrite the problem using the equivalent fractions. Then add.

$\frac{5}{12} + \frac{1}{8}$ becomes $\frac{10}{24} + \frac{3}{24} = \frac{13}{24}$.

Subtract. $\frac{9}{10} - \frac{1}{2}$

Step 1 Write equivalent fractions for $\frac{9}{10}$.

$$\frac{9}{10}, \frac{18}{20}, \frac{27}{30}, \frac{36}{40}$$

Step 2 Write equivalent fractions for $\frac{1}{2}$.

$$\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}$$

Step 3 Rewrite the problem using the equivalent fractions. Then subtract.

$\frac{9}{10} - \frac{1}{2}$ becomes $\frac{9}{10} - \frac{5}{10} = \frac{4}{10}$. Written in simplest form, $\frac{4}{10} = \frac{2}{5}$.

Find the sum or difference. Write your answer in simplest form.

1. $\frac{2}{9} + \frac{1}{3}$

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

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

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

_____ _____ _____ _____

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

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

7. $\frac{9}{10} - \frac{4}{5}$

8. $\frac{8}{9} - \frac{5}{6}$

_____ _____ _____ _____

Name _____

Let's Make a Fraction

Use the conversion chart below to replace each letter with a fraction. Find a common denominator and solve. Show your work. Write your answer in simplest form. The first one is done for you.

Fraction Conversion Chart				
$a = \frac{1}{2}$	$b = \frac{2}{3}$	$c = \frac{3}{4}$	$d = \frac{4}{5}$	$e = \frac{2}{5}$
$f = \frac{5}{6}$	$g = \frac{1}{6}$	$h = \frac{2}{7}$	$i = \frac{5}{7}$	$j = \frac{1}{8}$
$k = \frac{5}{8}$	$l = \frac{7}{8}$	$m = \frac{4}{9}$	$n = \frac{8}{9}$	$o = \frac{3}{10}$

1. $a + c =$

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

2. $b + h =$

3. $d - a =$

4. $n - b =$

5. $e + o =$

6. $l - c =$

7. $m + g =$

8. $d - o =$

9. Think About It! Add the answer for Exercise 7 to the answer for Exercise 8. What is the sum? Write your answer in simplest form.

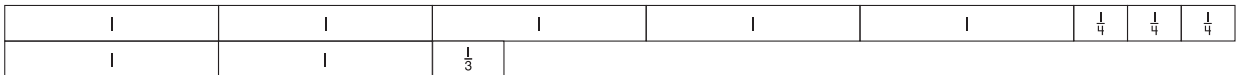**10. Stretch Your Thinking** Find $h + m$. Subtract i from the sum. What is your answer?

Name _____

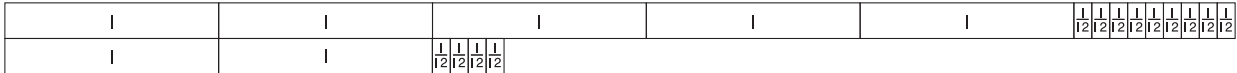# Add and Subtract Mixed Numbers

When you add or subtract mixed numbers, you may need to rename the fractions as fractions with a common denominator.

Find the sum. Write the answer in simplest form. $5\frac{3}{4} + 2\frac{1}{3}$

Step 1　Model $5\frac{3}{4}$ and $2\frac{1}{3}$.

					$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

		$\frac{1}{3}$

Step 2　A common denominator for $\frac{3}{4}$ and $\frac{1}{3}$ is 12, so rename $5\frac{3}{4}$ as $5\frac{9}{12}$ and $2\frac{1}{3}$ as $2\frac{4}{12}$.

					$\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}$

		$\frac{1}{12}\frac{1}{12}\frac{1}{12}\frac{1}{12}$

Step 3　Add the fractions.

$$\frac{9}{12} + \frac{4}{12} = \frac{13}{12}$$

Step 4　Add the whole numbers

$$5 + 2 = 7$$

Add the sums. Write the answer in simplest form.

$$\frac{13}{12} + 7 = 7\frac{13}{12}, \text{ or } 8\frac{1}{12}$$

So, $5\frac{3}{4} + 2\frac{1}{3} = 8\frac{1}{12}$.

Find the sum or difference. Write your answer in simplest form.

1. $2\frac{2}{9} + 4\frac{1}{6}$　　　**2.** $10\frac{5}{6} + 5\frac{3}{4}$　　　**3.** $11\frac{7}{8} - 9\frac{5}{6}$　　　**4.** $18\frac{3}{5} - 14\frac{1}{2}$

_____　_____　_____　_____

Name _____

Mixed Number Sums and Differences

Write equivalent fractions and then find the sum or difference. Write the answer in simplest form. Write the letter of the exercise above its sum or difference at the bottom of the page to answer the riddle. Two have been done for you.

A. $1\frac{1}{3} + 2\frac{1}{4} =$ _____

E. $5\frac{9}{10} - 3\frac{2}{5} =$ __$2\frac{1}{2}$__

E. $8\frac{5}{8} - 7\frac{1}{2} =$ _____

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

O. $1\frac{3}{4} + 1\frac{7}{8} =$ _____

R. $2\frac{1}{6} + 1\frac{7}{12} =$ _____

R. $1\frac{9}{10} + 1\frac{4}{15} =$ __$3\frac{1}{6}$__

S. $6\frac{5}{6} - 4\frac{3}{8} =$ _____

U. $8\frac{5}{6} - 6\frac{4}{9} =$ _____

V. $7\frac{1}{2} - 6\frac{1}{5} =$ _____

X. $1\frac{1}{6} + 1\frac{8}{9} =$ _____

What do you call a scared dinosaur?

$\dfrac{}{3\frac{7}{12}}$ $\dfrac{}{1\frac{1}{2}}$ $\dfrac{E}{2\frac{1}{2}}$ $\dfrac{}{3\frac{3}{4}}$ $\dfrac{}{1\frac{3}{10}}$ $\dfrac{}{3\frac{5}{8}}$ $\dfrac{}{2\frac{7}{18}}$ $\dfrac{}{2\frac{11}{24}}$ $\dfrac{R}{3\frac{1}{6}}$ $\dfrac{}{1\frac{1}{8}}$ $\dfrac{}{3\frac{1}{18}}$

Subtraction with Renaming

You can use a common denominator to find the difference of two mixed numbers.

Estimate. $9\frac{1}{6} - 2\frac{3}{4}$

Step 1   Estimate by using 0, $\frac{1}{2}$, and 1 as benchmarks.

$9\frac{1}{6} - 2\frac{3}{4} \longrightarrow 9 - 3 = 6$

So, the difference should be close to 6.

Step 2   Identify a common denominator.

$9\frac{1}{6} - 2\frac{3}{4}$ A common denominator of 6 and 4 is 12.

Step 3   Write equivalent fractions using the common denominator.

$9\frac{1}{6} = 9 + \frac{1 \times 2}{6 \times 2} = 9\frac{2}{12}$

$2\frac{3}{4} = 2 + \frac{3 \times 3}{4 \times 3} = 2\frac{9}{12}$

Step 4   Rename if needed. Then subtract.

Since $\frac{2}{12} < \frac{9}{12}$, rename $9\frac{2}{12}$ as $8\frac{14}{12}$.

Subtract. $8\frac{14}{12} - 2\frac{9}{12} = 6\frac{5}{12}$

So, $9\frac{1}{6} - 2\frac{3}{4} = 6\frac{5}{12}$.

Since the difference of $6\frac{5}{12}$ is close to 6, the answer is reasonable.

Estimate. Then find the difference and write it in simplest form.

1. Estimate: _____

$5\frac{1}{3} - 3\frac{5}{6}$ _____

2. Estimate: _____

$7\frac{1}{4} - 2\frac{5}{12}$ _____

3. Estimate: _____

$8\frac{2}{3} - 2\frac{7}{9}$ _____

4. Estimate: _____

$9\frac{2}{5} - 3\frac{3}{4}$ _____

5. Estimate: _____

$7\frac{3}{16} - 1\frac{5}{8}$ _____

6. Estimate: _____

$2\frac{4}{9} - 1\frac{11}{18}$ _____

Star Ray Differences

Start in the center of the star. Subtract the fraction or mixed number along the arrows to find the five answers in simplest form.
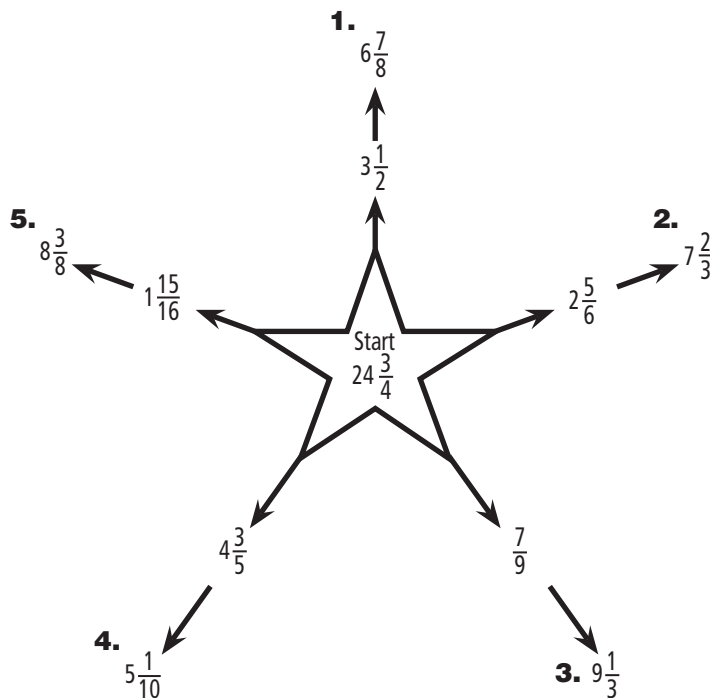
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

6. **Stretch Your Thinking** Order the answers from least to greatest.

7. [Write Math] **Explain** how you found the answer to Exercise 6.

_____

_____

_____

_____

_____

_____

Algebra • Patterns with Fractions

You can find an unknown term in a sequence by finding a rule for the sequence.

Find the unknown term in the sequence.

$1\frac{2}{5}, 1\frac{7}{10}, 2, \underline{\hspace{1cm}}, 2\frac{3}{5}$

Step 1   Find equivalent fractions with a common denominator for all of the terms.

The denominators are 5 and 10. A common denominator is 10.

$1\frac{2}{5} = 1\frac{4}{10}$ and $2\frac{3}{5} = 2\frac{6}{10}$

Step 2   Write the terms in the sequence using the common denominator.

$1\frac{4}{10}, 1\frac{7}{10}, 2, \underline{\hspace{1cm}}, 2\frac{6}{10}$

Step 3   Write a rule that describes the pattern.

The sequence increases. To find the difference between terms, subtract at least two pairs of consecutive terms.

$1\frac{7}{10} - 1\frac{4}{10} = \frac{3}{10}$ $2 - 1\frac{7}{10} = \frac{3}{10}$

So, a rule is to add $\frac{3}{10}$.

Step 4   Use the rule to find the unknown term.

Add $\frac{3}{10}$ to the third term to find the unknown term.

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

Write a rule for the sequence. Then, find the unknown term.

1. $2\frac{2}{3}, 3\frac{1}{2}, \underline{\hspace{1cm}}, 5\frac{1}{6}, 6$

2. $4\frac{1}{2}, 3\frac{7}{8}, 3\frac{1}{4}, \underline{\hspace{1cm}}, 2$

Rule: _____

Rule: _____

Fractions Rule

For each sequence, the first term and one more term are given.
Find a possible rule for the sequence.

1. First term: $2\frac{3}{4}$

Sixth term: $3\frac{7}{12}$

Possible rule: _____

2. First term: 10

Eighth term: $5\frac{4}{5}$

Possible rule: _____

3. First term: $3\frac{1}{9}$

Seventh term: $7\frac{1}{9}$

Possible rule: _____

4. First term: $6\frac{7}{12}$

Sixth term: $5\frac{1}{3}$

Possible rule: _____

5. First term: $2\frac{3}{4}$

Eighth term: $12\frac{1}{12}$

Possible rule: _____

6. First term: $7\frac{1}{3}$

Seventh term: $\frac{1}{3}$

Possible rule: _____

7. ⟨Write Math⟩ **Explain** in writing how you found the answer to Exercise 1.

_____

_____

_____

_____

Problem Solving • Practice Addition and Subtraction

Makayla walks for exercise. She wants to walk a total of 6 miles.
On Monday, she walked $2\frac{5}{6}$ miles. On Tuesday, she walked $1\frac{1}{3}$ miles.
How many more miles does Makayla need to walk to reach her goal?

Read the Problem	Solve the Problem
What do I need to find? I need to find **the distance that Makayla needs to walk.**	• Start with the equation. $6 = 2\frac{5}{6} + 1\frac{1}{3} + x$ Subtraction is the inverse operation of addition.
What information do I need to use? I need to use **the distance she wants to walk** and **the distance she has already walked.**	• Use subtraction to work backward and rewrite the equation. $6 - 2\frac{5}{6} - 1\frac{1}{3} = x$ • Subtract to find the value of x.
How will I use the information? First **I can write an equation** $6 = 2\frac{5}{6} + 1\frac{1}{3} + x$. Then **I can work backward to solve the problem.**	$\begin{array}{rcl} 6 &=& 5\frac{6}{6} \\ -2\frac{5}{6} &=& -2\frac{5}{6} \\ \hline && 3\frac{1}{6} \end{array} \longrightarrow \begin{array}{rcl} 3\frac{1}{6} &=& 2\frac{7}{6} \\ -1\frac{1}{3} &=& -1\frac{2}{6} \\ \hline && 1\frac{5}{6} \end{array}$ Estimate to show that your answer is reasonable. $3 + 1 + 2 = 6$ So, Makayla has to walk $1\frac{5}{6}$ more miles to reach her goal.

1. Ben has $5\frac{3}{4}$ cups of sugar. He uses $\frac{2}{3}$ cup of sugar to make cookies. Then he uses $2\frac{1}{2}$ cups of sugar to make fresh lemonade. How many cups of sugar does Ben have left?

2. Cheryl has 5 ft of ribbon. She cuts a $3\frac{3}{4}$-ft strip to make a hair bow. Then she cuts a $\frac{5}{6}$-ft strip for a border on a scrapbook page. Is there enough ribbon for Cheryl to cut two $\frac{1}{3}$-ft pieces to put on a picture frame? **Explain**.

The Path of Least Resistance

Always choose the path with the least value. Do not retrace any parts of the path. What shapes are on this path?

Rounded square: $2\frac{7}{10} + 3\frac{11}{20}$

Starburst: $10\frac{1}{3} - 6\frac{5}{9}$

Cross: $1\frac{1}{4} + 2\frac{1}{8}$

Parallelogram: $12\frac{1}{2} - 3\frac{7}{10}$

Square: $4\frac{1}{12} + 7\frac{4}{5}$

Flag: $6\frac{1}{2} - 2\frac{7}{8}$

Heart: $5\frac{7}{8} + 3\frac{1}{4}$

Hexagon: **Start**

Pentagon: $3\frac{4}{5} + 4\frac{3}{4}$

Diamond: $3\frac{11}{12} + 4\frac{5}{6}$

Triangle: $5\frac{1}{4} + 1\frac{3}{8}$

Octagon: $9\frac{1}{6} + 1\frac{2}{3}$

Trapezoid: $9\frac{2}{5} - 2\frac{7}{20}$

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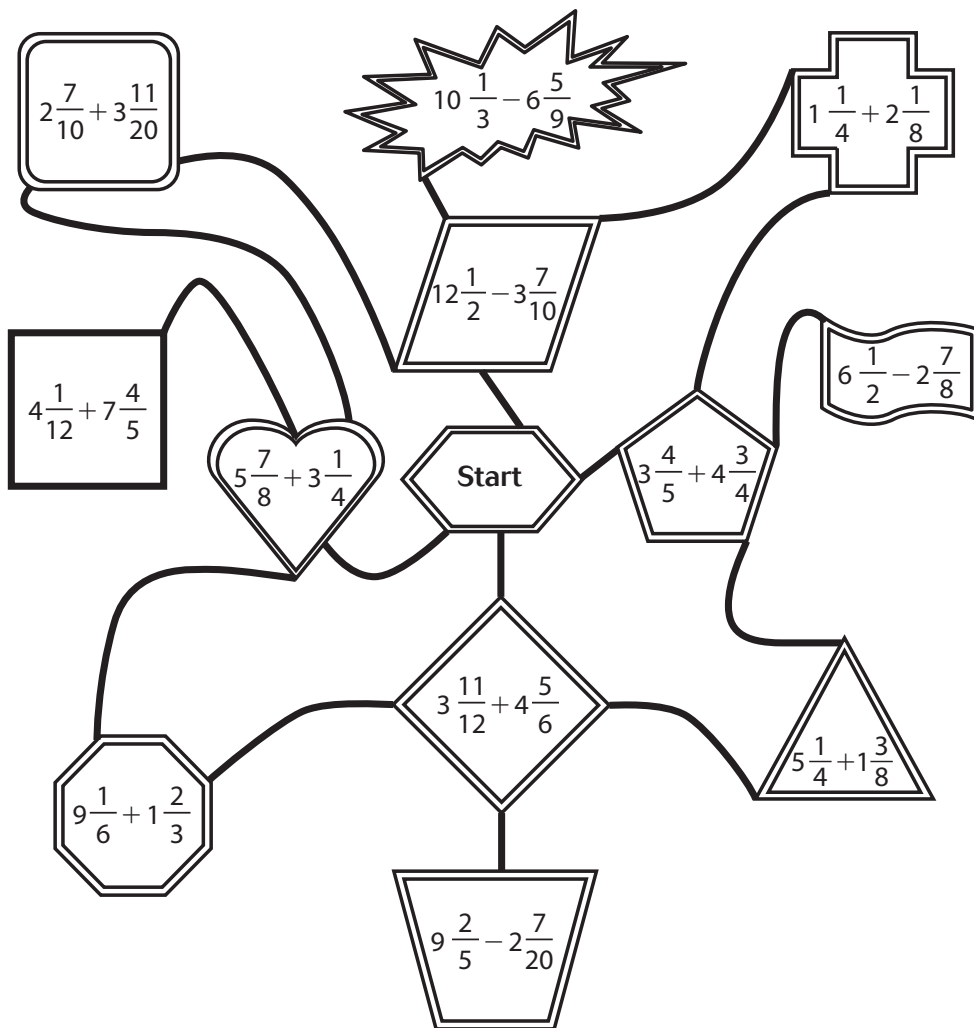
1. Which shape contains the greatest value? What is that value?

_____

_____

_____

2. Stretch Your Thinking Use the second lowest value as your first choice. Then use lowest values the rest of the way. What shapes are on the new path?

_____

_____

_____

Name _____

Algebra • Use Properties of Addition

You can use the properties of addition to help you add fractions with unlike denominators.

Use the Commutative Property and the Associative Property.

Add. $\left(3\frac{2}{5} + 1\frac{7}{15}\right) + 2\frac{1}{5}$

$\left(3\frac{2}{5} + 1\frac{7}{15}\right) + 2\frac{1}{5} = \left(1\frac{7}{15} + 3\frac{2}{5}\right) + 2\frac{1}{5}$ ← Use the Commutative Property to order fractions with like denominators.

$= 1\frac{7}{15} + \left(3\frac{2}{5} + 2\frac{1}{5}\right)$ ← Use the Associative Property to group fractions with like denominators.

$= 1\frac{7}{15} + 5\frac{3}{5}$ ← Use mental math to add the fractions with like denominators.

$= 1\frac{7}{15} + 5\frac{9}{15}$ ← Write equivalent fractions with like denominators. Then add.

$= 6\frac{16}{15} = 7\frac{1}{15}$ ← Rename and simplify.

Use the properties and mental math to solve. Write your answer in simplest form.

1. $\left(\frac{5}{7} + \frac{3}{14}\right) + \frac{4}{7}$ _____

2. $\left(\frac{2}{5} + \frac{5}{9}\right) + \frac{7}{9}$ _____

3. $\left(3\frac{7}{10} + 5\frac{3}{4}\right) + \frac{3}{4}$ _____

4. $2\frac{5}{12} + \left(4\frac{2}{3} + 3\frac{7}{12}\right)$ _____

5. $3\frac{3}{8} + \left(2\frac{1}{5} + 5\frac{1}{8}\right)$ _____

6. $\left(4\frac{3}{7} + 2\frac{1}{6}\right) + 3\frac{5}{7}$ _____

Which Property?

Use the properties and mental math to solve. Find each unknown number.

1. $\left(\dfrac{7}{8} + \dfrac{3}{4}\right) + \dfrac{\square}{8} = 1\dfrac{3}{4}$

_____

2. $\left(\dfrac{5}{8} + \dfrac{\square}{7}\right) + \dfrac{3}{8} = 1\dfrac{4}{7}$

_____

3. $\left(3\dfrac{4}{5} + \square\dfrac{5}{6}\right) + 5\dfrac{1}{5} = 11\dfrac{5}{6}$

_____

4. $\left(\square\dfrac{7}{10} + 4\dfrac{2}{3}\right) + 2\dfrac{3}{10} = 14\dfrac{2}{3}$

_____

5. $\left(5\dfrac{2}{3} + 8\dfrac{1}{\square}\right) + 9\dfrac{1}{3} = 23\dfrac{1}{6}$

_____

6. $\left(8\dfrac{7}{12} + 10\dfrac{3}{\square}\right) + 6\dfrac{5}{12} = 25\dfrac{3}{4}$

_____

7. Write Math ▶ Tell how you can use the properties and mental math to find the unknown number in Exercise 1.

_____

_____

_____

_____

8. Stretch Your Thinking How does using properties help you find unknown numbers mentally in these exercises?

_____

_____

_____

_____