Addition and Subtraction Meanings and Strategies with Fractions

Focus Question

How can I add and subtract fractions with like denominators?

Hi, I'm Owen.

I want to be an entomologist. $\frac{2}{5}$ of the insects I found are butterflies and $\frac{1}{5}$ are ladybugs. Understanding how to add and subtract fractions makes my job easier!

STEM video | **GO ONLINE**

IGNITE!

Name _____

Would You Rather Have ... ?

Look at each pan. What do you notice?

Pan 1

Pan 2

Understand Decomposing Fractions

?

Be Curious

How are they the same?
How are they different?

$$\frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10}$$

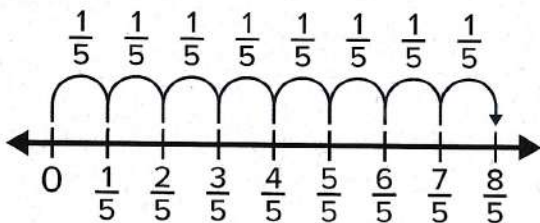$$\frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10}$$

$$\frac{1}{10} \quad \frac{1}{10} \qquad \frac{1}{10} \quad \frac{1}{10} \quad \frac{1}{10} \qquad \frac{1}{10}$$

Math is... **Mindset**

Why is it important to have confidence in your work?

Learn

How can you decompose $\frac{8}{5}$ into the *greatest* number of parts?

You can decompose $\frac{8}{5}$ into unit fractions using a number line.

$$\frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5}$$

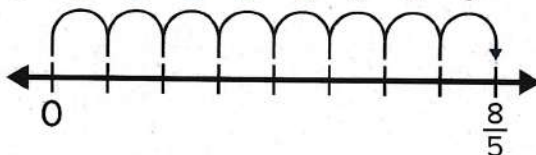Write an addition equation to express $\frac{8}{5}$ as a sum of the unit fractions.

$$\frac{8}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$$
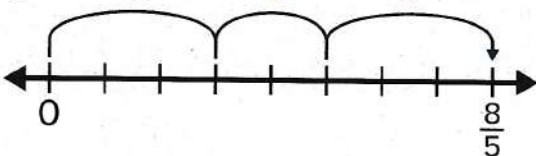
Math is... Modeling

What other ways can you represent sums of fractions?

You can combine unit fractions in more than one way to make greater addends.

$$\frac{8}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$$

$$\frac{8}{5} = \frac{3}{5} + \frac{2}{5} + \frac{3}{5}$$

$$\frac{8}{5} = \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5}$$

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

A fraction can be decomposed into a sum of fractions with the same denominator in more than one way.

Work Together

How can you decompose $\frac{5}{6}$ into a sum of three fractions two different ways? Write equations to show your work.

On My Own

Name _____
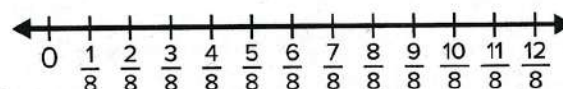
How can you decompose the fraction into unit fractions?

1. $\dfrac{5}{8} = \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square}$

2. $\dfrac{4}{5} = \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square}$

How can you decompose the fraction? Use the number line to justify your answer.
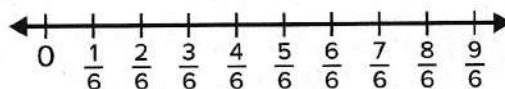
3. Decompose $\dfrac{12}{8}$ into a sum of 5 fractions.

   $\dfrac{12}{8} = \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square}$

4. Decompose $\dfrac{9}{6}$ into a sum of 3 fractions.

   $\dfrac{9}{6} = \dfrac{\square}{\square} + \dfrac{\square}{\square} + \dfrac{\square}{\square}$

5. How can you decompose $\dfrac{7}{10}$ into a sum of 4 fractions? Write equations to show two different ways.

6. Tricia has $\dfrac{9}{12}$ of a breakfast casserole left over. She puts the casserole into 3 containers. What fraction of the casserole could Tricia have put into each container? Show your work.

7. Amy decomposes a fraction into a sum of fractions. What fraction could Amy have decomposed? Draw fraction tiles to justify your answer.

$$\frac{\square}{\square} = \frac{2}{8} + \frac{1}{8} + \frac{2}{8}$$

8. A family of 4 ate $\frac{7}{12}$ of a lasagna. How much lasagna could each person have eaten? Explain your thinking.

9. STEM Connection Owen measures 3 ladybugs in his backyard with his ruler. The combined length of the ladybugs is $\frac{9}{10}$ inch. What length might each of the ladybugs be? Explain.

10. A team of 6 people participated in a relay race. Each person ran $\frac{1}{4}$ mile. A team of 4 people runs the same distance. How far might each of the 4 people run? Justify your answer.

11. Extend Your Thinking Jana says $\frac{2}{3} = \frac{1}{3} + \frac{1}{3}$ is the only way to decompose $\frac{2}{3}$. How do you respond to Jana?

Reflect

How can you find more than one way to decompose a fraction?

Math is... Mindset

How did having confidence help you in your work today?

Represent Adding Fractions

? Be Curious

What could the question be?

Math is... **Mindset**

How do you show others you respect their ideas?

Learn

Loretta will make a peanut mix using salty and spicy peanuts. She will use $\frac{3}{8}$ pound of salty peanuts and $\frac{5}{8}$ pound of spicy peanuts.

How many pounds of peanut mix will she make?

$\frac{3}{8}$ pound $\frac{5}{8}$ pound

Fraction tiles can represent the problem.

The fraction tiles can represent the amount of each kind of peanut.

salty peanuts   spicy peanuts

$\frac{3}{8}$ $\frac{5}{8}$

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

Each fraction tile is the same size.

Add the fraction tiles.   **Add the tiles.**

1

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

Loretta will make $\frac{8}{8}$ pound of peanut mix.

The denominator stays the same.

Adding fractions with like denominators means joining parts that refer to the same whole.

Math is... Quantities

How does the fraction model represent the quantities in the equation?

Work Together

Macie says if she combines the juice into one bottle, she will have a total of $\frac{1}{2}$ bottle of juice. How can you respond to Macie? Explain.

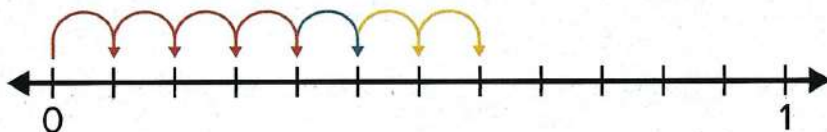$\frac{1}{4}$ bottle $\frac{1}{4}$ bottle

On My Own

Name _____

1. How can you find the sum? Draw a picture to show your thinking.

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{\Box}{\Box}$$

2. Aaron used a number line to find the sum of three fractions.

What fractions did Aaron add? What is the sum?

$$\frac{\Box}{\Box} + \frac{\Box}{\Box} + \frac{\Box}{\Box} = \frac{\Box}{\Box}$$

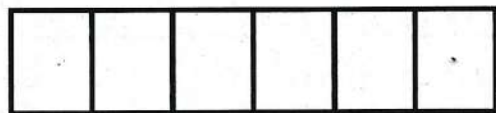**How can you find the sum? Use the fraction model to represent the equation.**

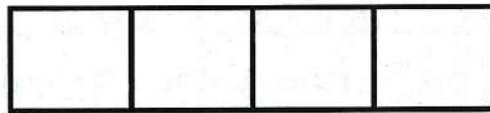3. $\frac{5}{12} + \frac{2}{12} + \frac{3}{12} = \frac{\Box}{\Box}$

4. $\frac{2}{8} + \frac{5}{8} = \frac{\Box}{\Box}$

5. $\frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{\Box}{\Box}$
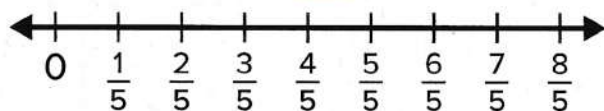
6. $\frac{1}{4} + \frac{2}{4} = \frac{\Box}{\Box}$

7. Hank combines $\frac{5}{12}$ gallon of red paint with $\frac{6}{12}$ gallon of white paint to make pink paint. How much pink paint does Hank have? Draw a picture to show your thinking.
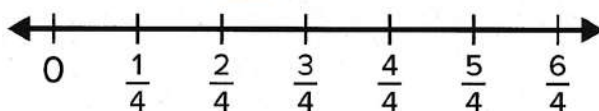
8. **Error Analysis** A student wrote $\frac{2}{6} + \frac{3}{6} = \frac{5}{12}$. How do you respond to the student?

What is the sum? Use the number line to represent the equation.

9. $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = \dfrac{\square}{\square}$

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←──┼──┼──┼──┼──┼──┼──┼──┼──→
   0  1  2  3  4  5  6  7  8
      5  5  5  5  5  5  5  5
```

10. $\frac{3}{4} + \frac{2}{4} = \dfrac{\square}{\square}$

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←─┼────┼────┼────┼────┼────┼──→
  0    1    2    3    4    5    6
       4    4    4    4    4    4
```

11. Before school, it snowed $\frac{3}{8}$ inch. During school, it snowed $\frac{2}{8}$ inch. After school, it snowed $\frac{5}{8}$ inch. How much did it snow?

12. **Extend Your Thinking** Jin wants to run or walk at least a kilometer each day. One day he jogged $\frac{3}{10}$ kilometer, walked $\frac{5}{10}$ kilometer, and then ran $\frac{2}{10}$ kilometer. Did he meet his goal? Use a representation to justify your response.

⟳ Reflect

How can you use representations to show adding fractions with like denominators?

Math is... Mindset

How have you shown others you respect their ideas?

Be Curious

Is It Always True?

$$\frac{5}{8} + \frac{4}{8} = \frac{9}{8}$$

$$\frac{3}{12} + \frac{5}{12} = \frac{8}{12}$$

$$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

Math is... **Mindset**

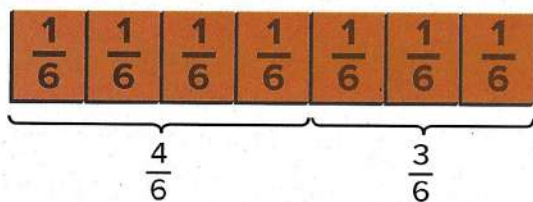What goal do you want to accomplish today?

Learn

Mateo walked $\frac{4}{6}$ mile from his home to the bakery. He walked home by a shorter path that is $\frac{3}{6}$ mile long.

How many miles did Mateo walk in all?

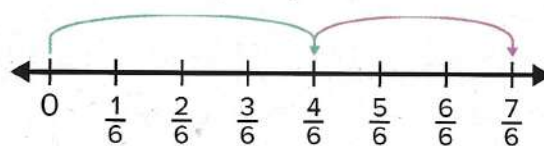You can add fractions to solve this problem.

> ▶ **One Way** Use fraction tiles.
>
> $$\frac{4}{6} + \frac{3}{6} = ?$$
>
> | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ |
>
> $\underbrace{\qquad}_{\frac{4}{6}}$ $\underbrace{\qquad}_{\frac{3}{6}}$
>
> $$\frac{4}{6} + \frac{3}{6} = \frac{7}{6}$$

> ▶ **Another Way** Use a number line.
>
> $$\frac{4}{6} + \frac{3}{6} = ?$$
>
>
>
> $$\frac{4}{6} + \frac{3}{6} = \frac{7}{6}$$

Mateo walked $\frac{7}{6}$ miles in all.

When adding fractions that refer to the same whole, you add the numerators and the denominators stay the same.

Math is... **Thinking**

How do you know the addends refer to the same whole?

💬 Work Together

What two fractions can you add to get a sum of $\frac{6}{10}$? Use representations to explain your answer.

Name _____

What is the sum? Create a representation to find the sum.

1. $\dfrac{3}{5} + \dfrac{3}{5} = \dfrac{\square}{\square}$

2. $\dfrac{1}{4} + \dfrac{2}{4} = \dfrac{\square}{\square}$

What is the missing value? Complete the equation.

3. $\dfrac{2}{3} + \dfrac{3}{3} = \dfrac{\square}{3}$

4. $\dfrac{2}{10} + \dfrac{6}{10} = \dfrac{8}{\square}$

5. $\dfrac{1}{8} + \dfrac{5}{8} = \dfrac{\square}{\square}$

6. $\dfrac{3}{2} + \dfrac{4}{2} = \dfrac{\square}{\square}$

7. $\dfrac{\square}{\square} + \dfrac{4}{6} = \dfrac{5}{6}$

8. $\dfrac{5}{12} + \dfrac{\square}{\square} = \dfrac{8}{12}$

9. Anu has $\dfrac{1}{6}$ meter of wire. She buys $\dfrac{3}{6}$ meter more. How much wire does Anu have now?

10. James swims part of a mile using the freestyle stroke. He uses the backstroke for $\dfrac{3}{5}$ mile. If he swims $\dfrac{4}{5}$ mile in all, how far did James swim using the freestyle stroke?

11. A class sets a goal to collect money for a local charity. They collect $\dfrac{2}{10}$ of their goal the first week. After the second week, they had collected $\dfrac{6}{10}$ of the total goal. How much of their goal did the class collect in the second week?

12. Which expressions have a sum of $\frac{5}{6}$? Choose all that apply.

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

B. $\frac{2}{3} + \frac{3}{3}$

C. $\frac{5}{3} + \frac{5}{3}$

D. $\frac{2}{6} + \frac{3}{6}$

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

13. STEM Connection Owen is checking a population of butterflies for a unique marking on their wings. In one day, he studies $\frac{4}{5}$ of the population in the morning and $\frac{1}{5}$ of the population in the afternoon. How much of the population of butterfiles did he study in one day?

14. Extend Your Thinking Dionne uses $\frac{3}{10}$ roll of tape to seal some boxes and $\frac{4}{10}$ roll of tape for an art project. Did Dionne use more than or less than $\frac{1}{2}$ roll of tape in all? Explain your answer.

🔁 Reflect

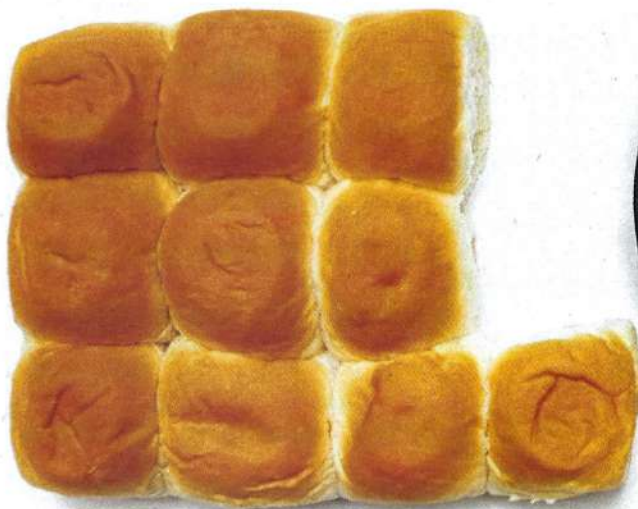How can you add fractions with like denominators?

Math is... **Mindset**

How were you able to accomplish your goal today?

Represent Subtracting Fractions

Be Curious

Tell me everything you can.

Math is... **Mindset**

How do you work well with a classmate even when you might disagree?

Learn

Samantha has a ribbon that is $\frac{7}{8}$ yard long. She cuts it into two pieces. One piece is $\frac{4}{8}$ yard long.

How long is the other piece?

You can use representations to find the difference.

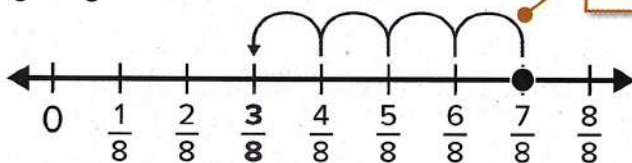▶ **One Way** Use fraction tiles.

$\frac{7}{8} - \frac{4}{8} = ?$

Subtract 4 tiles.

$$\frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \left[\frac{1}{8}\right]$$

$\frac{7}{8} - \frac{4}{8} = \frac{3}{8}$

The denominator stays the same.

▶ **Another Way** Use a number line.

$\frac{7}{8} - \frac{4}{8} = ?$

Each interval is the same size.

$\frac{7}{8} - \frac{4}{8} = \frac{3}{8}$

The other piece of ribbon is $\frac{3}{8}$ yard long.

You can subtract fractions that refer to the same whole.

Math is... **Modeling**

How do representations help you subtract fractions?

🗨 Work Together

Samantha has another ribbon that is $\frac{10}{12}$ yard long. She cuts off a piece that is $\frac{3}{12}$ yard long. How long is the other piece? Use a representation to show your work.
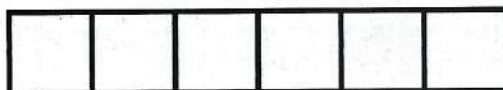
On My Own

Name _____

1. The park is $\frac{9}{10}$ mile from Ms. Rydal's house. She walks $\frac{3}{10}$ mile and rests on a bench. How much farther does Ms. Rydal have to walk to reach the park? Draw a picture to show your thinking.

How can you find the difference? Use the fraction model to represent the equation.

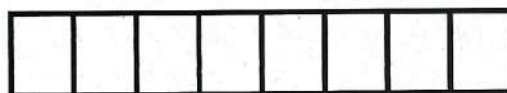2. $\frac{3}{4} - \frac{1}{4} = \frac{\square}{\square}$

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

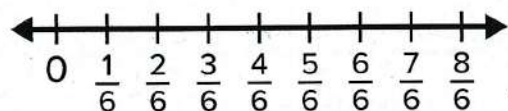4. $\frac{5}{10} - \frac{3}{10} = \frac{\square}{\square}$
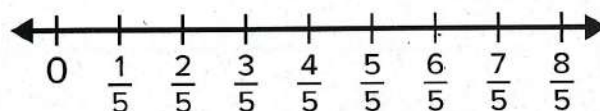
5. $\frac{6}{8} - \frac{3}{8} = \frac{\square}{\square}$

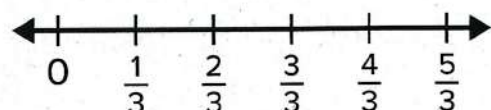**How can you find the difference? Use the number line to represent the equation.**

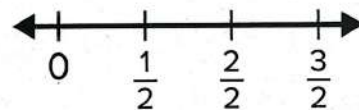6. $\frac{7}{6} - \frac{1}{6} = \frac{\square}{\square}$

0   $\frac{1}{6}$ $\frac{2}{6}$ $\frac{3}{6}$ $\frac{4}{6}$ $\frac{5}{6}$ $\frac{6}{6}$ $\frac{7}{6}$ $\frac{8}{6}$

7. $\frac{8}{5} - \frac{4}{5} = \frac{\square}{\square}$

0   $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{5}{5}$ $\frac{6}{5}$ $\frac{7}{5}$ $\frac{8}{5}$

8. $\frac{5}{3} - \frac{2}{3} = \frac{\square}{\square}$

0   $\frac{1}{3}$ $\frac{2}{3}$ $\frac{3}{3}$ $\frac{4}{3}$ $\frac{5}{3}$

9. $\frac{3}{2} - \frac{1}{2} = \frac{\square}{\square}$
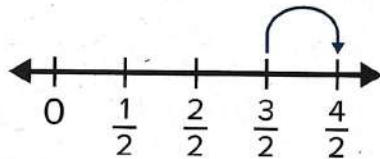
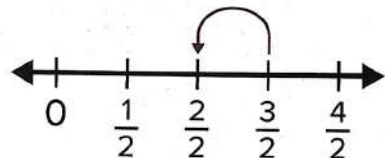0 $\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$

10. **Error analysis** Jackson has $\frac{3}{4}$ liter of water in his water bottle. He drinks some of the water during soccer practice. There is $\frac{1}{4}$ liter of water left in his water bottle. He thinks he drank more than half a liter. Do you think Jackson is correct? Draw a picture to show your thinking.

11. Which representation shows $\frac{3}{2} - \frac{1}{2}$?

A.

$$0 \quad \frac{1}{2} \quad \frac{2}{2} \quad \frac{3}{2} \quad \frac{4}{2}$$

B.

$$0 \quad \frac{1}{2} \quad \frac{2}{2} \quad \frac{3}{2} \quad \frac{4}{2}$$

C.

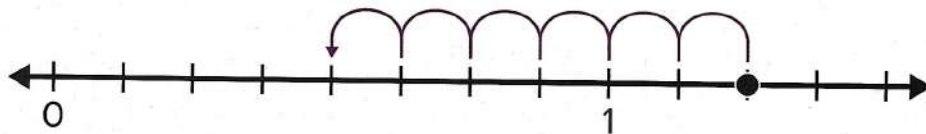**D.**

12. **Extend Your Thinking** Carlos used a number line to find the difference of two fractions. What equation can you write to represent the difference?

$$0 \qquad\qquad\qquad 1$$

🔄 **Reflect**

How can you use representations to subtract fractions with like denominators?

Math is... **Mindset**

How have you worked well with a classmate when you disagreed?

Subtract Fractions with Like Denominators

Be Curious

What do you notice?
What do you wonder?

$$\frac{8}{12} - \frac{5}{12}$$
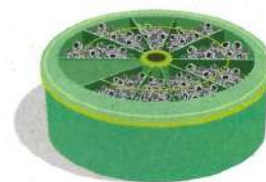
$$\frac{11}{6} - \frac{4}{6}$$

Math is... Mindset

What helps you understand your feelings?

Learn

Robert had nails in $\frac{9}{10}$ of the container.

He used the nails in $\frac{4}{10}$ of the container to build a bookshelf.
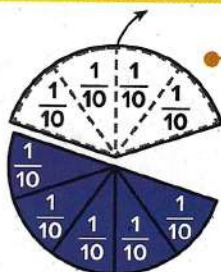
How much of the container still has nails in it?

You can subtract to solve this problem.

▶ **One Way** Use fraction circles.
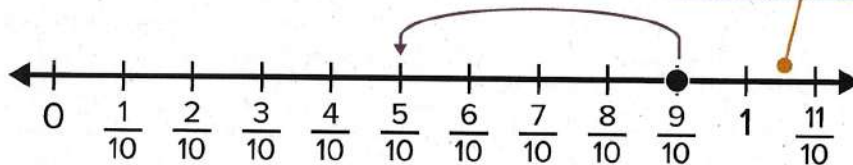
$\frac{9}{10} - \frac{4}{10} = ?$

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

Subtract 4 parts.

▶ **Another Way** Use a number line.

$\frac{9}{10} - \frac{4}{10} = ?$

Each interval is the same size.

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

The denominators stay the same.

There are nails in $\frac{5}{10}$ of the container.

Math is... **Quantities**

How do you know what fraction each part of a fraction circle represents?

You can subtract two like fractions that refer to the same whole by using models and subtracting the numerators and keeping the denominators the same.
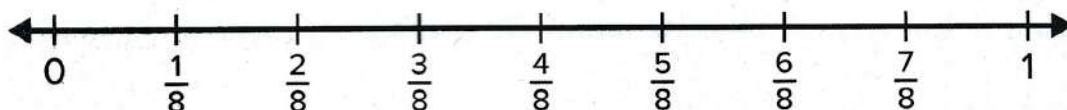
💬 Work Together

Ryan has $\frac{6}{8}$ cup of rice. Rita has $\frac{4}{8}$ cup of rice. Who has more rice? How much more? Use representations to explain your answer.
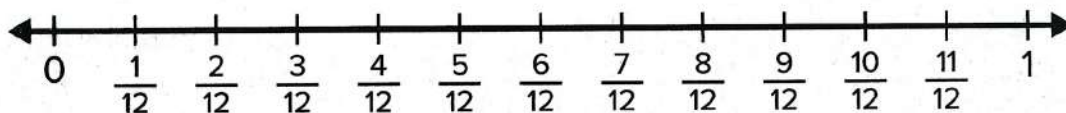
Name _____

1. Henry's home is $\frac{7}{8}$ mile from school. He stops at the library on his way home. The library is $\frac{4}{8}$ mile from the school. How much farther does Henry need to travel to get home? Use the number line to find the difference.

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◄──┼────┼────┼────┼────┼────┼────┼────┼──►
   0    1    2    3    4    5    6    7    1
        8    8    8    8    8    8    8
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2. A tank was $\frac{7}{12}$ full of water. Camryn drained $\frac{5}{12}$ of the tank. How much of the tank is still filled with water? Use the number line to find the difference.

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◄──┼───┼───┼───┼───┼───┼───┼───┼───┼───┼───┼───┼──►
   0   1   2   3   4   5   6   7   8   9   10  11  1
       12  12  12  12  12  12  12  12  12  12  12
```

What is the difference?

3. $\frac{6}{8} - \frac{2}{8} = \frac{\square}{\square}$

4. $\frac{15}{12} - \frac{11}{12} = \frac{\square}{\square}$

5. $\frac{9}{6} - \frac{4}{6} = \frac{\square}{\square}$

6. $\frac{7}{8} - \frac{2}{8} - \frac{2}{8} = \frac{\square}{\square}$

What fraction are you taking away?

7. $\frac{8}{10} - \frac{\square}{\square} = \frac{6}{10}$

8. $\frac{8}{12} - \frac{\square}{\square} = \frac{5}{12}$

9. $\frac{4}{5} - \frac{1}{5} - \frac{\square}{\square} = \frac{2}{5}$

10. $\frac{9}{12} - \frac{2}{12} - \frac{\square}{\square} = \frac{4}{12}$

11. Gianna has $\frac{5}{6}$ yard of string. She cuts off $\frac{3}{6}$ yard to make bracelets. Does Gianna have more than or less than $\frac{1}{2}$ yard of string left? Explain.

12. Roger eats $\frac{2}{4}$ of a large protein bar. Sammi eats $\frac{3}{4}$ of a small protein bar. Jenna says Sammi ate more? Do you agree? Explain.

13. Error Analysis Tamara says the difference of $\frac{12}{7}$ and $\frac{5}{7}$ is $\frac{7}{0}$. How can you help her find the correct difference?

14. Extend Your Thinking Marnie has $\frac{7}{8}$ cup of nuts. She uses some of the nuts in a recipe and now she has $\frac{3}{8}$ cup of nuts. How much did she use? Explain.

Reflect

How are adding and subtracting fractions the same? How are they different?

Math is... Mindset

How have you worked to understand your feelings?

Fraction Sums and Differences

Name _____

For each problem, choose the best estimate for the sum.

1. $\frac{5}{12} + \frac{2}{12}$

Explain or show your thinking.

Circle the best estimate.

A. more than 1

B. between $\frac{1}{2}$ and 1

C. between 0 and $\frac{1}{2}$

D. none of the above

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

Explain or show your thinking.

Circle the best estimate.

A. more than 1

B. between $\frac{1}{2}$ and 1

C. between 0 and $\frac{1}{2}$

D. none of the above

For each problem, choose the best estimate for the difference.

3. $\dfrac{11}{6} - \dfrac{7}{6}$

   Circle the best estimate.

   A. more than 1

   B. between $\dfrac{1}{2}$ and 1

   C. between 0 and $\dfrac{1}{2}$

   D. none of the above

   Explain or show your thinking.

---

4. $\dfrac{11}{8} - \dfrac{2}{8}$

   Circle the best estimate.

   A. more than 1

   B. between $\dfrac{1}{2}$ and 1

   C. between 0 and $\dfrac{1}{2}$

   D. none of the above

   Explain or show your thinking.

Reflect On Your Learning

I'm confused.　　　I'm still learning.　　　I understand.　　　I can teach someone else.

○————————○————————○————————○

Solve Problems Involving Fractions

Be Curious

What math do you see?

Math is... **Mindset**

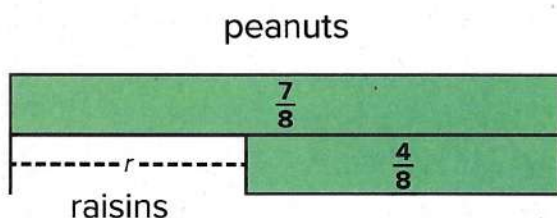What is your responsibility in building a safe classroom culture?

Learn

Graham makes his own trail mix. Graham uses $\frac{7}{8}$ pound peanuts in the trail mix. He uses $\frac{4}{8}$ pound less raisins than peanuts.

What is the total weight of the trail mix?

Some problems have more than one question to answer.

Step 1: What is the weight of the raisins that Graham uses?

peanuts

| $\frac{7}{8}$ |

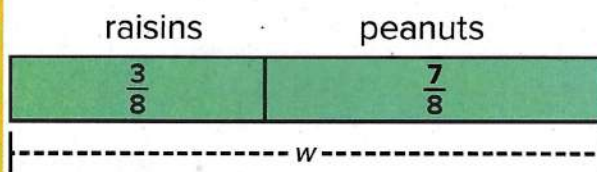| $\frac{4}{8}$ |

raisins

$$\frac{7}{8} - \frac{4}{8} = r$$
$$\frac{3}{8} = r$$

Graham uses $\frac{3}{8}$ pound of raisins.

Step 2: What is the total weight of the trail mix?

| raisins | peanuts |
| $\frac{3}{8}$ | $\frac{7}{8}$ |

w

$$\frac{3}{8} + \frac{7}{8} = w$$
$$\frac{10}{8} = w$$

The total weight of the trail mix is $\frac{10}{8}$ pounds.

You can use strategies you know to solve problems involving addition and subtraction of fractions.

Math is... **Connections**

How is addition with fractions like addition with whole numbers?

Work Together

Heidi and her brother are painting a wall. Heidi painted $\frac{4}{10}$ of the wall. Her brother painted $\frac{3}{10}$ of the wall. How much of the wall still needs to be painted? Use equations and representations to show your work.

On My Own

Name _____

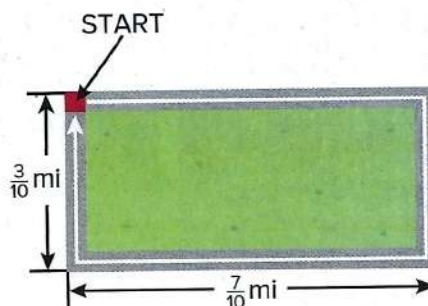**What is the solution? Use representations and equations to solve.**

1. To make a recipe, Clarice uses $\frac{1}{4}$ cup of oil and $\frac{2}{4}$ cup of water. How much liquid does she use?

2. Jen ran $\frac{9}{10}$ mile. Her sister ran $\frac{12}{10}$ miles. How much farther did Jen's sister run?

3. There was some water in a tank. Camryn drained $\frac{5}{12}$ of the tank. Now there is $\frac{2}{12}$ of the tank remaining. How much of the tank was filled with water before Camryn drained it?

4. To make a fruit salad, Sully uses $\frac{5}{6}$ pound of oranges. He uses $\frac{3}{6}$ pound less berries than oranges. What is the total weight of the oranges and berries?

5. Marcie planned to walk around the entire park, but her mother gave her a ride in the car for the last $\frac{4}{10}$ mile. How far did she walk?

START

$\frac{3}{10}$ mi

$\frac{7}{10}$ mi

6. Julia rode her bike $\frac{8}{10}$ mile to the library. She rode another $\frac{1}{10}$ mile to the post office. Then, she rode $\frac{2}{10}$ mile to school. How many miles did Julia ride?

7. A bottle contained $\frac{7}{8}$ gallon of juice. Then $\frac{5}{8}$ gallon was poured out. After some juice was added, the bottle contained $\frac{3}{8}$ gallon of juice. How much juice was added?

8. Santosh walked $\frac{9}{10}$ mile. He realized he dropped his scarf, so he walked back $\frac{3}{10}$ mile. Then he walked another $\frac{5}{10}$ mile. How far is Santosh from where he started?

9. Extend Your Thinking Write a word problem that can be represented by the equations below. Then solve.

$$b = \frac{5}{8} + \frac{4}{8}, c = b - \frac{2}{8}$$

🔁 Reflect

How can you determine which operations to use to solve problems with fractions?

Math is... **Mindset**

How did you help to create a safe classroom culture?

Unit Review   Name _____

Vocabulary Review

Choose the correct word(s) to complete the sentence.

addend	decompose	denominator
difference	like denominators	numerator
sum	unit fraction	

1. To _____ is to break apart a number into parts.
   (Lesson 9-1)

2. A(n) _____ is a fraction with a numerator of 1.
   (Lessons 9-1, 9-2)

3. The top number in a fraction is called the _____.
   (Lessons 9-3, 9-4)

4. The bottom number in a fraction is called the _____.
   (Lessons 9-3, 9-4)

5. When two or more fractions have the same denominators they have _____. (Lessons 9-1, 9-2)

6. The numbers you add together in an addition equation are called _____. (Lessons 9-1, 9-2)

7. The answer in a subtraction equation is called the _____.
   (Lessons 9-4, 9-5)

8. The answer in an addition equation is called the _____.
   (Lessons 9-1, 9-2)

Review

9. Which addition expressions show a decomposition of $\frac{5}{8}$? Choose all that apply. (Lesson 9-1)

A. $\frac{2}{8} + \frac{3}{8}$

B. $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

C. $\frac{1}{8} + \frac{1}{8} + \frac{2}{8}$

D. $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

E. $\frac{1}{8} + \frac{2}{8} + \frac{2}{8}$

10. What fraction decomposes into the addition expression $\frac{1}{5} + \frac{1}{5} + \frac{2}{5}$? (Lesson 9-3)

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{3}{5}$

D. $\frac{4}{5}$

11. Timothy mowed $\frac{1}{6}$ of the lawn. His sister Eliana mowed $\frac{4}{6}$ of the lawn. How much of the lawn did Timothy and Eliana mow in all? Create a representation to solve.

(Lessons 9-2, 9-3)

12. Marina used $\frac{3}{12}$ pound of butter for her cookies and $\frac{4}{12}$ pound of butter for carrot cake. How much butter did Marina use?

(Lessons 9-4, 9-5)

13. What is the sum? Use a fraction model to solve the equation.

(Lessons 9-4, 9-5)

$$\frac{3}{7} + \frac{2}{7} + \frac{1}{7} = \frac{\square}{\square}$$

14. Is the equation correct? Use a checkmark to choose *Correct* or *Not Correct* for each equation.

(Lessons 9-3, 9-5)

	Correct	Not Correct
$\frac{7}{10} + \frac{4}{10} = \frac{11}{10}$		
$\frac{4}{8} - \frac{3}{8} = \frac{1}{16}$		
$\frac{1}{2} + \frac{1}{2} = \frac{2}{4}$		
$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$		
$\frac{5}{12} + \frac{2}{12} = \frac{7}{12}$		

15. Which number line illustrates the difference $\frac{7}{8} - \frac{3}{8}$? (Lessons 9-4, 9-5)
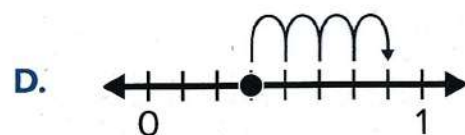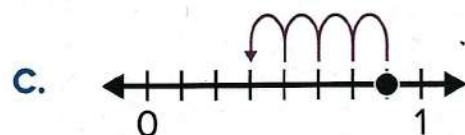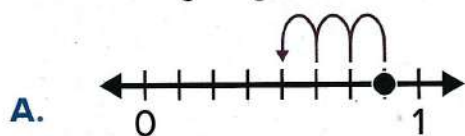
A.

B.

C.

D.

16. What is the difference $\frac{9}{12} - \frac{4}{12}$? Create a representation to solve.

(Lessons 9-4, 9-5)

17. Monica has $\frac{2}{5}$ of a glass filled with milk. She adds milk to the glass until $\frac{4}{5}$ of the glass is filled with milk. How much milk does Monica add to the glass? Create a representation to solve.

(Lessons 9-4, 9-5)

18. A water cooler at Mr. Kane's office was $\frac{8}{10}$ full. The office workers drained $\frac{6}{10}$ of the cooler during the day. At the end of the day more water was added and the cooler is now $\frac{9}{10}$ full. How much water was added at the end of the day? (Lesson 9-6)

Performance Task

You have a container that has a capacity of $\frac{3}{4}$ cup and another container that has a capacity of $\frac{5}{4}$ cup. You want to measure out exactly 1 cup into a bowl. Explain how you can measure your water.

🔁 Reflect

Describe how you can add and subtract fractions with like denominators.

Fluency Practice

Name _____

Fluency Strategy

You can use an **algorithm** to add whole numbers. Add the digits in the same place value.

Add the ones, tens, hundreds, then thousands.
Sometimes it is necessary to regroup when using the algorithm.

$$\begin{array}{r} \overset{1}{2},\overset{1}{4}\overset{1}{7}8 \\ +\ 3,756 \\ \hline 6,234 \end{array}$$

Fluency Flash

Write the sum in the place value chart.

1.

thousands	hundreds	tens	ones
3	5	2	2
+ 4	1	9	6

2.

thousands	hundreds	tens	ones
6	7	4	8
+ 1	6	5	9

Fluency Check

Find each sum or difference.

3. $2{,}497 + 248 =$ _____

4. $697 - 262 =$ _____

5. $1{,}799 - 354 =$ _____

6. $15{,}947 + 2{,}021 =$ _____

7. $53{,}610 + 21{,}468 =$ _____

8. $9{,}857 - 6{,}724 =$ _____

9. $359 + 446 =$ _____

10. $3{,}345 + 4{,}413 =$ _____

11. $319 + 784 =$ _____

12. $3{,}468 - 2{,}314 =$ _____

13. $192 + 354 =$ _____

14. $4{,}567 + 321 =$ _____

Fluency Talk

Explain to a friend how you know if you have to regroup when adding using an algorithm.

How does adding with regrouping compare to adding without regrouping?