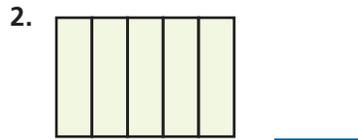
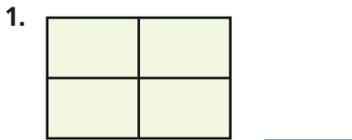


# Add and Subtract Fractions

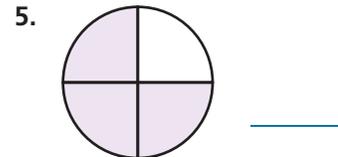
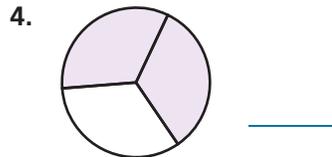
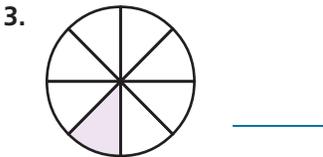


## Show What You Know

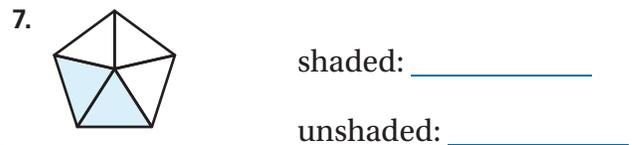
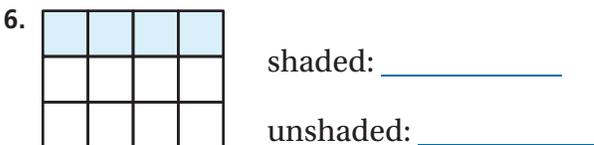
► **Fractions Equal to 1** Write the fraction that names the whole.



► **Parts of a Whole** Write a fraction that names the shaded part.

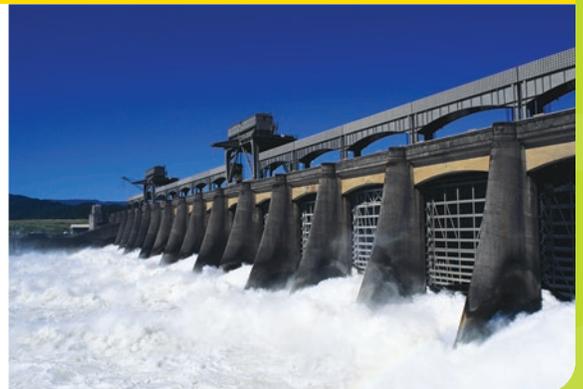


► **Read and Write Fractions** Write a fraction for the shaded part. Write a fraction for the unshaded part.



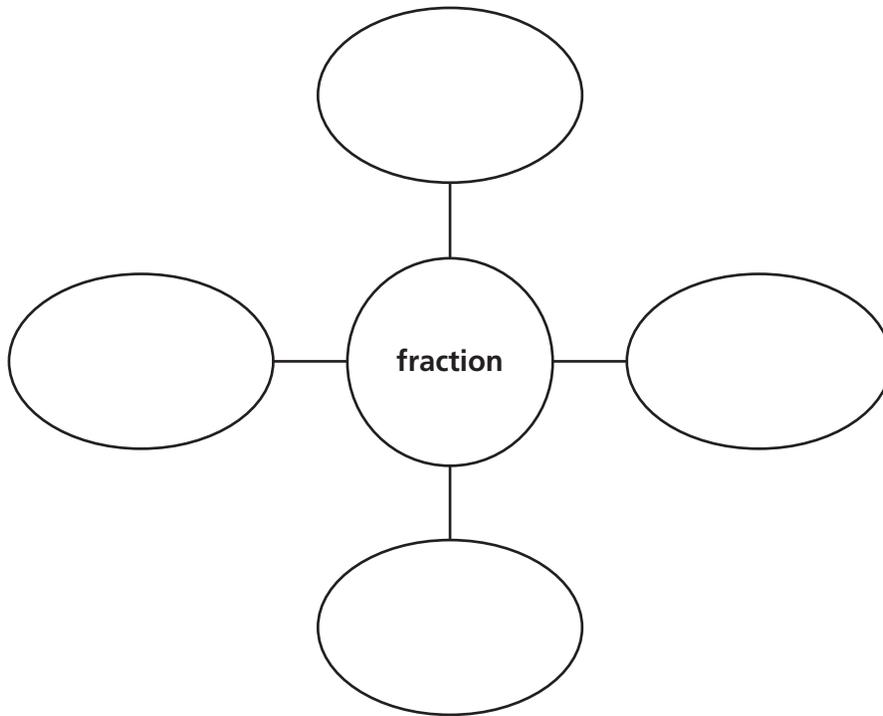
## MATH in the Real World

The electricity that powers our appliances is converted from many sources of energy. About  $\frac{5}{10}$  is made from coal, about  $\frac{2}{10}$  from natural gas, and about  $\frac{2}{10}$  from nuclear power. About how much of our electricity comes from sources other than coal, natural gas, or nuclear power?



## Visualize It

Complete the bubble map using the words with a ✓.



### Connect to Vocabulary

#### Review Words

- Associative Property of Addition
- Commutative Property of Addition
- ✓ denominator
- fraction
- ✓ numerator
- ✓ unit fraction

#### Preview Words

- ✓ mixed number

## Understand Vocabulary

Write the word or phrase that matches the description.

- the number in a fraction that tells how many parts of the whole or group are being considered

\_\_\_\_\_

- a number that names a part of a whole or part of a group

\_\_\_\_\_

- an amount given as a whole number and a fraction

\_\_\_\_\_

- the number in a fraction that tells how many equal parts are in the whole or in the group \_\_\_\_\_

- a fraction that has a numerator of 1 \_\_\_\_\_



Name \_\_\_\_\_

# Add and Subtract Parts of a Whole

**I Can** add or subtract fractions with like denominators.

Florida's B.E.S.T.

- Algebraic Reasoning 4.AR.1.2
- Fractions 4.FR.2.2
- Mathematical Thinking & Reasoning  
MTR.2.1, MTR.4.1, MTR.7.1

## Investigate

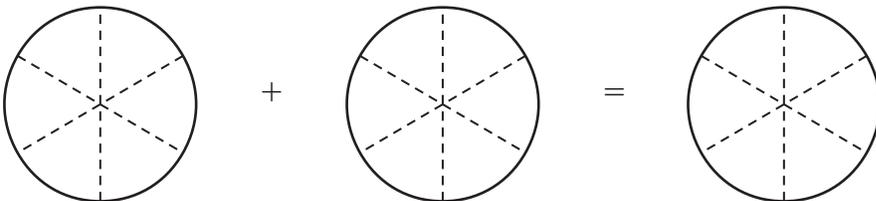
**Materials** ■ fraction circles

Ms. Clark has the following pie pieces left over from a bake sale.



She will combine the pieces so they are on the same dish.  
How much pie will be on the dish?

**A.** Model the problem using fraction circles. Draw a picture of your model. Then write the sum.



\_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

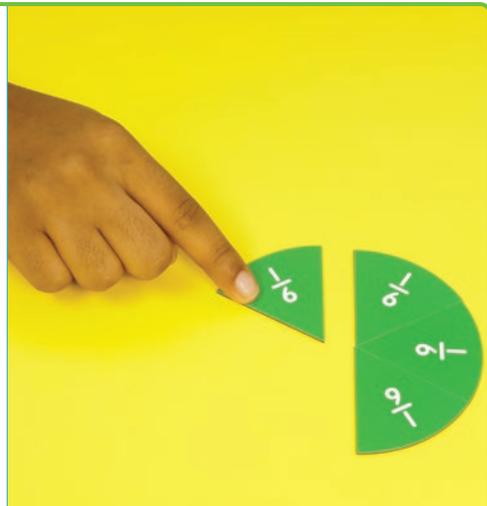
So, \_\_\_\_\_ of a pie is on the dish.

**B.** Suppose Ms. Clark eats 2 pieces of the pie. How much pie will be left on the dish? Model the problem using fraction circles. Draw a picture of your model. Then write the difference.



\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_

So, \_\_\_\_\_ of the pie is left on the dish.



## Draw Conclusions

1. Arslan says that when you combine 3 pieces of pie and 1 piece of pie, you have 4 pieces of pie. Explain how Arslan's statement is related to the equation  $\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$ .

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2. Isabel wrote the equation  $\frac{1}{2} + \frac{1}{6} = \frac{4}{6}$  and Jonah wrote  $\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$  to represent combining the pie pieces. Explain why both equations are correct.

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3. If there is  $\frac{4}{6}$  of a pie on a plate, what part of the pie is missing from the plate? Write an equation to justify your answer.

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## Make Connections

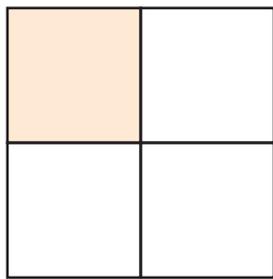
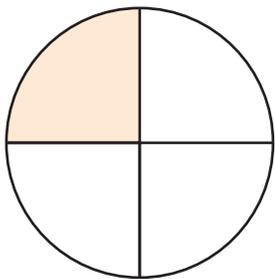


**MTR**  
**4.1** Engage in discussions on mathematical thinking.

Give an example of a situation where the equation  $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$  makes sense. Explain your reasoning.

4. You can only join or separate parts that refer to the same whole.

Suppose Randy has  $\frac{1}{4}$  of a round cake and  $\frac{1}{4}$  of a square cake.



- a. Are the wholes the same? Explain.

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- b. Does the sum  $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$  make sense in this situation? Explain.

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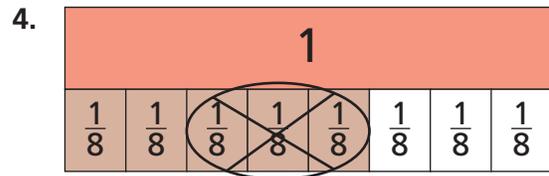
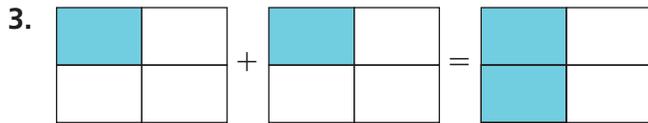
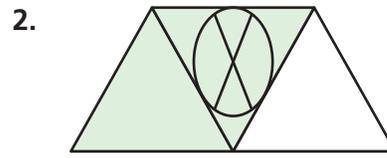
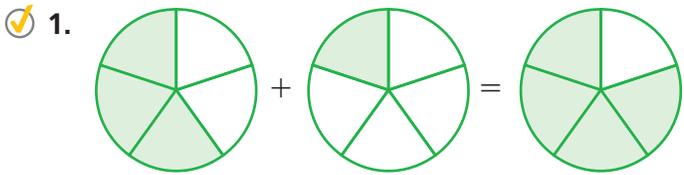
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# Share and Show

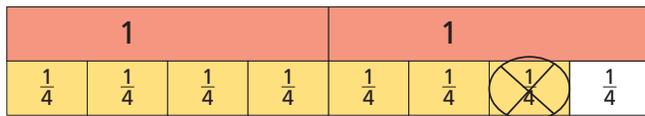


Use the model to write an equation.



Use the model to solve the equation.

5.  $\frac{7}{4} - \frac{1}{4} =$  \_\_\_\_\_



6.  $\frac{5}{6} + \frac{1}{6} =$  \_\_\_\_\_



## On Your Own

7. **MTR** Sean has  $\frac{1}{5}$  of a cupcake and  $\frac{1}{5}$  of a large cake.

a. Are the wholes the same? Explain.

\_\_\_\_\_

b. Does the sum  $\frac{1}{5} + \frac{1}{5} = \frac{2}{5}$  make sense in this situation? Explain.

\_\_\_\_\_

8. Halima's dance class learned  $\frac{1}{5}$  of a new dance on Monday, and  $\frac{2}{5}$  of the dance on Tuesday. What fraction of the dance is left for the class to learn on Wednesday?

\_\_\_\_\_

9. Samantha and Kim used different models to help find  $\frac{1}{3} + \frac{1}{6}$ . Whose model makes sense? Whose model is nonsense? Explain your reasoning below each model.

**Samantha's Model**

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

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**Kim's Model**

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

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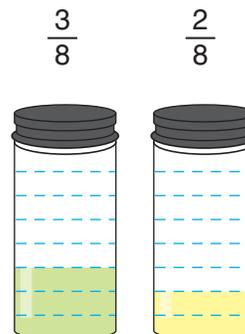
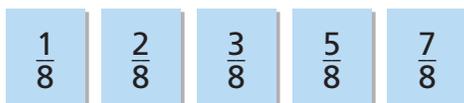


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10. Draw a model you could use to add  $\frac{1}{4} + \frac{1}{2}$ .
11. Haji has two jars of paint.  
One jar is  $\frac{3}{8}$  full. The other jar is  $\frac{2}{8}$  full.  
Use the fractions to write an equation that shows the amount of paint Haji has.



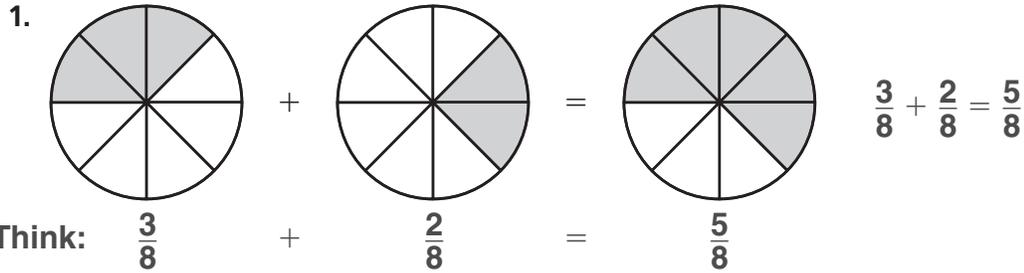
\_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

# Add and Subtract Parts of a Whole

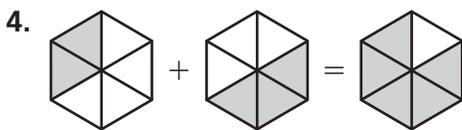
Go Online

Interactive Examples

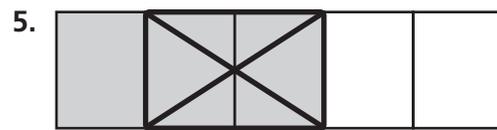
Use the model to write an equation.



Use the model to solve the equation.



$$\frac{2}{6} + \frac{3}{6} = \underline{\hspace{2cm}}$$



$$\frac{3}{5} - \frac{2}{5} = \underline{\hspace{2cm}}$$

## Problem Solving

6. Javi ate  $\frac{4}{8}$  of a pizza. Millie ate  $\frac{3}{8}$  of the same pizza. How much of the pizza was eaten by Javi and Millie?
- \_\_\_\_\_

7. **WRITE**  *Math* Draw a fraction circle to model  $\frac{8}{6} - \frac{1}{6}$  and write the difference.

## Lesson Check

8. A whole pie is cut into 12 equal slices. Three of the slices are served. How much of the pie is left?
9. An orange is divided into 6 equal wedges. Aaliya eats 1 wedge. Then she eats 3 more wedges. How much of the orange did Aaliya eat?

## Spiral Review

10. Put these distances in order from least to greatest:  $\frac{3}{16}$  mile,  $\frac{1}{8}$  mile,  $\frac{3}{4}$  mile
11. Jeremy walked  $\frac{6}{8}$  of the way to school and ran the rest of the way. Write an equivalent fraction to show the part of the way that Jeremy walked.
12. An elevator starts on the 100th floor of a building. It descends 4 floors every 10 seconds. At what floor will the elevator be 60 seconds after it starts?
13. For a school play, the teacher asked the class to set up chairs in 20 rows with 25 chairs in each row. After setting up all the chairs, they were 5 chairs short. How many chairs did the class set up?

Name \_\_\_\_\_

# Add Fractions Using Models

**I Can** add fractions with like denominators using models.

Florida's B.E.S.T.

- Algebraic Reasoning 4.AR.1.2
- Fractions 4.FR.2.2
- Mathematical Thinking & Reasoning MTR.2.1, MTR.3.1, MTR.4.1, MTR.6.1, MTR.7.1



## UNLOCK the Problem Real World

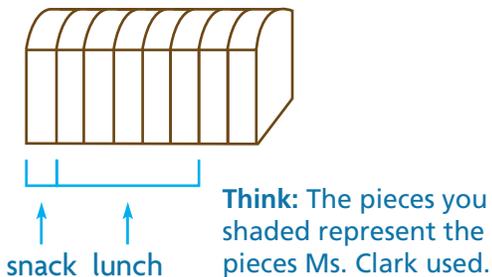
Ms. Clark made a loaf of bread. She used  $\frac{1}{8}$  of the bread for a snack and  $\frac{5}{8}$  of the bread for lunch. How much did she use for a snack and lunch?

**One Way** Use a picture.

$\frac{1}{8}$  is \_\_\_\_\_ eighth-size piece of bread.

$\frac{5}{8}$  is \_\_\_\_\_ eighth-size pieces of bread.

Shade 1 eighth-size piece. Then shade 5 eighth-size pieces.



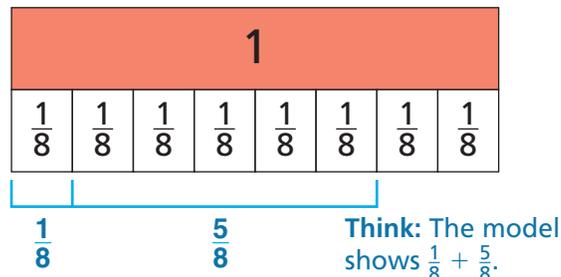
So, Ms. Clark used \_\_\_\_\_ eighth-size pieces, or  $\frac{\square}{8}$  of the bread.

**Another Way** Use fraction strips.

The 1 strip represents the whole loaf.

Each  $\frac{1}{8}$  part represents 1 eighth-size piece of bread.

Shade  $\frac{1}{8}$ . Then shade  $\frac{5}{8}$ .



How many  $\frac{1}{8}$ -size parts are shaded? \_\_\_\_\_

Write the sum.  $\frac{1}{8} + \frac{5}{8} = \frac{\square}{8}$

So, Ms. Clark used \_\_\_\_\_ of the bread.

1. Explain how the numerator of the sum is related to the fraction strip model.

\_\_\_\_\_

\_\_\_\_\_

2. Explain how the denominator of the sum is related to the fraction strip model.

\_\_\_\_\_

\_\_\_\_\_

**Math Talk**

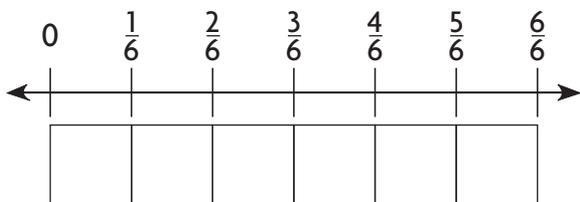
**MTR 6.1** Assess reasonableness of solutions.

Explain why  $\frac{1}{8} + \frac{5}{8} \neq \frac{6}{16}$ .

## Example

Altair needs two strips of wood to make masts for a miniature sailboat. One mast will be  $\frac{3}{6}$  foot long. The other mast will be  $\frac{2}{6}$  foot long. He has a strip of wood that is  $\frac{4}{6}$  foot long. Is this strip of wood long enough to make both masts?

Shade the model to show  $\frac{3}{6} + \frac{2}{6}$ .



Write the sum.  $\frac{3}{6} + \frac{2}{6} = \frac{\quad}{6}$

Is the sum less than or greater than  $\frac{4}{6}$ ? \_\_\_\_\_

So, the strip of wood \_\_\_\_\_ long enough to make both masts.

3. Explain how you used the number line to determine if the sum was less than  $\frac{4}{6}$ .

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4. What if each mast was  $\frac{2}{6}$  foot long? Could Altair use the strip of wood to make both masts? Explain.

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## Share and Show

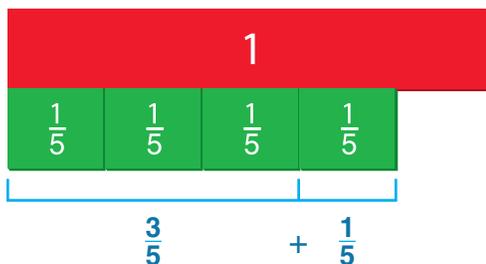
Math Board

1. Paki's cat ate  $\frac{3}{5}$  of a bag of cat treats in September and  $\frac{1}{5}$  of the same bag of cat treats in October. What part of the bag of cat treats did Paki's cat eat in both months?

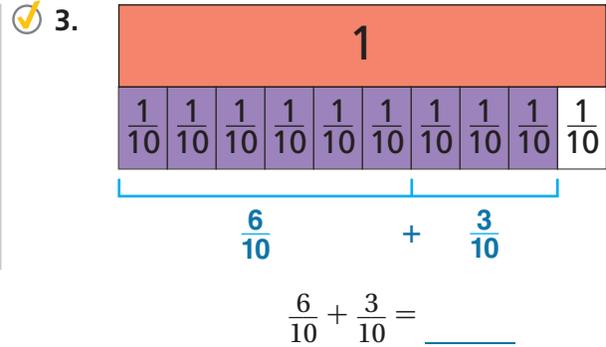
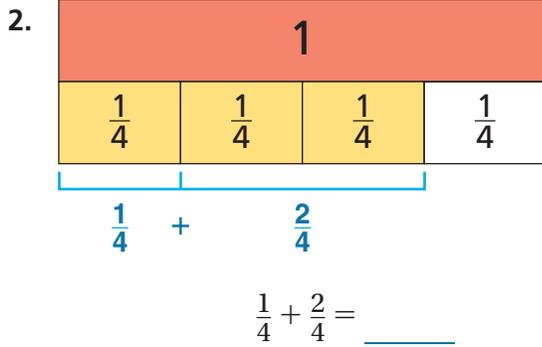
Use the model to find the sum  $\frac{3}{5} + \frac{1}{5}$ .

How many fifth-size pieces are shown? \_\_\_\_\_

$\frac{3}{5} + \frac{1}{5} = \frac{\quad}{5}$  of a bag



Use the model to find the sum.



Find the sum. Use models to help.

4.  $\frac{3}{6} + \frac{3}{6} =$  \_\_\_\_\_

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

6.  $\frac{1}{3} + \frac{1}{3} =$  \_\_\_\_\_

### On Your Own

Find the sum. Use models or *iTools* to help.

7.  $\frac{5}{8} + \frac{2}{8} =$  \_\_\_\_\_

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

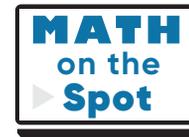
9.  $\frac{4}{6} + \frac{1}{6} =$  \_\_\_\_\_

10. Chris is making a fruit drink. He mixes  $\frac{2}{8}$  quart of grape juice with  $\frac{3}{8}$  quart of apple juice. Then he adds  $\frac{1}{8}$  quart of lemonade. How much fruit drink does Chris make?



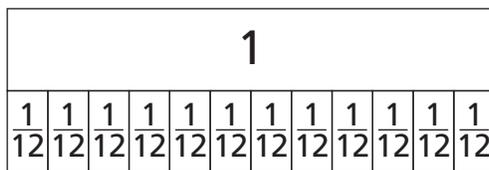
**MTR 4.1** Engage in discussions on mathematical thinking.  
Explain how to add  $\frac{2}{6} + \frac{3}{6}$ .

### Problem Solving • Applications



11. A sum has five addends. Each addend is a unit fraction. The sum is 1. What are the addends?
- \_\_\_\_\_

12. In a survey,  $\frac{4}{12}$  of the students chose Friday and  $\frac{5}{12}$  chose Saturday as their favorite day of the week. What fraction shows the students who chose Friday or Saturday as their favorite day? Shade the model to show your answer.



\_\_\_\_\_ of the students chose Friday or Saturday.

13. **MTR** Jin is putting colored sand in a jar. She filled  $\frac{2}{10}$  of the jar with blue sand and  $\frac{4}{10}$  of the jar with pink sand. Describe one way to model the part of the jar filled with sand.

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## Cross-Curricular: Art

### Stained Glass Windows

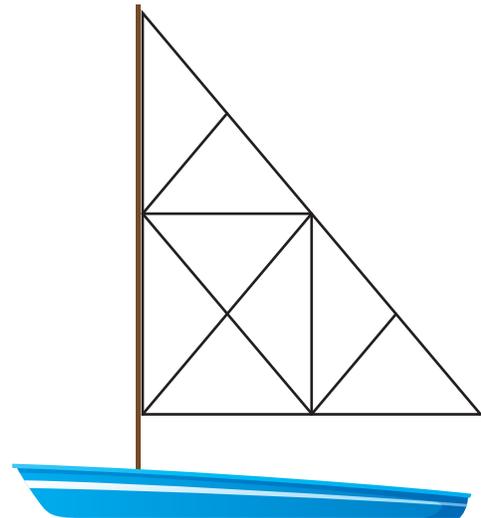
Have you ever seen a stained glass window in a building or home? Artists have been designing stained glass windows for hundreds of years.

Help design the stained glass sail on the boat below.

**Materials** ■ color pencils

Look at the eight triangles in the sail. Use the guide below to color the triangles:

- $\frac{2}{8}$  blue
- $\frac{3}{8}$  red
- $\frac{2}{8}$  orange
- $\frac{1}{8}$  yellow



14. **MTR** Write an equation that shows the fraction of triangles that are red or blue.

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15. What color is the greatest part of the sail? Write a fraction for that color. How do you know that fraction is greater than the other fractions? Explain.

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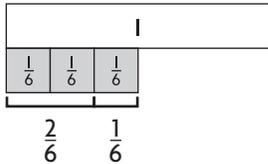
# Add Fractions Using Models

Go Online

Interactive Examples

Find the sum. Use fraction strips to help.

1.  $\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$



2.  $\frac{4}{10} + \frac{5}{10} =$  \_\_\_\_\_

3.  $\frac{1}{3} + \frac{2}{3} =$  \_\_\_\_\_

4.  $\frac{2}{4} + \frac{1}{4} =$  \_\_\_\_\_

5.  $\frac{2}{12} + \frac{4}{12} =$  \_\_\_\_\_

6.  $\frac{1}{6} + \frac{2}{6} =$  \_\_\_\_\_

## Problem Solving

7. Zeena walks  $\frac{4}{10}$  mile to her friend's house. Then she walks  $\frac{5}{10}$  mile to the store. How far does she walk in all?

---

8. Evan eats  $\frac{1}{8}$  of a pan of lasagna and his brother eats  $\frac{2}{8}$  of it. What fraction of the pan of lasagna do they eat?

---

9. Jacqueline buys  $\frac{2}{4}$  yard of green ribbon and  $\frac{1}{4}$  yard of pink ribbon. How many yards of ribbon does she buy?

---

10. Shu mixes  $\frac{2}{3}$  pound of peanuts with  $\frac{1}{3}$  pound of almonds. How many pounds of nuts does Shu mix?

---

11.  **WRITE** *Math* Find a recipe in a book or online that includes the amount of salt as a fraction. Model how to find the amount of salt needed when the recipe is doubled.

## Lesson Check

12. Kala has  $\frac{3}{8}$  of a medium pizza left. Hector has  $\frac{2}{8}$  of another medium pizza left. How much pizza do they have altogether? Use models to help.
- 
13. Jeannie ate  $\frac{1}{4}$  of an apple. Kelly ate  $\frac{2}{4}$  of the apple. How much did they eat together? Use models to help.
- 

## Spiral Review

14. Arya is making 14 different kinds of greeting cards. She is making 12 of each kind. How many greeting cards is she making?
- 
15. Jefferson works part time and earns \$1,520 in four weeks. How much does he earn each week?
- 
16. By using efficient water fixtures, the average American can cut water use to about 45 gallons of water per day. About how many gallons of water would the average American use in December if they used the new amount?
- 
17. Collin is making a bulletin board and note center. He is using square cork tiles and square dry-erase tiles. One of every 3 squares will be a cork square. If he uses 12 squares for the center, how many will be cork squares?
-

Name \_\_\_\_\_

# Subtract Fractions Using Models

**I Can** subtract fractions with like denominators using models.

Florida's B.E.S.T.

- Algebraic Reasoning 4.AR.1.2
- Fractions 4.FR.2.2
- Mathematical Thinking & Reasoning MTR.2.1, MTR.4.1, MTR.5.1, MTR.7.1



## UNLOCK the Problem Real World

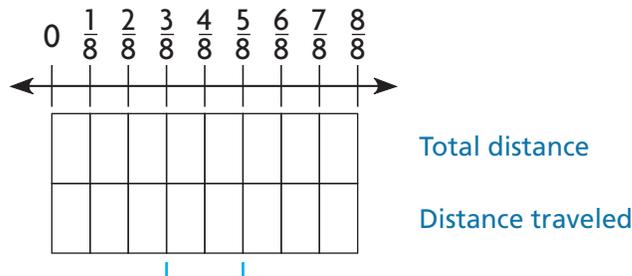
A rover needs to travel  $\frac{5}{8}$  mile to reach its destination. It has already traveled  $\frac{3}{8}$  mile. How much farther does the rover need to travel?

Compare fractions to find the difference.

**STEP 1** Shade the model.

Shade the model to show the total distance.

Then shade the model to show how much distance the rover has already traveled.



Think: The difference is \_\_\_\_\_.

**STEP 2** Write the difference.

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

So, the rover needs to travel \_\_\_\_\_ mile farther.



1. Explain how the model shows how much farther the rover needs to travel.

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2. Explain how you can use the model to find  $\frac{6}{8} - \frac{2}{8}$ .

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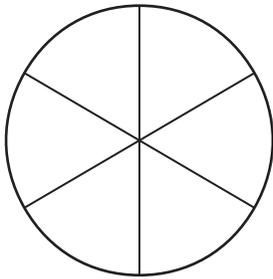
## Example

Sam ordered a small pizza, which was cut into 6 equal slices. He ate  $\frac{2}{6}$  of the pizza and put the rest away for later. How much of the pizza did he put away for later?

Find  $1 - \frac{2}{6}$ .

## One Way Use a picture.

Shade 1 whole.



Cross out the parts Sam ate.

**Think:** He ate  $\frac{2}{6}$  of the pizza, or 2 sixth-sized parts.

How many sixth-sized parts are left? \_\_\_\_\_

So, Sam put \_\_\_\_\_ of the pizza away for later.

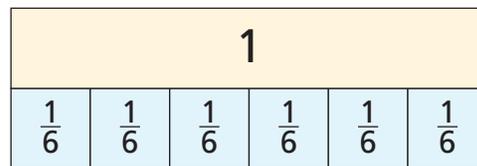
- How much pizza did Sam begin with?  
\_\_\_\_\_

- How many slices are in the whole? \_\_\_\_\_

- How many slices did Sam eat? \_\_\_\_\_

## Another Way Use fraction strips.

Use six  $\frac{1}{6}$ -sized parts to model the whole pizza.



How many  $\frac{1}{6}$ -sized parts should you cross out to model the slices Sam ate? \_\_\_\_\_

How many  $\frac{1}{6}$ -sized parts are left? \_\_\_\_\_

Write the difference.

$$1 - \frac{\quad}{6} = \frac{\quad}{6}$$

**Math Talk**

**MTR 4.1** Engage in discussions on mathematical thinking.

Explain why it makes sense to think of 1 whole as  $\frac{6}{6}$  in this problem.

3. Explain how the equation  $\frac{6}{6} - \frac{2}{6} = \frac{4}{6}$  is related to the problem situation.

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4. Suppose Sam ate  $\frac{2}{3}$  of the pizza and put the rest away for later. Explain how you can use the circle to find how much of the pizza Sam put away for later.

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# Share and Show



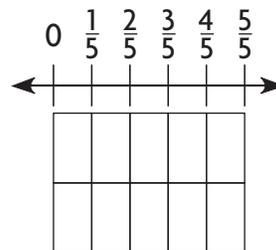
1. Lisa needs  $\frac{4}{5}$  pound of shrimp to make shrimp salad. She has  $\frac{1}{5}$  pound of shrimp. How much more shrimp does Lisa need to make the salad?

Subtract  $\frac{4}{5} - \frac{1}{5}$ . Use the model to help.

Shade the model to show how much shrimp Lisa needs.

Then shade the model to show how much shrimp Lisa has.

Compare the difference between the two shaded rows.

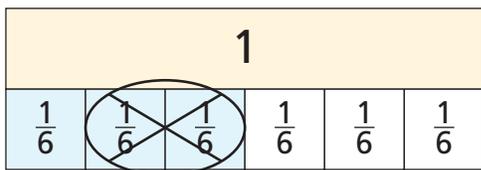


$$\frac{4}{5} - \frac{1}{5} = \frac{\quad}{5} \text{ pound}$$

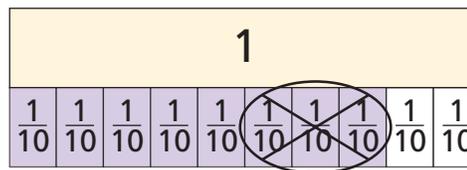
Lisa needs \_\_\_\_\_ pound more shrimp.

Use the models to find the difference.

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



3.  $\frac{8}{10} - \frac{3}{10} = \frac{\quad}{10}$



Subtract. Use models to help.

4.  $\frac{5}{8} - \frac{2}{8} = \underline{\hspace{2cm}}$

5.  $\frac{7}{12} - \frac{2}{12} = \underline{\hspace{2cm}}$

6.  $\frac{3}{4} - \frac{2}{4} = \underline{\hspace{2cm}}$

# On Your Own

Subtract. Use models to help.

7.  $\frac{2}{3} - \frac{1}{3} = \underline{\hspace{2cm}}$

8.  $\frac{7}{8} - \frac{5}{8} = \underline{\hspace{2cm}}$

9. Explain how you could find the unknown addend in  $\frac{2}{6} + \underline{\hspace{1cm}} = 1$  without using a model.

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**MTR 5.1** Use patterns and structure.

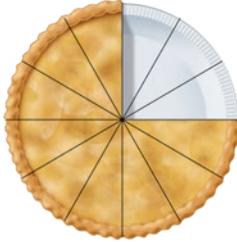
Why does the numerator change when you subtract fractions with like denominators, but the denominator doesn't?



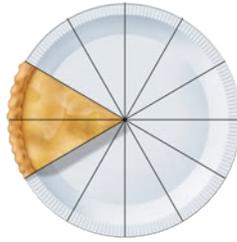
# Problem Solving · Applications

10. Mr. Ruiz served a pie for dessert two nights in a row. The drawings below show the pie after his family ate dessert on each night. What fraction of the pie did they eat on the second night?

First night



Second night



- a. What do you need to know? \_\_\_\_\_

\_\_\_\_\_

- b. How can you find the number of pieces eaten on the second night? \_\_\_\_\_

\_\_\_\_\_

- c. Explain the steps you used to solve the problem.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- d. Complete the sentences.

After the first night, \_\_\_\_\_ pieces were left.

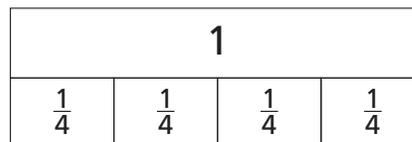
After the second night, \_\_\_\_\_ pieces were left.

So, they ate \_\_\_\_\_ of the pie on the second night.

11. **MTR** Judi ate  $\frac{7}{8}$  of a small pizza and Jack ate  $\frac{2}{8}$  of a second small pizza. How much more of a pizza did Judi eat?

\_\_\_\_\_

12. Keiko sewed  $\frac{3}{4}$  yard of lace on her backpack. Pam sewed  $\frac{1}{4}$  yard of lace on her backpack. Shade the model to show how much more lace Keiko sewed on her backpack than Pam.



Keiko sewed \_\_\_\_\_ yard more lace on her backpack than Pam.

# Subtract Fractions Using Models

Go Online

Interactive Examples

Subtract. Use fraction strips to help.

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

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

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

4.  $\frac{7}{8} - \frac{1}{8} =$  \_\_\_\_\_

## Problem Solving

Use the table for Problems 5 and 6.

5. Ena is making trail mix. She buys the items shown in the table. How many more pounds of pretzels than raisins does she buy?

\_\_\_\_\_

6. How many more pounds of granola than banana chips does she buy?

\_\_\_\_\_

Item	Weight (in pounds)
pretzels	$\frac{7}{8}$
peanuts	$\frac{4}{8}$
raisins	$\frac{2}{8}$
banana chips	$\frac{3}{8}$
granola	$\frac{5}{8}$

7.  List and describe the steps you would use to model  $\frac{7}{10} - \frac{4}{10}$ .

\_\_\_\_\_

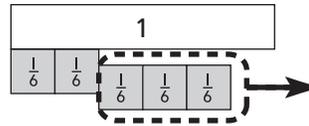
\_\_\_\_\_

## Lesson Check

8. Lee reads for  $\frac{3}{4}$  hour in the morning and  $\frac{2}{4}$  hour in the afternoon. How much longer does Lee read in the morning than in the afternoon? Use models to help.

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9. What equation does the model below represent?



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## Spiral Review

10. A city received 2 inches of rain each day for 3 days. The meteorologist said that if the rain had been snow, each inch of rain would have been 10 inches of snow. How much snow would the city have received in the 3 days?

---

11. At a party there were four large submarine sandwiches, all the same size. During the party,  $\frac{2}{3}$  of the chicken sandwich,  $\frac{3}{4}$  of the tuna sandwich,  $\frac{7}{12}$  of the roast beef sandwich, and  $\frac{5}{6}$  of the veggie sandwich were eaten. Which sandwich had the least amount left?

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12. Deena uses  $\frac{3}{8}$  cup of milk and  $\frac{2}{8}$  cup of oil in a recipe. How much liquid is this?

---

13. In the car lot,  $\frac{4}{12}$  of the cars are white and  $\frac{3}{12}$  of the cars are blue. What fraction of the cars in the lot are either white or blue?

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Name \_\_\_\_\_

# Use Benchmarks to Determine Reasonableness

Florida's B.E.S.T.

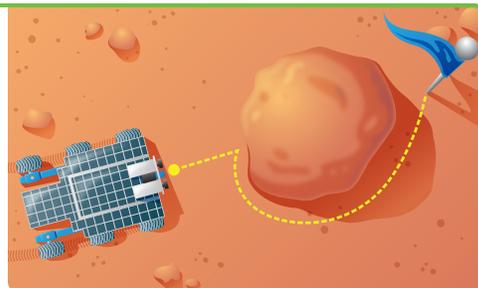
- Algebraic Reasoning 4.AR.1.2
- Fractions 4.FR.2.2, 4.FR.1.4
- Mathematical Thinking & Reasoning MTR.6.1, MTR.7.1

**I Can** use benchmarks to estimate the sum or difference and determine if the solution is reasonable.



## UNLOCK the Problem Real World

A rover considers many possible paths before choosing the safest path toward its goal. A rover moved  $\frac{2}{6}$  yard in a straight line, and then  $\frac{5}{6}$  yard around a rock to reach its goal. How far did it travel?

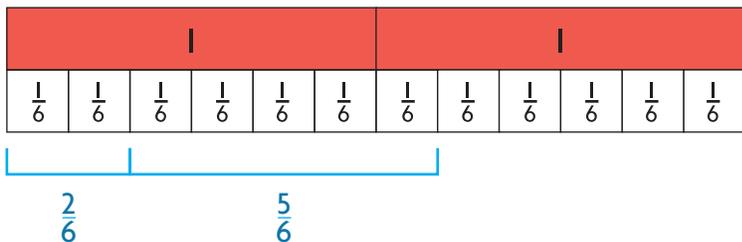


Find the sum.

### MODEL IT

Use fraction strips.

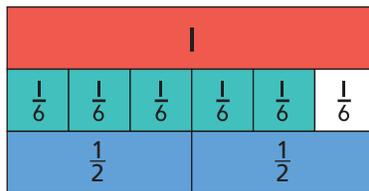
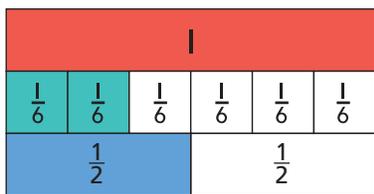
**Think:** The rover moved 2 sixth yard and then 5 sixth yard. Shade 2 sixth-size pieces and then 5 sixth-size pieces.



So, the rover traveled \_\_\_\_\_ yards to reach its goal.

Determine whether the sum is reasonable.

Compare the addends to the benchmarks 0,  $\frac{1}{2}$ , and 1.



- Is  $\frac{2}{6}$  closer to 0 or  $\frac{1}{2}$ ? \_\_\_\_\_
- Is  $\frac{5}{6}$  closer to  $\frac{1}{2}$  or 1? \_\_\_\_\_
- $\frac{1}{2} + 1 =$  \_\_\_\_\_

Since  $1\frac{1}{2}$  and  $1\frac{1}{6}$  are close, the sum is reasonable.

### RECORD IT

Write the sum.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \frac{7}{6}$$

Rename  $\frac{7}{6}$  as a mixed number.

**Think:** The model shows 1 whole yard and 1 sixth yard.

$$\frac{7}{6} = \underline{\hspace{2cm}}$$



**MTR 5.1** Use patterns and structure.

Explain how you know  $\frac{5}{6}$  is greater than  $\frac{1}{2}$ .

## Example

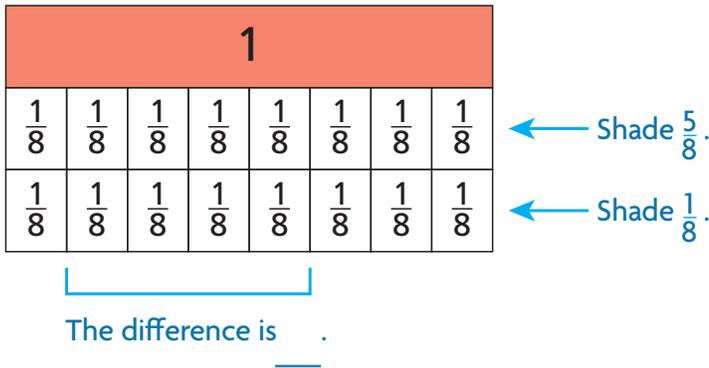
A rover must move  $\frac{5}{8}$  mile to reach its goal.  
The rover moves  $\frac{1}{8}$  mile toward its goal. How  
much farther must the rover move to reach its goal?



### A Find the difference.

#### MODEL IT

Use fraction strips.



#### RECORD IT

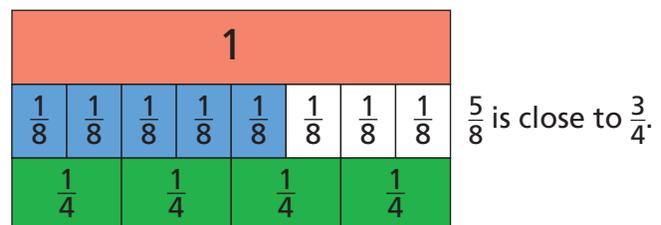
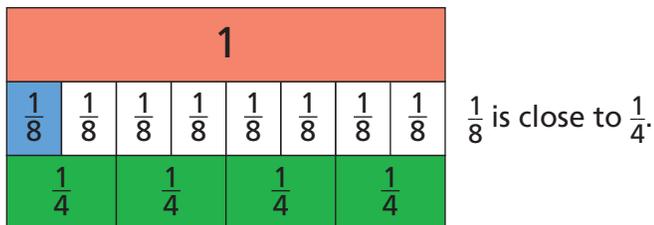
Write the difference.

$$\underline{\quad} - \underline{\quad} = \frac{4}{8}$$

So, the rover must move      mile farther.

### B Determine whether the difference is reasonable.

Compare the fractions to the benchmarks 0,  $\frac{1}{4}$ ,  $\frac{3}{4}$ , and 1.



- Is  $\frac{1}{8}$  closer to 0 or  $\frac{1}{4}$ ? \_\_\_\_\_
- Is  $\frac{5}{8}$  closer to  $\frac{1}{4}$  or  $\frac{3}{4}$ ? \_\_\_\_\_
- $\frac{3}{4} - \frac{1}{4} =$  \_\_\_\_\_

So,  $\frac{4}{8}$  is a reasonable difference.



## Problem Solving • Applications

Fill in the bubble completely to show your answer.

6. Amari times the movement of a banana slug. It moves  $\frac{2}{6}$  foot during the first minute. It then moves  $\frac{3}{6}$  foot during the second minute. How far does the banana slug move in all?
- (A)  $\frac{5}{12}$  foot                      (C)  $\frac{1}{12}$  foot  
(B)  $\frac{1}{6}$  foot                          (D)  $\frac{5}{6}$  foot
7. One day  $\frac{3}{8}$  of the students in Jack's class ate toast for breakfast. Another  $\frac{1}{8}$  of the students ate oatmeal. Jack added the fractions and found the sum was  $\frac{7}{8}$ . Which statement best describes the sum  $\frac{7}{8}$ ?
- (A) It is reasonable because  $\frac{1}{2} + 0 = \frac{1}{2}$ .  
(B) It is reasonable because  $\frac{1}{2} + \frac{1}{2} = 1$ .  
(C) It is not reasonable because  $\frac{1}{2} + 0 = \frac{1}{2}$ .  
(D) It is not reasonable because  $\frac{1}{2} + \frac{1}{2} = 1$ .
8. Ms. Mamani buys  $\frac{7}{8}$  yard of striped cloth. She uses  $\frac{3}{8}$  yard to make a bag. Then she uses  $\frac{1}{8}$  yard to make a belt. How much cloth does Ms. Mamani have left to make a hat?
- (A)  $\frac{2}{8}$  yard                          (C)  $\frac{3}{8}$  yard  
(B)  $\frac{4}{8}$  yard                          (D)  $\frac{6}{8}$  yard
9. Suppose a rover on Mars moved  $\frac{2}{6}$  yard in a straight line. Then it moved  $\frac{5}{6}$  yard around a rock. How many more yards did the rover move around the rock than it moved in a straight line?
- (A)  $\frac{3}{12}$  yard  
(B)  $\frac{3}{6}$  yard  
(C)  $\frac{7}{12}$  yard  
(D)  $1\frac{1}{6}$  yard

# Use Benchmarks to Determine Reasonableness

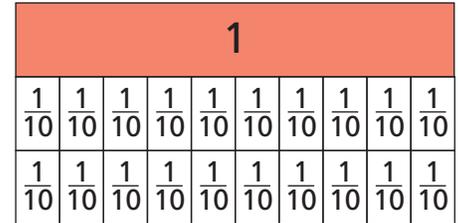
Go Online

Interactive Examples

1. Melina wants to finish  $\frac{6}{10}$  of her math homework problems before dinner. She finishes  $\frac{4}{10}$  of them. What fraction of her math problems does she still need to complete before dinner?

- Model the difference.
- Write the difference.

$$\frac{6}{10} - \frac{4}{10} = \underline{\hspace{2cm}}$$



Add or subtract. Determine whether your answer is reasonable.

2.  $\frac{1}{6} + \frac{4}{6} = \underline{\hspace{2cm}}$

3.  $\frac{3}{4} - \frac{1}{4} = \underline{\hspace{2cm}}$

4.  $\frac{9}{12} - \frac{3}{12} = \underline{\hspace{2cm}}$

5.  $\frac{9}{16} + \frac{6}{16} = \underline{\hspace{2cm}}$

## Problem Solving

6. In Luiza's family,  $\frac{2}{6}$  of the people have blue eyes and  $\frac{3}{6}$  of the people have brown eyes. What fraction of people has either blue or brown eyes?
- \_\_\_\_\_

7. Kim wants to add drawings to  $\frac{5}{8}$  of the stories in her journal. So far she has completed drawings for  $\frac{2}{8}$  of the stories. How many more stories still need drawings?
- \_\_\_\_\_

## Lesson Check

Fill in the bubble completely to show your answer.

8. Add. Determine if the answer is reasonable.

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

- (A)  $\frac{4}{8}$   
(B)  $\frac{3}{8}$   
(C)  $\frac{5}{8}$   
(D)  $\frac{1}{8}$

9. Subtract. Determine if the answer is reasonable.

$$\frac{10}{12} - \frac{1}{12}$$

- (A)  $\frac{9}{12}$   
(B)  $\frac{11}{12}$   
(C)  $\frac{8}{12}$   
(D)  $\frac{7}{12}$

10. In Raisa's class,  $\frac{5}{8}$  of the students walk to school and  $\frac{1}{8}$  of the students ride the bus. Raisa added the fractions and found the sum was  $\frac{1}{8}$ . Which statement best describes the sum  $\frac{1}{8}$ ?

- (A) It is reasonable because  $\frac{1}{2} + 0 = \frac{1}{2}$   
(B) It is reasonable because  $\frac{1}{2} + \frac{1}{2} = 1$   
(C) It is not reasonable because  $\frac{1}{2} + 0 = \frac{1}{2}$   
(D) It is not reasonable because  $\frac{1}{2} + \frac{1}{2} = 1$

11. Sabina walks dogs on Saturday. Last Saturday only  $\frac{7}{10}$  of the dogs needed to be walked. She walked  $\frac{5}{10}$  of them in the morning. What fractional part of the dogs does Sabina need to walk in the afternoon?

- (A)  $\frac{2}{10}$   
(B)  $\frac{1}{10}$   
(C)  $\frac{3}{10}$   
(D)  $\frac{4}{10}$

## Spiral Review

12. Samir poured  $\frac{3}{4}$  cup yellow paint into a can and  $\frac{3}{4}$  cup of blue paint in a can. He mixed the colors to make green paint. How much green paint did Samir make?

\_\_\_\_\_

13. Andrew had a whole carton of 12 eggs. He used  $\frac{5}{12}$  of a carton for egg salad. What fraction of the carton is remaining?

\_\_\_\_\_

Name \_\_\_\_\_

# Add and Subtract Fractions

**I Can** solve real-world problems involving addition and subtraction of fractions.

Florida's B.E.S.T.

- Algebraic Reasoning 4.AR.1.2
- Fractions 4.FR.2.2
- Mathematical Thinking & Reasoning MTR.3.1, MTR.7.1



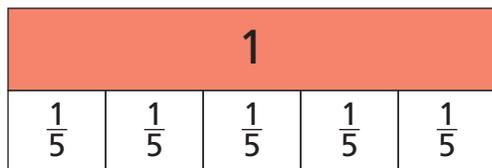
## UNLOCK the Problem Real World

Julie is making a poster for a book report. The directions say to use  $\frac{1}{5}$  of the poster to describe the setting,  $\frac{2}{5}$  of the poster to describe the characters, and the rest of the poster to describe the plot. What part of the poster will she use to describe the plot?

**Example** Use a model.

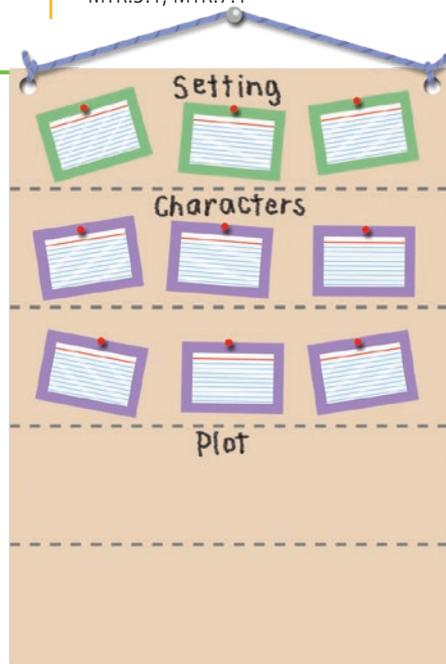
Shade \_\_\_\_\_ to represent the part for the setting.

Shade \_\_\_\_\_ to represent the part for the characters.



- Write an equation for the part of the poster used for the setting and characters. \_\_\_\_\_
- What does the part of the model that is not shaded represent?  
\_\_\_\_\_
- Write an equation for the part of the poster she will use for the plot.  
\_\_\_\_\_

So, Julie will use \_\_\_\_\_ of the poster to describe the plot.



**Math Talk**

**MTR 5.1** Use patterns and structure.

Why should Julie divide her poster into 5 equal parts instead of 3 equal parts?

1. Luke says  $\frac{1}{5} + \frac{2}{5} = \frac{3}{10}$ . Describe his error.

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**Common Denominators** Fractions with common denominators represent wholes divided into the same number of equal-size parts. To add or subtract fractions with the same denominator, you can add or subtract the number of parts given in the numerators.

**Example** Complete each equation.

Words	Fractions
1 fourth-size part + 2 fourth-size parts = _____ fourth-size parts	$\frac{1}{4} + \frac{2}{4} = \frac{\square}{4}$
3 sixth-size parts + 2 sixth-size parts = _____	$\frac{3}{6} + \frac{2}{6} = \frac{\square}{\square}$
7 tenth-size parts - 4 tenth-size parts = _____	$\frac{\square}{10} - \frac{\square}{10} = \frac{\square}{\square}$

## Share and Show

Math Board



**MTR 4.1** Engage in discussions on mathematical thinking.

Explain why  $\frac{11}{12} - \frac{5}{6} \neq \frac{6}{6}$ .

1. 9 twelfth-size parts - 5 twelfth-size parts = \_\_\_\_\_

$$\frac{9}{12} - \frac{5}{12} = \underline{\hspace{2cm}}$$

Find the sum or difference.

2.  $\frac{3}{12} + \frac{14}{12} = \underline{\hspace{2cm}}$

3.  $\frac{1}{3} + \frac{1}{3} = \underline{\hspace{2cm}}$

4.  $\frac{3}{4} - \frac{1}{4} = \underline{\hspace{2cm}}$

✓ 5.  $\frac{2}{6} + \frac{2}{6} = \underline{\hspace{2cm}}$

6.  $\frac{3}{8} + \frac{1}{8} = \underline{\hspace{2cm}}$

✓ 7.  $\frac{6}{10} - \frac{2}{10} = \underline{\hspace{2cm}}$

## On Your Own

Find the sum or difference.

8.  $\frac{1}{2} + \frac{1}{2} = \underline{\hspace{2cm}}$

9.  $\frac{5}{6} - \frac{4}{6} = \underline{\hspace{2cm}}$

10.  $\frac{4}{5} - \frac{2}{5} = \underline{\hspace{2cm}}$

**Practice: Copy and Solve** Find the sum or difference.

11.  $\frac{1}{4} + \frac{1}{4} = \underline{\hspace{2cm}}$

12.  $\frac{13}{10} - \frac{5}{10} = \underline{\hspace{2cm}}$

13.  $\frac{1}{12} + \frac{7}{12} = \underline{\hspace{2cm}}$

14. Christopher mixes  $\frac{3}{8}$  gallon of red paint with  $\frac{5}{8}$  gallon of blue paint to make purple paint. He uses  $\frac{2}{8}$  gallon of the purple paint. How much purple paint is left?

\_\_\_\_\_

## Problem Solving · Applications

15. **MTR** A city worker is painting a stripe down the center of Main Street. Main Street is  $\frac{8}{10}$  mile long. The worker painted  $\frac{4}{10}$  mile of the street. Explain how to find what part of a mile is left to paint.

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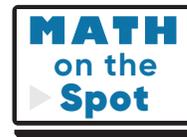
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16. Brian says that when you add or subtract fractions with the same denominator, you can add or subtract the numerators and keep the same denominator. Is Brian correct? Explain.




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17. The length of a rope was  $\frac{6}{8}$  yard. Jeff cut the rope into 3 pieces. Each piece is a different length measured in eighths of a yard. What is the length of each piece of rope?

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18. For 18a–18d, choose Yes or No to show if the sum or difference is correct.

- 18a.  $\frac{3}{5} + \frac{1}{5} = \frac{4}{5}$        Yes       No
- 18b.  $\frac{1}{4} + \frac{2}{4} = \frac{3}{8}$        Yes       No
- 18c.  $\frac{15}{8} - \frac{9}{8} = \frac{6}{8}$        Yes       No
- 18d.  $\frac{32}{100} - \frac{24}{100} = \frac{12}{100}$        Yes       No

19. Harry says  $\frac{1}{4} + \frac{1}{8} = \frac{2}{8}$ . Jane says  $\frac{1}{4} + \frac{1}{8} = \frac{3}{8}$ . Whose answer makes sense? Whose answer is nonsense? Explain your reasoning. Draw a model to help.

○	Harry
	$\frac{1}{4} + \frac{1}{8} = \frac{2}{8}$

○	Jane
	$\frac{1}{4} + \frac{1}{8} = \frac{3}{8}$

**Model**

**Harry**

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**Jane**

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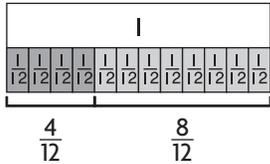
# Add and Subtract Fractions

Go Online

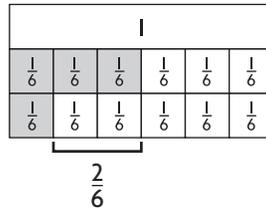
Interactive Examples

Find the sum or difference.

1.  $\frac{4}{12} + \frac{8}{12} = \frac{12}{12}$



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



3.  $\frac{7}{5} - \frac{3}{5} =$  \_\_\_\_\_

4.  $\frac{6}{16} + \frac{3}{16} =$  \_\_\_\_\_

5.  $1 - \frac{3}{8} =$  \_\_\_\_\_

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

## Problem Solving

Use the table for Problems 7 and 8.

7. Kaiba finds how far his house is from several locations and makes the table shown. How much farther away from Kaiba's house is the library than the cafe?

\_\_\_\_\_

8. If Kaiba walks from his house to school and back, how far does he walk?

\_\_\_\_\_

9. **WRITE**  *Math* Compare how you would model and record finding the sum and difference of two rocks weighing  $\frac{2}{8}$  pound and  $\frac{3}{8}$  pound.

\_\_\_\_\_

\_\_\_\_\_

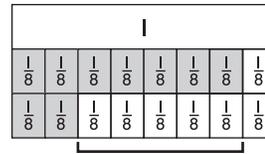
Distance from Kaiba's House	
Location	Distance (in miles)
Library	$\frac{9}{10}$
School	$\frac{5}{10}$
Store	$\frac{7}{10}$
Cafe	$\frac{4}{10}$
Yogurt Shop	$\frac{6}{10}$

## Lesson Check

10. Mr. Angulo buys  $\frac{5}{8}$  pounds of red grapes and  $\frac{3}{8}$  pound of green grapes. How many pounds of grapes did Mr. Angulo buy?

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11. What equation does the model below represent?




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## Spiral Review

12. There are 6 muffins in a package. How many packages will be needed to feed 48 people if each person has 2 muffins?

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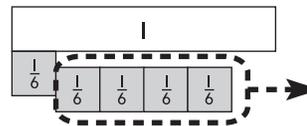
13. Camp Oaks gets 32 boxes of orange juice and 56 boxes of apple juice. Each shelf in the cupboard can hold 8 boxes of juice. What is the least number of shelves needed for all the juice boxes?

---

14. A machine makes 18 parts each hour. If the machine operates 24 hours a day, how many parts can it make in one day?

---

15. What equation does the model below represent?




---

Name \_\_\_\_\_

# Add and Subtract Mixed Numbers

Florida's B.E.S.T.

- Fractions 4.FR.2.2
- Algebraic Reasoning 4.AR.1.2
- Mathematical Thinking & Reasoning MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1

**I Can** add and subtract mixed numbers with like denominators.

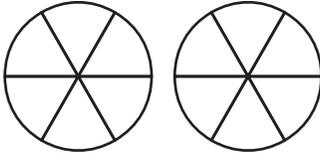
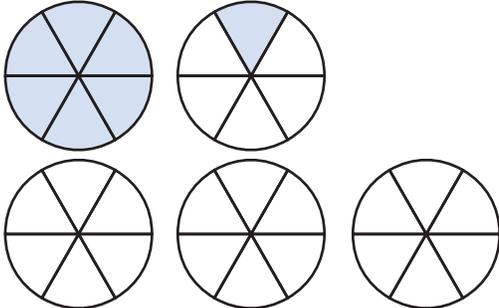


## UNLOCK the Problem Real World

After a party, there were  $1\frac{4}{6}$  quesadillas left on one tray and  $2\frac{3}{6}$  quesadillas left on another tray. How many quesadillas were left?

- What operation will you use?  
\_\_\_\_\_
- Is the sum of the fractional parts of the mixed numbers greater than 1?  
\_\_\_\_\_

**Example** Add mixed numbers.

THINK	MODEL	RECORD
<p><b>STEP 1</b> Add the fractional parts of the mixed numbers.</p>	<p>Think: Shade to model <math>\frac{4}{6} + \frac{3}{6}</math>.</p> 	$\begin{array}{r} 1\frac{4}{6} \\ + 2\frac{3}{6} \\ \hline \end{array}$
<p><b>STEP 2</b> Add the whole-number parts of the mixed numbers.</p>	<p>Think: Shade to model <math>1 + 2</math>.</p> 	$\begin{array}{r} 1\frac{4}{6} \\ + 2\frac{3}{6} \\ \hline 3\frac{7}{6} \end{array}$
<p><b>STEP 3</b> Rename the sum.</p> <p>So, _____ quesadillas were left.</p>	<p>Think: <math>\frac{7}{6}</math> is greater than 1. Group the wholes together to rename the sum.</p> <p>The model shows a total of _____ wholes and _____ left over.</p>	$\begin{aligned} 3\frac{7}{6} &= 3 + \frac{6}{6} + \frac{1}{6} \\ &= 3 + 1 + \frac{1}{6} = 4\frac{1}{6} \end{aligned}$



**MTR 3.1** Complete tasks with mathematical fluency.

When modeling sums such as  $\frac{4}{6}$  and  $\frac{3}{6}$ , why is it helpful to combine parts into wholes when possible? Explain.

## Example Subtract mixed numbers.

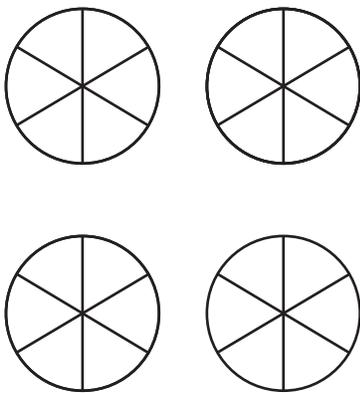
Alejandro had  $3\frac{3}{6}$  quesadillas. His family ate  $2\frac{4}{6}$  of the quesadillas. How many quesadillas are left?

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

### MODEL

Shade the model to show  $3\frac{3}{6}$ .

Then cross out  $2\frac{4}{6}$  to model the subtraction.



The difference is \_\_\_\_\_.

So, there is \_\_\_\_\_ quesadilla left.



### RECORD

Subtract the fractional parts of the mixed numbers.

Then subtract the whole-number parts of the mixed numbers.

$$\begin{array}{r} 3\frac{3}{6} \\ - 2\frac{4}{6} \\ \hline \end{array}$$

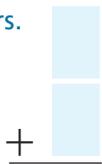
## Share and Show

Math Board

Write the sum as a mixed number with the fractional part less than 1.

1. 
$$\begin{array}{r} 1\frac{1}{6} \\ + 3\frac{3}{6} \\ \hline \end{array}$$

Add whole numbers.



Add fractions.



$$+ \quad + \quad = \quad \underline{\hspace{2cm}}$$

2. 
$$\begin{array}{r} 1\frac{4}{5} \\ + 7\frac{2}{5} \\ \hline \end{array}$$

3. 
$$\begin{array}{r} 2\frac{1}{2} \\ + 3\frac{1}{2} \\ \hline \end{array}$$

Find the difference.

$$\begin{array}{r} 4. \quad 3\frac{7}{12} \\ -2\frac{5}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 4\frac{2}{3} \\ -3\frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} \checkmark 6. \quad 6\frac{7}{10} \\ -3\frac{9}{10} \\ \hline \end{array}$$



**MTR 4.1** Engage in discussions on mathematical thinking.

Explain how adding and subtracting mixed numbers is different from adding and subtracting fractions.

## On Your Own

Write the sum as a mixed number with the fractional part less than 1.

$$\begin{array}{r} 7. \quad 7\frac{4}{6} \\ +4\frac{3}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 8\frac{1}{3} \\ +3\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 5\frac{4}{8} \\ +3\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 3\frac{5}{12} \\ +4\frac{2}{12} \\ \hline \end{array}$$

Find the difference.

$$\begin{array}{r} 11. \quad 5\frac{7}{8} \\ -2\frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 5\frac{1}{12} \\ -4\frac{7}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 3\frac{5}{10} \\ -1\frac{3}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 7\frac{2}{4} \\ -2\frac{3}{4} \\ \hline \end{array}$$

Find the sum or difference.

$$15. \quad 1\frac{3}{8} + 2\frac{7}{8}$$

$$16. \quad 6\frac{5}{8} - 4$$

$$17. \quad 9\frac{1}{2} + 8\frac{1}{2}$$

$$18. \quad 6\frac{3}{5} + 4\frac{3}{5}$$

$$19. \quad 8\frac{4}{10} - \frac{7}{10}$$

$$20. \quad 7\frac{3}{5} - 6\frac{3}{5}$$

# Problem Solving · Applications

Solve. Write your answer as a mixed number.

21. **MTR** The driving distance from Alex's house to the museum is  $6\frac{7}{10}$  miles. What is the round-trip distance?
- 

22. The driving distance from the sports arena to Kristina's house is  $10\frac{9}{10}$  miles. The distance from the sports arena to Luke's house is  $2\frac{7}{10}$  miles. How much greater is the driving distance between the sports arena and Kristina's house than between the sports arena and Luke's house?
- 

23. Pedro biked from his house to the nature preserve, a distance of  $23\frac{4}{5}$  miles. Sandra biked from her house to the lake, a distance of  $12\frac{2}{5}$  miles. How many miles less did Sandra bike than Pedro?
- 

24. During the Song family trip, they drove from home to a national park, a distance of  $55\frac{4}{5}$  miles, and then drove an additional  $12\frac{4}{5}$  miles to visit friends. If the family drove the same route back home, what was the distance traveled during their trip?
- 

25. For 25a–25d, select True or False for each statement.

25a.  $2\frac{3}{8} + 1\frac{6}{8}$  is equal to  $4\frac{1}{8}$ .       True       False

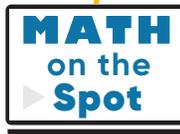
25b.  $3\frac{6}{12} + 1\frac{4}{12}$  is equal to  $2\frac{2}{12}$ .       True       False

25c.  $5\frac{4}{6} - 2\frac{5}{6}$  is equal to  $1\frac{3}{6}$ .       True       False

25d.  $5\frac{5}{8} - 3\frac{2}{8}$  is equal to  $2\frac{3}{8}$ .       True       False

## Show the Math

Demonstrate Your Thinking



# Add and Subtract Mixed Numbers

Go Online

Interactive Examples

Find the sum. Write the sum as a mixed number, so the fractional part is less than 1.

$$\begin{array}{r} 1. \quad 6\frac{4}{5} \\ + 3\frac{3}{5} \\ \hline 9\frac{7}{5} = 10\frac{2}{5} \end{array}$$

$$\begin{array}{r} 2. \quad 4\frac{1}{2} \\ + 2\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 2\frac{2}{3} \\ + 3\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 6\frac{4}{5} \\ + 7\frac{4}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 9\frac{3}{6} \\ + 2\frac{2}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 8\frac{4}{12} \\ + 3\frac{6}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 4\frac{3}{8} \\ + 1\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 9\frac{5}{10} \\ + 6\frac{3}{10} \\ \hline \end{array}$$

Find the difference.

$$\begin{array}{r} 9. \quad 6\frac{6}{8} \\ - 4\frac{7}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 4\frac{2}{3} \\ - 3\frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 6\frac{4}{5} \\ - 3\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 7\frac{3}{4} \\ - 2\frac{1}{4} \\ \hline \end{array}$$

## Problem Solving

13. Damien wants to send two gifts by mail. One package weighs  $2\frac{12}{16}$  pounds. The other package weighs  $1\frac{12}{16}$  pounds. What is the total weight of the packages?

---



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14.  **WRITE** *Math* Describe how adding and subtracting mixed numbers can help you with recipes.

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## Lesson Check

15. Alex has two lengths of copper pipe to fit together. One has a length of  $2\frac{5}{12}$  feet and the other has a length of  $3\frac{7}{12}$  feet. How many feet of pipe does Alex have?
- 
16. A pattern calls for  $2\frac{1}{4}$  yards of material and  $1\frac{1}{4}$  yards of lining. How much total fabric is needed?
- 

## Spiral Review

17. Shanice has 23 baseball trading cards of star players. She agrees to sell them for \$16 each. How much money will she make from selling the cards?
- 
18. Nanci is volunteering at the animal shelter. She wants to spend an equal amount of time playing with each dog. She has 145 minutes to play with all 7 dogs. About how much time can she spend with each dog?
- 
19. Frieda has 12 red apples and 15 green apples. She is going to share the apples equally among 8 people and keep any extra apples for herself. How many apples will Frieda keep for herself?
- 
20. The Dhar family bought a house for \$75,300. A few years later, they sold the house for \$80,250. How much greater was the selling price than the purchase price?
-

Name \_\_\_\_\_

# Use Properties of Addition

**I Can** add fractions with like denominators using the properties of addition.

**CONNECT** The Associative and Commutative Properties of Addition can help you group and order addends to find sums mentally. You can use mental math to combine fractions that have a sum of 1.

- The Commutative Property of Addition states that when the order of two addends is changed, the sum is the same. For example,  $4 + 5 = 5 + 4$ .
- The Associative Property of Addition states that when the grouping of addends is changed, the sum is the same. For example,  $(5 + 8) + 4 = 5 + (8 + 4)$ .

**Florida's B.E.S.T.**

- Fractions 4.FR.2.2
- Algebraic Reasoning 4.AR.1.2
- Mathematical Thinking & Reasoning MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1



## UNLOCK the Problem Real World

The map shows four lighthouses in the Florida Keys and their distances apart in miles. The Dry Tortugas Lighthouse is the farthest west, and the Alligator Reef Lighthouse is the farthest east.

What is the distance from the Dry Tortugas Lighthouse to the Alligator Reef Lighthouse, traveling between the four lighthouses?



Use the properties to order and group.

**Add.**  $70\frac{5}{10} + 43\frac{6}{10} + 34\frac{5}{10}$

$$70\frac{5}{10} + 43\frac{6}{10} + 34\frac{5}{10} = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$= (\underline{\hspace{2cm}} + \underline{\hspace{2cm}}) + \underline{\hspace{2cm}}$$

$$= (\underline{\hspace{2cm}}) + \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

Use the Commutative Property to order the addends so that the fractions with a sum of 1 are together.

Use the Associative Property to group the addends that you can add mentally.

Add the grouped numbers, and then add the other mixed number.

Write the sum.

So, the distance from the Dry Tortugas Lighthouse to the Alligator Reef Lighthouse, traveling between the four lighthouses, is \_\_\_\_\_ miles.

**Try This!** Use the properties and mental math to solve.  
Show each step, and name the property used.

$$1\frac{1}{3} + (2 + 3\frac{2}{3})$$

## Share and Show

Math Board

1. Complete. Name the property used.

$$\begin{aligned} (3\frac{4}{10} + 5\frac{2}{10}) + \frac{6}{10} &= (5\frac{2}{10} + 3\frac{4}{10}) + \underline{\hspace{2cm}} \\ &= 5\frac{2}{10} + (3\frac{4}{10} + \underline{\hspace{2cm}}) \\ &= 5\frac{2}{10} + \underline{\hspace{2cm}} \\ &= \underline{\hspace{2cm}} \end{aligned}$$

Math Talk

**MTR 4.1** Engage in discussions on mathematical thinking.

Describe how you could use the properties to find the sum  $1\frac{1}{3} + 2\frac{5}{8} + 1\frac{2}{3}$ .

Use the properties and mental math to find the sum.

2.  $(2\frac{7}{8} + 3\frac{2}{8}) + 1\frac{1}{8}$

3.  $1\frac{2}{5} + (1 + \frac{3}{5})$

4.  $5\frac{3}{6} + (5\frac{5}{6} + 4\frac{3}{6})$

✓ 5.  $(1\frac{1}{4} + 1\frac{1}{4}) + 2\frac{3}{4}$

6.  $(12\frac{5}{16} + 1\frac{13}{16}) + 3\frac{11}{16}$

✓ 7.  $\frac{3}{12} + (1\frac{8}{12} + \frac{9}{12})$

## On Your Own

Use the properties and mental math to find the sum.

8.  $\left(\frac{34}{3} + \frac{19}{3}\right) + \frac{26}{3}$

9.  $\frac{1}{2} + \left(103\frac{1}{2} + 12\right)$

10.  $\left(3\frac{5}{10} + 10\right) + 11\frac{5}{10}$

11. Pablo is training for a marathon. He ran  $5\frac{4}{8}$  miles on Friday,  $6\frac{5}{8}$  miles on Saturday, and  $7\frac{4}{8}$  miles on Sunday. How many miles did he run on all three days?
- \_\_\_\_\_

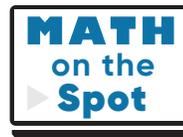
12. At lunchtime, Keir's Diner served a total of  $2\frac{2}{6}$  pots of vegetable soup,  $3\frac{5}{6}$  pots of chicken soup, and  $4\frac{3}{6}$  pots of tomato soup. How many pots of soup were served in all?
- \_\_\_\_\_

## Problem Solving · Applications

Use the expressions in the box for Problems 13–14.

13. Which property of addition would you use to regroup the addends in Expression A?
- \_\_\_\_\_

14. Which two expressions have the same value?
- \_\_\_\_\_



A  $\frac{1}{8} + \left(\frac{7}{8} + \frac{4}{8}\right)$

B  $\frac{1}{2} + 2$

C  $\frac{3}{7} + \left(\frac{1}{2} + \frac{4}{7}\right)$

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

15. Match the equation with the property used.

$$\frac{6}{12} + \left(\frac{6}{12} + \frac{3}{12}\right) = \left(\frac{6}{12} + \frac{6}{12}\right) + \frac{3}{12} \quad \bullet$$

$$3\frac{2}{5} + \left(5\frac{4}{5} + 2\frac{1}{5}\right) = 3\frac{2}{5} + \left(2\frac{1}{5} + 5\frac{4}{5}\right) \quad \bullet$$

$$\left(4\frac{1}{6} + 3\frac{5}{6}\right) + 2\frac{2}{6} = \left(3\frac{5}{6} + 4\frac{1}{6}\right) + 2\frac{2}{6} \quad \bullet$$

$$\left(1\frac{1}{8} + \frac{5}{8}\right) + 3\frac{3}{8} = 1\frac{1}{8} + \left(\frac{5}{8} + 3\frac{3}{8}\right) \quad \bullet$$

• Commutative Property

• Associative Property

16. Costumes are being made for the high school musical. The table at the right shows the amount of fabric needed for the costumes of the male and female leads. Elei uses the expression  $7\frac{3}{8} + 1\frac{5}{8} + 2\frac{4}{8}$  to find the total amount of fabric needed for the costume of the female lead.

Material	Female Lead Costume	Male Lead Costume
Silk	$7\frac{3}{8}$	$1\frac{2}{8}$
Felt	$1\frac{5}{8}$	$2\frac{3}{8}$
Cotton	$2\frac{4}{8}$	$5\frac{6}{8}$

To find the value of the expression using mental math, Elei used the properties of addition.

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

Elei added  $7 + 1$  and was able to quickly add  $\frac{3}{8}$  and  $\frac{5}{8}$  to the sum of 8 to get 9. She added  $2\frac{4}{8}$  to 9, so her answer was  $11\frac{4}{8}$ .

So, the amount of fabric needed for the costume of the female lead actor is  $11\frac{4}{8}$  yards.

**Write a new problem using the information for the costume for the male lead actor.**

**Pose a Problem**

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**Solve your problem. Check your solution.**

**MTR** Explain how using the properties of addition makes both problems easier to solve.

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## Use Properties of Addition

Go Online

Interactive Examples

Use the properties and mental math to find the sum.

1.  $5\frac{1}{3} + (2\frac{2}{3} + 1\frac{1}{3})$

2.  $10\frac{1}{8} + (3\frac{5}{8} + 2\frac{7}{8})$

3.  $8\frac{1}{5} + (3\frac{2}{5} + 5\frac{4}{5})$

$5\frac{1}{3} + (4)$

$9\frac{1}{3}$

4.  $6\frac{3}{4} + (4\frac{2}{4} + 5\frac{1}{4})$

5.  $(6\frac{3}{6} + 10\frac{4}{6}) + 9\frac{2}{6}$

6.  $(\frac{16}{2} + \frac{9}{2}) + \frac{14}{2}$

## Problem Solving

7. Nate's classroom has three tables of different lengths. One has a length of  $4\frac{1}{2}$  feet, another has a length of 4 feet, and a third has a length of  $2\frac{1}{2}$  feet. What is the length of all three tables when pushed end to end?

8. Mr. Rolle uses  $2\frac{1}{4}$  bags of mulch for his garden and another  $4\frac{1}{4}$  bags for his front yard. He also uses  $\frac{3}{4}$  bag around a fountain. How many total bags of mulch does Mr. Rolle use?

9.  **WRITE** *Math* Describe how the Commutative and Associative Properties of Addition can make adding mixed numbers easier.

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## Lesson Check

10. A carpenter cut a board into three pieces. One piece was  $2\frac{5}{6}$  feet long. The second piece was  $3\frac{1}{6}$  feet long. The third piece was  $1\frac{5}{6}$  feet long. How long was the board?
11. Kele works at an apple orchard. He picked  $45\frac{7}{8}$  pounds of apples on Monday. He picked  $42\frac{3}{8}$  pounds of apples on Wednesday. He picked  $54\frac{1}{8}$  pounds of apples on Friday. How many pounds of apples did Kele pick those three days?

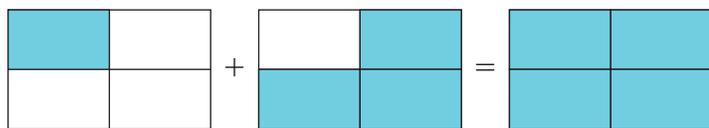
## Spiral Review

12. There was 1 orange in the refrigerator. Joey ate  $\frac{2}{3}$  of the orange. How much of the orange was left?
13. Aiko was asked to identify which of the following numbers is prime:  
2, 12, 21, 39  
Which number should she choose?
14. A teacher has 100 chairs to arrange into equal rows for an assembly. Write one way the chairs could be arranged. Include the number of rows and the number of chairs in each row.
15. Nic bought 28 folding chairs for \$16 each. How much money did Nic spend on chairs?

Name \_\_\_\_\_

## Chapter Review

1. A painter mixed  $\frac{1}{4}$  quart of red paint with  $\frac{3}{4}$  quart of blue paint to make purple paint. Use the model to write an equation that shows the amount of purple paint.



quart of purple paint

2. Ivan biked  $1\frac{2}{3}$  hours on Monday,  $2\frac{1}{3}$  hours on Tuesday, and  $2\frac{2}{3}$  hours on Wednesday. What is the total number of hours Ivan spent biking?

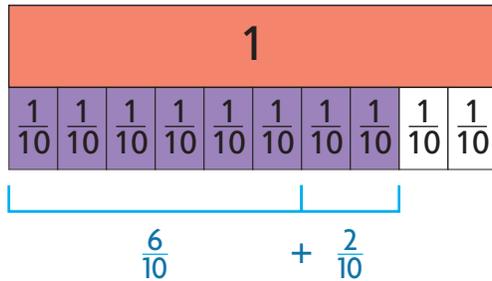
Ivan spent  hours biking.

3. Tricia had  $5\frac{3}{4}$  feet of polka dot masking tape to make a design. She had  $1\frac{1}{4}$  feet of tape left when she finished. How can Tricia find how much masking tape she used? Explain. Do you agree? Explain.

4. Miguel's class went to the state fair. The fairground is divided into sections. Rides are in  $\frac{6}{10}$  of the fairground. Games are in  $\frac{2}{10}$  of the fairground. Farm exhibits are in  $\frac{1}{10}$  of the fairground.

### Part A

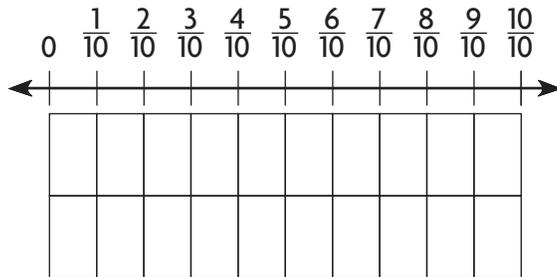
Use the model. What fraction of the fairground is rides and games?



The fraction of the fairground with rides and games is .

### Part B

How much more of the fairground has rides than has farm exhibits? Shade the model to show the sections with the rides and the farm exhibits. Explain how to use the model to find the answer.



5. Bella brought  $\frac{7}{8}$  gallon of water on a hiking trip. She drank  $\frac{5}{8}$  gallon of water. How much water is left?

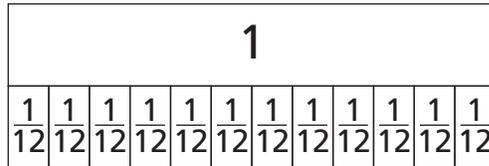
gallon

Name \_\_\_\_\_

6. In a survey,  $\frac{9}{12}$  of the students chose dogs and  $\frac{1}{12}$  chose gerbils as their favorite pet. What fraction shows the students who chose dogs or gerbils as their favorite pet?

### Part A

Shade the model to show your answer.



of the students chose dogs or gerbils.

### Part B

How are the numerator and denominator of your answer related to the model? Explain.

7. Match the equation with the property used.

$\frac{6}{10} + \left(\frac{4}{10} + \frac{3}{10}\right) = \left(\frac{6}{10} + \frac{4}{10}\right) + \frac{3}{10}$  •

$1\frac{1}{4} + \left(3 + 2\frac{1}{4}\right) = 1\frac{1}{4} + \left(2\frac{1}{4} + 3\right)$  •

$\left(2\frac{6}{10} + \frac{1}{10}\right) + 3\frac{9}{10} = 2\frac{6}{10} + \left(\frac{1}{10} + 3\frac{9}{10}\right)$  •

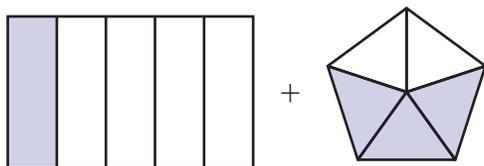
$\left(3\frac{1}{5} + 2\frac{3}{5}\right) + 6\frac{4}{5} = \left(2\frac{3}{5} + 3\frac{1}{5}\right) + 6\frac{4}{5}$  •

• Commutative Property

• Associative Property

8. Marcello is writing a history essay. He wrote  $\frac{1}{6}$  of the essay on Monday and  $\frac{4}{6}$  on Tuesday. How much of the history essay did Marcello write? Use benchmarks to explain how you know your answer is reasonable.

9. Sloane wants to use the model to find  $\frac{1}{5} + \frac{3}{5}$ . Explain why this is not possible.



10. Joe is making a long cape. He needs  $4\frac{2}{3}$  yards of fabric for the outside of the cape. He needs  $3\frac{2}{3}$  yards of fabric for the lining of the cape.

Name \_\_\_\_\_

## Part A

Joe incorrectly added the two mixed numbers to find how much fabric he should buy. His work is shown below.

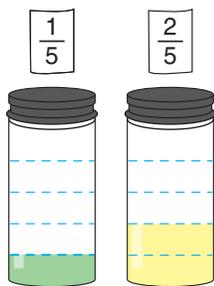
$$4\frac{2}{3} + 3\frac{2}{3} = 7\frac{4}{3} = 7 + \frac{3}{3} = 7 + 1 = 8$$

Why is Joe's work incorrect?

## Part B

How much fabric should Joe buy? Show your work.

11. Russ has two jars of glue. One jar is  $\frac{1}{5}$  full. The other jar is  $\frac{2}{5}$  full.

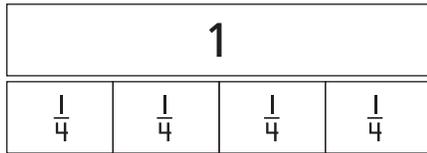


Use the fractions to write an equation to find the amount of glue Russ has.

$$\square + \square = \square$$



12. Gertie ran  $\frac{3}{4}$  mile during physical education class. Sarah ran  $\frac{2}{4}$  mile during the same class. How much farther did Gertie run than Sarah? Shade the model to show your answer.



Gertie ran  mile farther than Sarah.

13. Teresa planted marigolds in  $\frac{2}{8}$  of her garden and petunias in  $\frac{3}{8}$  of her garden. What fraction of the garden has marigolds and petunias?

Teresa's garden is  marigolds and petunias.

14. Henry ate  $\frac{3}{6}$  of a sandwich. Keith ate  $\frac{4}{6}$  of the same sandwich. How much more of the sandwich did Keith eat than Henry?

of the sandwich

15. For Problems 15a–15d, choose True or False for each sentence.

- |                                                                      |                            |                             |
|----------------------------------------------------------------------|----------------------------|-----------------------------|
| 15a. $1\frac{4}{10} + 2\frac{6}{10}$ is equal to $4\frac{1}{10}$ .   | <input type="radio"/> True | <input type="radio"/> False |
| 15b. $3\frac{5}{6} + 2\frac{3}{6}$ is equal to $5\frac{2}{6}$ .      | <input type="radio"/> True | <input type="radio"/> False |
| 15c. $4\frac{5}{8} - 2\frac{4}{8}$ is equal to $2\frac{3}{8}$ .      | <input type="radio"/> True | <input type="radio"/> False |
| 15d. $7\frac{9}{12} - 4\frac{10}{12}$ is equal to $2\frac{11}{12}$ . | <input type="radio"/> True | <input type="radio"/> False |