Chapter 7

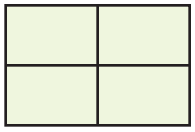
Add and Subtract Fractions

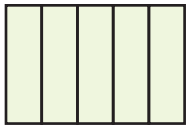
Show What You Know

Check your understanding of important skills

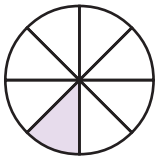
Name _____

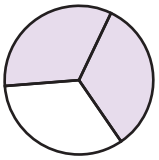
▶ Fractions Equal to 1 Write the fraction that names the whole.

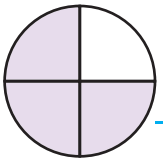
1.  _____

2.  _____

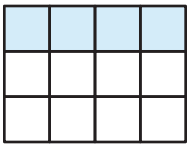
▶ Parts of a Whole Write a fraction that names the shaded part.

3.  _____

4.  _____

5.  _____

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

6. 

shaded: _____

unshaded: _____

7. 

shaded: _____

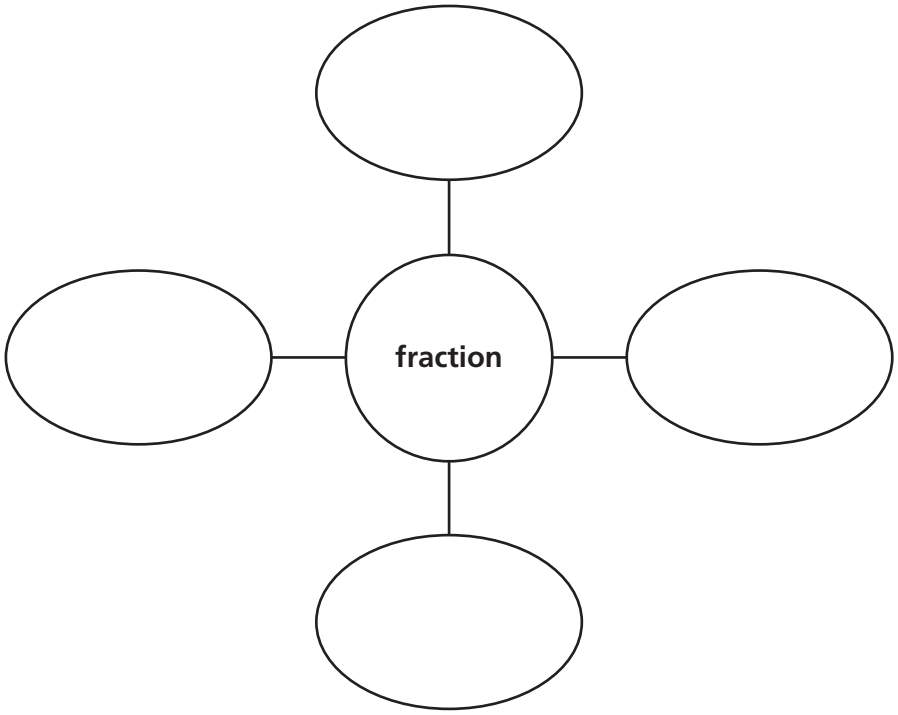
unshaded: _____

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. Be a Math Detective. About how much of our electricity comes from sources other than coal, natural gas, or nuclear power?

Vocabulary Builder

Visualize It

Complete the bubble map using the words with a ✓.



Review Words

Associative Property of Addition

Commutative Property of Addition

✓ denominator

fraction

✓ numerator

simplest form

Preview Words

✓ mixed number

✓ unit fraction

Understand Vocabulary

Write the word or phrase that matches the description.

1. When the numerator and denominator have only 1 as a common factor

   _____

2. A number that names a part of a whole or part of a group

   _____

3. An amount given as a whole number and a fraction

   _____

4. The number in a fraction that tells how many equal parts are in the whole or in the group _____

5. A fraction that has a numerator of one _____

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Name _____

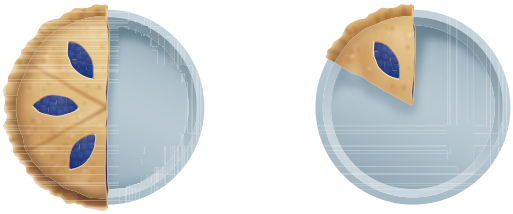
Add and Subtract Parts of a Whole

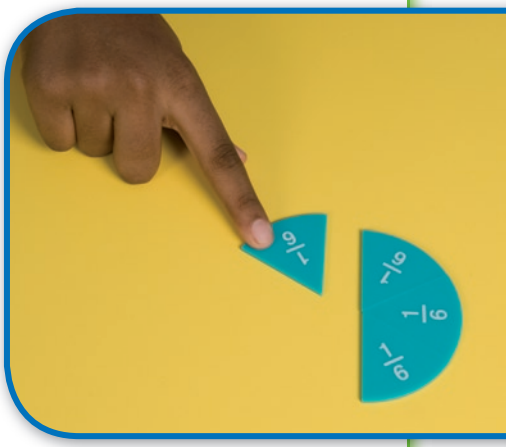
Essential Question When can you add or subtract parts of a whole?

Investigate

Materials ■ fraction circles ■ color pencils

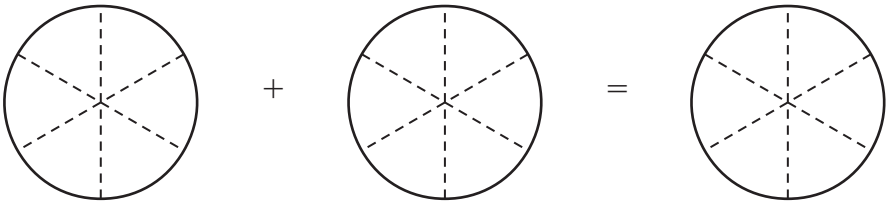
Ms. Clark has the following pie pieces left over from a bake sale.





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

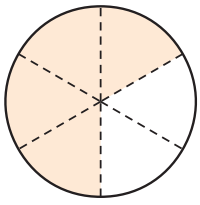
A. Model the problem using fraction circles. Draw a picture of your model. Then write the sum.



_____ + _____ = _____

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

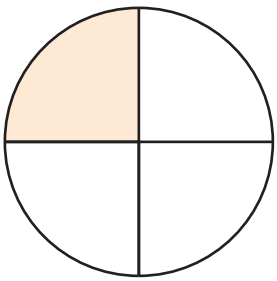
2. Isabel wrote the equation $\frac{1}{2} + \frac{1}{6} = \frac{4}{6}$ and Jonah wrote $\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$ to represent combining the pie pieces. **Explain** why both equations are correct.

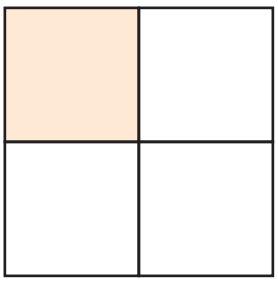
3. H.O.T. If there is $\frac{4}{6}$ of a pie on a plate, what part of the pie is missing from the plate? Write an equation to justify your answer.

Make Connections

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.





MATHEMATICAL PRACTICES

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

a. Are the wholes the same? **Explain**.

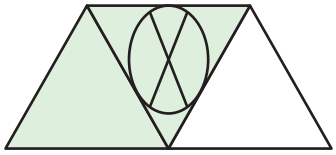
b. Does the sum $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ make sense in this situation? **Explain**.

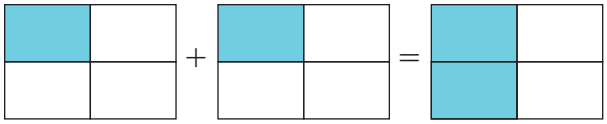
Name _____

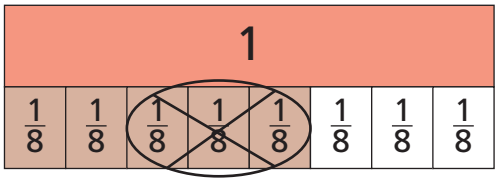
Share and Show MATH BOARD

Use the model to write an equation.

1. 

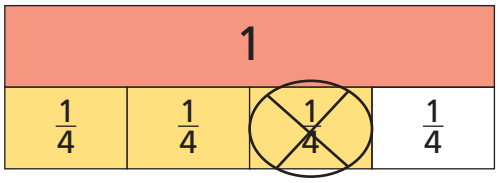
2. 

3. 

4. 

Use the model to solve the equation.

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



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

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

   a. Are the wholes the same? **Explain**.

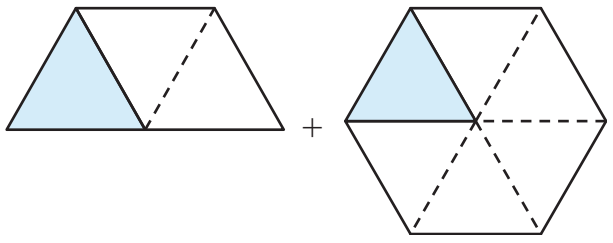
   b. Does the sum $\frac{1}{5} + \frac{1}{5} = \frac{2}{5}$ make sense in this situation? **Explain**.

Problem Solving REAL WORLD

Sense or Nonsense?

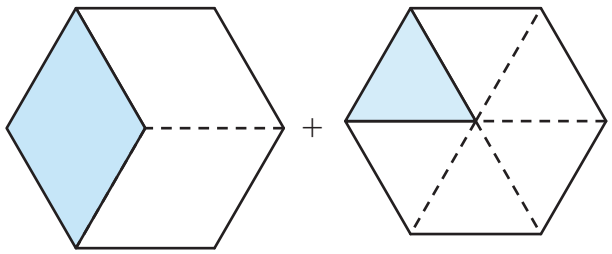
8. Samantha and Kim used different models to help find $\frac{1}{3} + \frac{1}{6}$. Whose model makes sense? Whose model is nonsense? **Explain** your reasoning below each model.

Samantha's Model



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

Kim's Model



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

9. Draw a model you could use to add $\frac{1}{4} + \frac{1}{2}$.

FOR MORE PRACTICE:
Standards Practice Book, pp. P133–P134

Name _____

Write Fractions as Sums

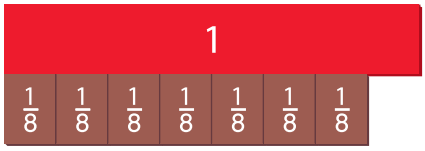
Essential Question How can you write a fraction as a sum of fractions with the same denominators?

UNLOCK the Problem REAL WORLD

Emilio cut a sandwich into 8 equal pieces and ate 1 piece. He has $\frac{7}{8}$ of the sandwich left. Emilio put each remaining piece on a snack plate. How many snack plates did he use? What part of the sandwich did he put on each plate?

Each piece of the sandwich is $\frac{1}{8}$ of the whole. $\frac{1}{8}$ is called a **unit fraction** because it tells the part of the whole that 1 piece represents. A unit fraction always has a numerator of 1.

Example 1 Write $\frac{7}{8}$ as a sum of unit fractions.



$\frac{7}{8} =$ _____ + _____ + _____ + _____ + _____ + _____ + _____

The number of addends represents the number of plates used.

The unit fractions represent the part of the sandwich on each plate.

So, Emilio used _____ plates. He put _____ of a sandwich on each plate.

1. What if Emilio ate 3 pieces of the sandwich instead of 1 piece? How many snack plates would he need? What part of the sandwich would be on each plate? **Explain.**

_____

_____

_____

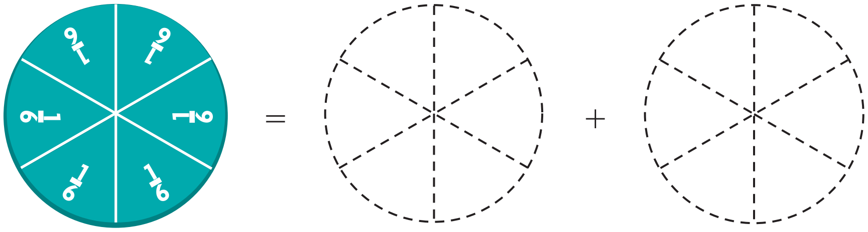
_____

Example 2 Write a fraction as a sum.

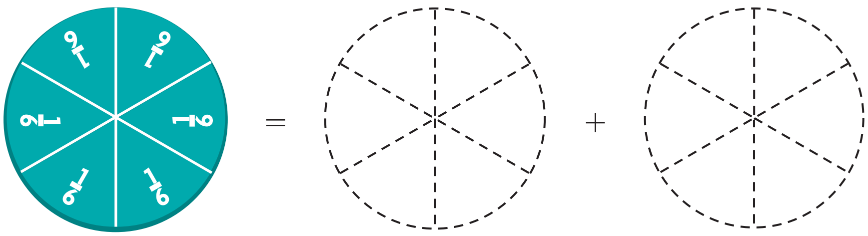
Kevin and Olivia are going to share a whole pizza. The pizza is cut into 6 equal slices. They will put the slices on two separate dishes. What part of the whole pizza could be on each dish?

Shade the models to show three different ways Kevin and Olivia could share the pizza. Write an equation for each model.

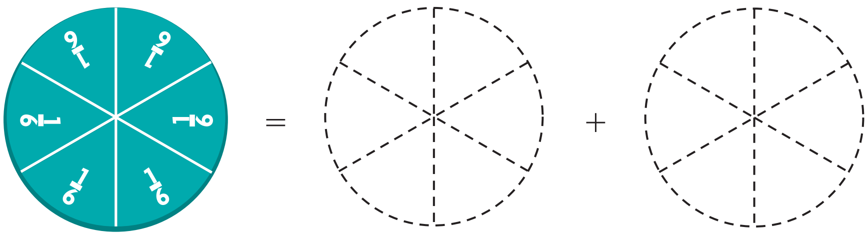
Think: $\frac{6}{6}$ = 1 whole pizza.



= ______ + ______



= ______ + ______



= ______ + ______

Math Talk MATHEMATICAL PRACTICES If there were 8 dishes, could $\frac{1}{6}$ of the whole pizza be on each dish? **Explain.**

2. **What if** 3 friends share the pizza and they put the pizza slices on three separate dishes? What part of the pizza could be on each dish? Write equations to support your answer.

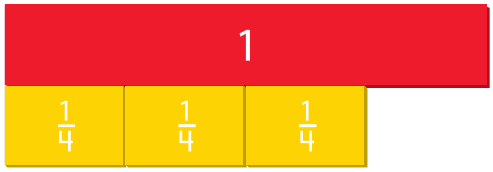
____

____

Name _____

Share and Show

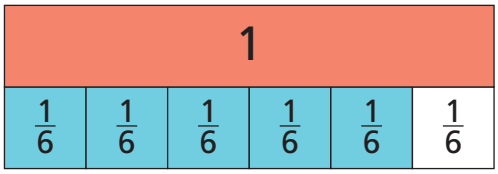
1. Write $\frac{3}{4}$ as a sum of unit fractions.



$\frac{3}{4} =$ _____ + _____ + _____

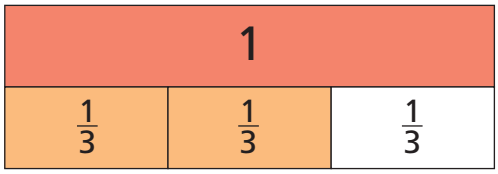
Write the fraction as a sum of unit fractions.

2.



$\frac{5}{6} =$ _____

3.



$\frac{2}{3} =$ _____

MATHEMATICAL PRACTICES

Math Talk **Explain** how the numerator in $\frac{5}{6}$ is related to the number of addends in the sum of its unit fractions.

On Your Own

Write the fraction as a sum of unit fractions.

4. $\frac{4}{12} =$ _____

5. $\frac{6}{8} =$ _____

Write the fraction as a sum of fractions three different ways.

6. $\frac{8}{10}$

_____

_____

_____

7. $\frac{6}{6}$

_____

_____

_____

8. H.O.T. How many different ways can you write a fraction that has a numerator of 2 as a sum of fractions? **Explain.**

_____

_____

UNLOCK the Problem REAL WORLD

9. Holly's garden is divided into 5 equal sections. She will fence the garden into 3 areas by grouping some equal sections together. What part of the garden could each fenced area be?

a. What information do you need to use?

_____

_____

b. How can writing an equation help you solve the problem? _____

_____

_____

c. How can drawing a model help you write an equation?

_____

_____

d. Show how you can solve the problem.

e. Complete the sentence.

The garden can be fenced into _____,

_____, and _____ parts or _____,

_____, and _____ parts.

10. What is $\frac{7}{10}$ written as a sum of unit fractions?

_____

11. **Test Prep** Which is equivalent to $\frac{9}{12}$?

Ⓐ $\frac{5}{12} + \frac{3}{12}$

Ⓑ $\frac{3}{12} + \frac{2}{12} + \frac{1}{12} + \frac{1}{12}$

Ⓒ $\frac{5}{12} + \frac{2}{12} + \frac{2}{12}$

Ⓓ $\frac{4}{12} + \frac{4}{12} + \frac{1}{12} + \frac{1}{12}$

FOR MORE PRACTICE:
Standards Practice Book, pp. P135–P136

Name _____

Add Fractions Using Models

Essential Question How can you add fractions with like denominators using models?

UNLOCK the Problem REAL WORLD

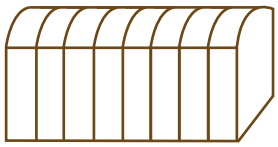
Ms. Clark made a loaf of bread. She used $\frac{1}{8}$ of the bread for a snack and $\frac{5}{8}$ of the bread for lunch. How much did she use for a snack and lunch?

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.



snack lunch

Think: The pieces you shaded represent the pieces Ms. Clark used.

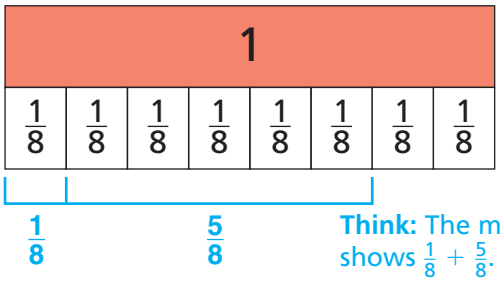
So, Ms. Clark used _____ eighth-size pieces, or $\frac{\quad}{8}$ of the bread.

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 $\frac{5}{8}$.



Think: The model shows $\frac{1}{8} + \frac{5}{8}$.

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

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

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.

_____

_____

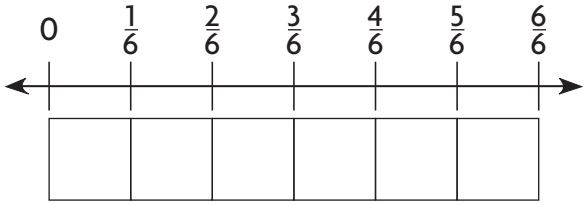
MATHEMATICAL PRACTICES

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

Example

Jacob 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. $\frac{3}{6} + \frac{2}{6} = \frac{\square}{6}$

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 $\frac{4}{6}$.

_____

_____

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

_____

Share and Show

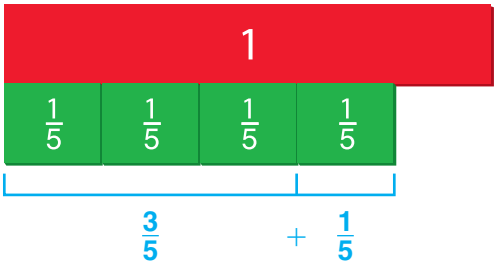
MATH BOARD

1. Gary'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 Gary'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? _____

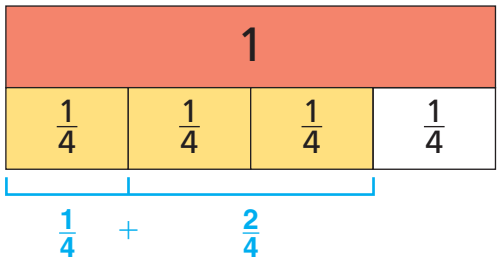
$\frac{3}{5} + \frac{1}{5} = \frac{\square}{5}$ of a bag



Name _____

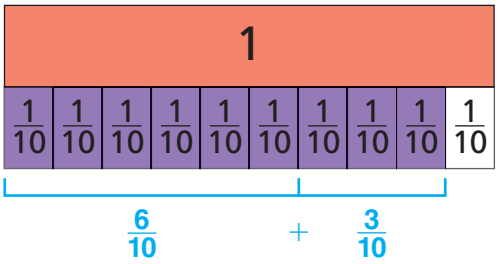
Use the model to find the sum.

2.



$\frac{1}{4} + \frac{2}{4} =$ _____

3.



$\frac{6}{10} + \frac{3}{10} =$ _____

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

MATHEMATICAL PRACTICES

Math Talk **Explain** how to add $\frac{2}{6} + \frac{3}{6}$.

Find the sum. Use models to help.

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

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

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

10. $\frac{1}{10} + \frac{4}{10} =$ _____

11. $\frac{1}{4} + \frac{1}{4} =$ _____

12. $\frac{5}{12} + \frac{5}{12} =$ _____

Problem Solving REAL WORLD

13. **Write Math** 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.

_____

_____

14. **H.O.T.** A sum has five addends. Each addend is a unit fraction. The sum is 1. What are the addends?

_____

15. **Test Prep** Rita needs $\frac{4}{8}$ yard of ribbon to wrap a gift for her sister and $\frac{2}{8}$ yard of ribbon to wrap a gift for a friend. How much ribbon does she need to wrap both gifts?

Ⓐ $\frac{3}{8}$ yard Ⓑ $\frac{6}{8}$ yard Ⓒ $\frac{7}{8}$ yard Ⓓ $\frac{8}{8}$ yard

Connect to Art

Stained Glass Windows

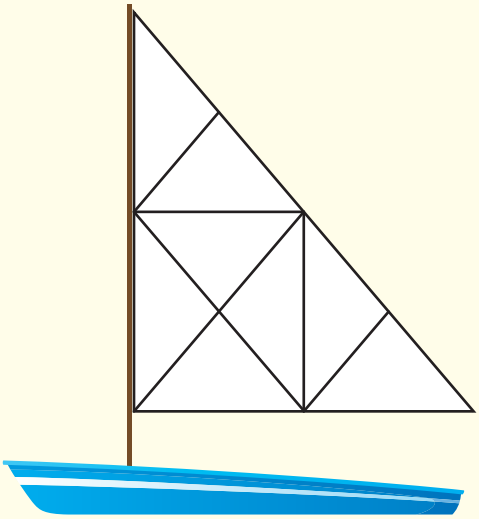
Have you ever seen a stained glass window in a building or home? Artists have been designing stained glass windows for thousands of years.

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



16. Write an equation that shows the fraction of triangles that are red or blue.

17. What part of the sail is orange or yellow? **Explain** how you found the answer.

18. 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.**

19. Write Math **Pose a Problem** Write a problem about the sail that uses addition of fractions.

FOR MORE PRACTICE:
Standards Practice Book, pp. P137–P138

Name _____

Subtract Fractions Using Models

Essential Question How can you subtract fractions with like denominators using models?

UNLOCK the Problem REAL WORLD

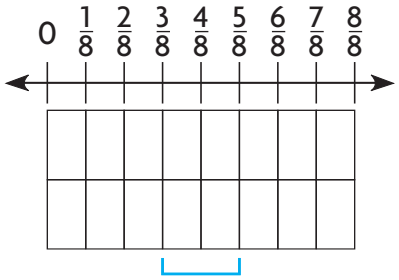
A rover needs to travel $\frac{5}{8}$ mile to reach its destination. It has already traveled $\frac{3}{8}$ mile. How much farther does the rover need to travel?

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 covered.



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.

_____

_____

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

_____

_____

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

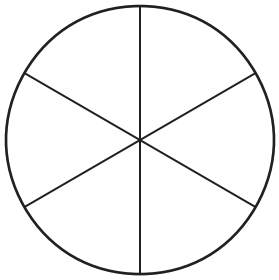
- How much pizza did Sam begin with?

  _____

- How many slices are in the whole? _____
- How many slices did Sam eat? _____

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-size parts.

How many sixth-size parts are left? _____

So, Sam put _____ of the pizza away for later.

Another Way Use fraction strips.

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

1					
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

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

How many $\frac{1}{6}$-size parts are left? _____

Write the difference.

$1 - \frac{\square}{\square} = \frac{\square}{\square}$

MATHEMATICAL PRACTICES

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

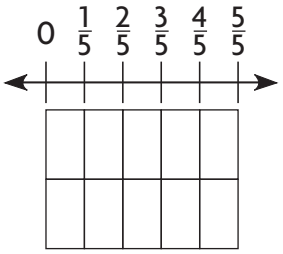
3. **Explain** how the equation $\frac{6}{6} - \frac{2}{6} = \frac{4}{6}$ is related to the problem situation.

4. H.O.T. **Explain** how you could find the unknown addend in $\frac{2}{6} + \square = 1$ without using a model.

Name _____

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.

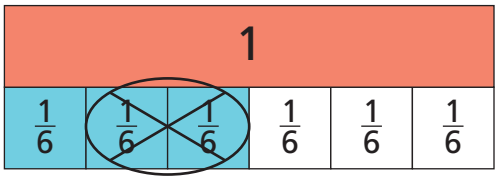
Then shade the model to show how much shrimp Lisa has. Compare the difference between the two shaded rows.

$\frac{4}{5} - \frac{1}{5} = \frac{\square}{5}$ pound

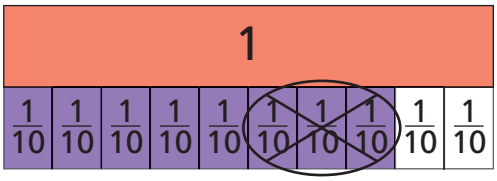
Lisa needs _____ pound more shrimp.

Use the model to find the difference.

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



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



Subtract. Use models to help.

4. $\frac{5}{8} - \frac{2}{8} =$ _____

5. $\frac{7}{12} - \frac{2}{12} =$ _____

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

MATHEMATICAL PRACTICES

Math Talk **Explain** why the numerator changes when you subtract fractions with like denominators, but the denominator doesn't.

On Your Own

Subtract. Use models to help.

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

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

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

10. $\frac{2}{4} - \frac{1}{4} =$ _____

11. $\frac{9}{10} - \frac{3}{10} =$ _____

12. $1 - \frac{5}{8} =$ _____

13. $\frac{6}{8} - \frac{5}{8} =$ _____

14. $1 - \frac{1}{3} =$ _____

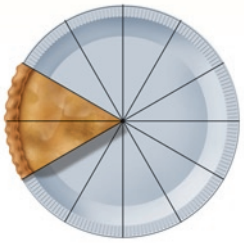
15. $\frac{4}{5} - \frac{2}{5} =$ _____

UNLOCK the Problem REAL WORLD

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

First night

Second night



Ⓐ $\frac{2}{12}$ Ⓑ $\frac{5}{12}$ Ⓒ $\frac{7}{12}$ Ⓓ $\frac{10}{12}$

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, _____ of the pie was eaten on the second night.

e. Fill in the bubble for the correct answer choice above.

17. 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?

Ⓐ $\frac{8}{8}$ Ⓒ $\frac{6}{8}$

Ⓑ 1 Ⓓ $\frac{5}{8}$

18. Dani's bean plant grew $\frac{6}{8}$ inch the first week and $\frac{2}{8}$ inch the second week. How much less did Dani's plant grow the second week?

Ⓐ $\frac{8}{8}$ inch Ⓒ $\frac{4}{8}$ inch

Ⓑ $\frac{6}{8}$ inch Ⓓ $\frac{2}{8}$ inch

FOR MORE PRACTICE:
Standards Practice Book, pp. P139–P140

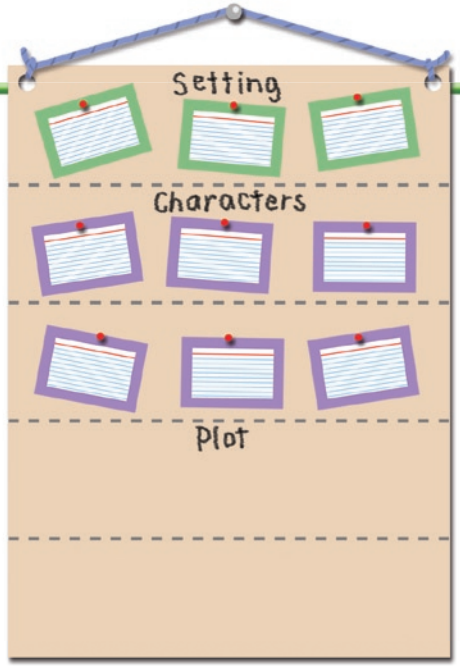
Name _____

Add and Subtract Fractions

Essential Question How can you add and subtract fractions with like denominators?

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.

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

- 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.

MATHEMATICAL PRACTICES

Math Talk Why should Julie divide her poster into 5 equal parts instead of 3 equal parts? **Explain.**

1. What's the Error? Luke says $\frac{1}{5} + \frac{2}{5} = \frac{3}{10}$. **Describe** his error.

_____

_____

_____

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 = _____	$\frac{\square}{\square} - \frac{\square}{\square} = \frac{\square}{\square}$

2. Sense or Nonsense? 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.**

_____

_____

_____

_____

_____

Share and Show

MATH BOARD

MATHEMATICAL PRACTICES

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

1. 9 twelfth-size parts − 5 twelfth-size parts = _____

$\frac{9}{12} - \frac{5}{12} =$ _____

Find the sum or difference.

2. $\frac{3}{12} + \frac{8}{12} =$ _____

3. $\frac{1}{3} + \frac{1}{3} =$ _____

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

5. $\frac{2}{6} + \frac{2}{6} =$ _____

6. $\frac{3}{8} + \frac{1}{8} =$ _____

7. $\frac{6}{10} - \frac{2}{10} =$ _____

Name _____

On Your Own

Find the sum or difference.

8. $\frac{1}{2} + \frac{1}{2} =$ _____

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

10. $\frac{4}{5} - \frac{2}{5} =$ _____

11. $\frac{1}{10} + \frac{3}{10} =$ _____

12. $\frac{5}{12} - \frac{1}{12} =$ _____

13. $\frac{3}{8} + \frac{2}{8} =$ _____

Practice: Copy and Solve Find the sum or difference.

14. $\frac{1}{4} + \frac{1}{4} =$ _____

15. $\frac{9}{10} - \frac{5}{10} =$ _____

16. $\frac{1}{12} + \frac{7}{12} =$ _____

H.O.T. **Algebra** Find the unknown fraction.

17. $\frac{2}{8} +$ _____ $= \frac{6}{8}$

18. $1 -$ _____ $= \frac{3}{4}$

19. $\frac{4}{5} -$ _____ $= \frac{1}{5}$

20. Write Math 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.

21. H.O.T. 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?

22. **Test Prep** Otis has 1 cup of granola. He added $\frac{3}{8}$ cup to a bowl of yogurt. How much granola is left?

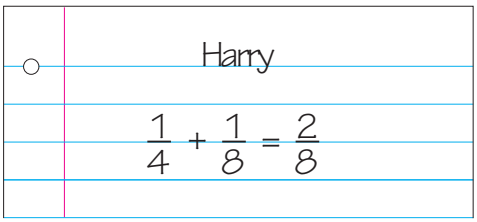
Ⓐ $\frac{2}{8}$ cup Ⓒ $\frac{5}{8}$ cup

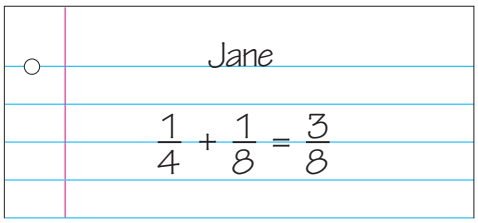
Ⓑ $\frac{3}{8}$ cup Ⓓ $\frac{8}{8}$ cup

Problem Solving REAL WORLD

Sense or Nonsense?

23. Harry says that $\frac{1}{4} + \frac{1}{8} = \frac{2}{8}$. 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.





Model

Harry

Jane

FOR MORE PRACTICE:
Standards Practice Book, pp. P141–P142

Name _____

Mid-Chapter Checkpoint

Vocabulary

Choose the best term from the box.

Vocabulary
fraction
simplest form
unit fraction

1. A _____ always has a numerator of 1. (p. 271)
2. A number that names part of a whole is a _____.

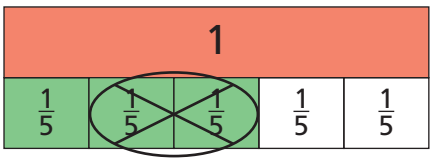
Check Concepts

Write the fraction as a sum of unit fractions.

3. $\frac{3}{10} =$ _____
4. $\frac{6}{6} =$ _____

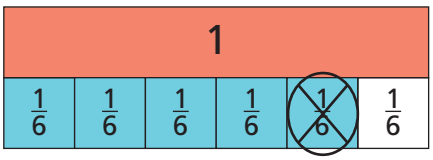
Use the model to write an equation.

5.



_____

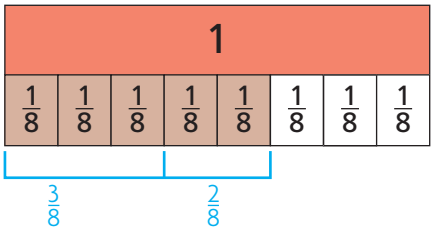
6.



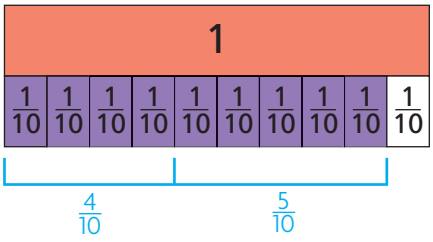
_____

Use the model to solve the equation.

7. $\frac{3}{8} + \frac{2}{8} =$ _____



8. $\frac{4}{10} + \frac{5}{10} =$ _____



Find the sum or difference.

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

Fill in the bubble completely to show your answer.

15. Tyrone mixed $\frac{7}{12}$ quart of red paint with $\frac{1}{12}$ quart of yellow paint. How much paint does Tyrone have in the mixture?

Ⓐ $\frac{8}{24}$ quart

Ⓑ $\frac{6}{12}$ quart

Ⓒ $\frac{8}{12}$ quart

Ⓓ $\frac{12}{12}$ quart

16. Jorge lives $\frac{6}{8}$ mile from school and $\frac{2}{8}$ mile from a ballpark. How much farther does Jorge live from school than from the ballpark?

Ⓐ $\frac{4}{16}$ mile

Ⓑ $\frac{4}{8}$ mile

Ⓒ $\frac{8}{8}$ mile

Ⓓ 8 miles

17. Su Ling started an art project with 1 yard of felt. She used $\frac{5}{6}$ yard. How much felt does Su Ling have left?

Ⓐ $\frac{1}{6}$ yard

Ⓑ $\frac{4}{6}$ yard

Ⓒ $\frac{5}{6}$ yard

Ⓓ $\frac{6}{6}$ yard

18. Eloise hung artwork on $\frac{2}{5}$ of a bulletin board. She hung math papers on $\frac{1}{5}$ of the same bulletin board. What part of the bulletin board has artwork or math papers?

Ⓐ $\frac{1}{10}$

Ⓑ $\frac{1}{5}$

Ⓒ $\frac{3}{10}$

Ⓓ $\frac{3}{5}$

Name _____

Rename Fractions and Mixed Numbers

Essential Question How can you rename mixed numbers as fractions greater than 1 and rename fractions greater than 1 as mixed numbers?

UNLOCK the Problem REAL WORLD

Mr. Fox has $2\frac{3}{6}$ loaves of corn bread. Each loaf was cut into $\frac{1}{6}$-size pieces. If he has 14 people over for dinner, is there enough bread for each person to have 1 piece?

- What is the size of 1 piece of bread relative to the whole?

- How much bread does Mr. Fox need for 14 people?

A **mixed number** is a number represented by a whole number and a fraction. You can write a mixed number as a fraction.

To find how many $\frac{1}{6}$-size pieces are in $2\frac{3}{6}$, write $2\frac{3}{6}$ as a fraction.

Example Write a mixed number as a fraction.

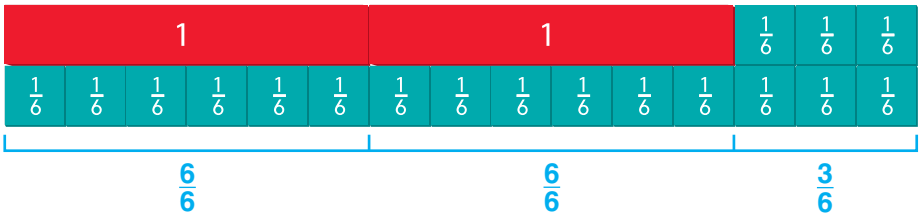
THINK

STEP 1 Model $2\frac{3}{6}$.

MODEL AND RECORD

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

STEP 2 Find how many $\frac{1}{6}$-size pieces are in each whole. Model $2\frac{3}{6}$ using only $\frac{1}{6}$-size pieces.



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

STEP 3 Find the total number of $\frac{1}{6}$-size pieces in $2\frac{3}{6}$.

Think: Find $\frac{6}{6} + \frac{6}{6} + \frac{3}{6}$.

$2\frac{3}{6} = \_\_\_\_$

There are _____ sixth-size pieces in $2\frac{3}{6}$.

So, there is enough bread for 14 people to each have 1 piece.

MATHEMATICAL PRACTICES

Math Talk **Explain** how to write $1\frac{1}{4}$ as a fraction without using a model.

Example Write a fraction greater than 1 as a mixed number.

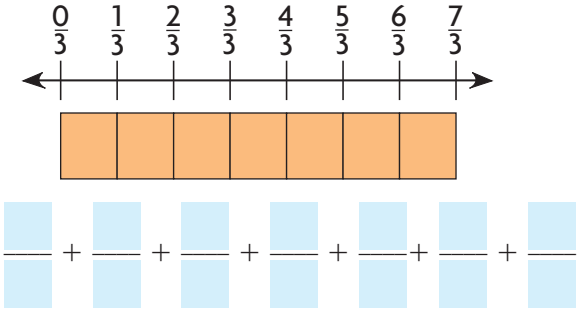
To weave a bracelet, Charlene needs 7 pieces of brown thread. Each piece of thread must be $\frac{1}{3}$ yard long. How much thread should she buy to weave the bracelet?

Write $\frac{7}{3}$ as a mixed number.

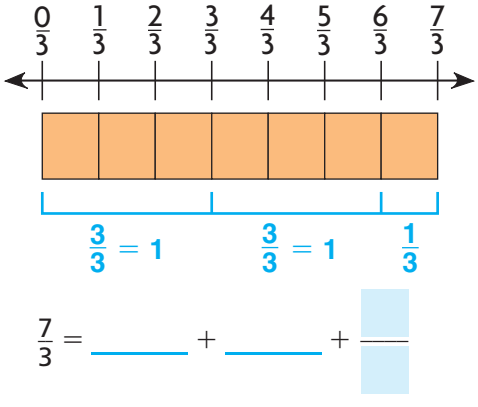
THINK

STEP 1 Model $\frac{7}{3}$.

MODEL AND RECORD



STEP 2 Find how many wholes are in $\frac{7}{3}$, and how many thirds are left over.



STEP 3 Write $\frac{7}{3}$ as a mixed number.

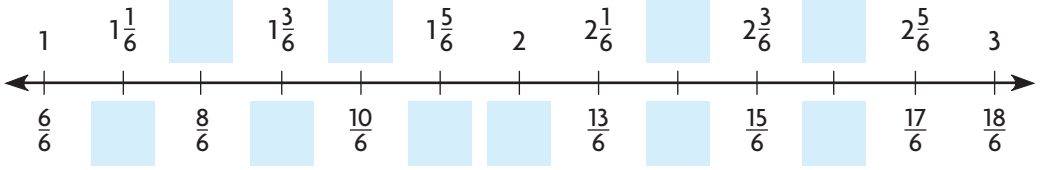
$\frac{7}{3} =$ ☐ ___

So, Charlene should buy _____ yards of thread.

Share and Show MATH BOARD

Write the unknown numbers. Write mixed numbers above the number line and fractions greater than one below the number line.

1.



Name _____

Write the mixed number as a fraction.

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

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

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

Write the fraction as a mixed number.

5. $\frac{11}{4}$

6. $\frac{6}{5}$

7. $\frac{13}{10}$

MATHEMATICAL PRACTICES

Math Talk **Describe** how you can compare $1\frac{3}{5}$ and $\frac{7}{5}$.

On Your Own

Write the mixed number as a fraction.

8. $2\frac{7}{10}$

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

10. $4\frac{2}{5}$

Write the fraction as a mixed number.

11. $\frac{9}{5}$

12. $\frac{11}{10}$

13. $\frac{12}{2}$

H.O.T. **Algebra** **Find the unknown numbers.**

14. $\frac{13}{7} = 1\frac{\square}{7}$

15. $\square\frac{5}{6} = \frac{23}{6}$

16. $\frac{57}{11} = \square\frac{\square}{11}$

Problem Solving REAL WORLD

Use the recipe to solve 17–19.

17. Cal is making energy squares. How many $\frac{1}{2}$ cups of peanut butter are used in the recipe?

18. What is the amount of bran cereal, written as a fraction greater than 1, that is used in the recipe?

SHOW YOUR WORK

19. H.O.T. Suppose Cal wants to make 2 times as many energy squares as the recipe makes. How many cups of bran cereal should he use? Write your answer as a mixed number and as a fraction greater than 1 in simplest form.

20. Cal added $2\frac{3}{8}$ cups of raisins. Write this mixed number as a fraction greater than 1 in simplest form.

21. H.O.T. Jenn is preparing brown rice. She needs $1\frac{1}{2}$ cups of brown rice and 2 cups of water. Jenn has only a $\frac{1}{8}$-cup measuring cup. How many $\frac{1}{8}$ cups each of rice and water will Jenn use to prepare the rice?

22. **Test Prep** Which fraction greater than 1 can you write for $4\frac{5}{9}$?

Ⓐ $\frac{9}{9}$ Ⓒ $\frac{41}{9}$

Ⓑ $\frac{18}{9}$ Ⓓ $\frac{45}{9}$

Name _____

Add and Subtract Mixed Numbers

Essential Question How can you 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 much of the quesadillas were left?

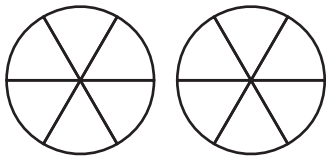
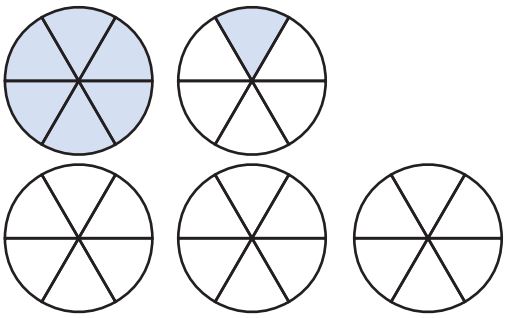
- What operation will you use?

_____

- Is the sum of the fractional parts of the mixed numbers greater than 1?

_____

Example Add mixed numbers.

	THINK	MODEL	RECORD
STEP 1	Add the fractional parts of the mixed numbers.	**Think:** Shade to model $\frac{4}{6} + \frac{3}{6}$. 	$1\frac{4}{6}$ $+ 2\frac{3}{6}$ $\frac{\square}{\square}$
STEP 2	Add the whole-number parts of the mixed numbers.	**Think:** Shade to model 1 + 2. 	$1\frac{4}{6}$ $+ 2\frac{3}{6}$ $\square\frac{7}{6}$
STEP 3	Rename the sum.	**Think:** $\frac{7}{6}$ is greater than 1. Group the wholes together to rename the sum. The model shows a total of $\square$ wholes and $\frac{\square}{\square}$ left over.	$3\frac{7}{6} = 3 + \frac{6}{6} + \frac{\square}{\square}$ $= 3 + 1 + \frac{\square}{\square} = \square\frac{\square}{\square}$

So, _____ quesadillas were left.

MATHEMATICAL PRACTICES

Math Talk 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.

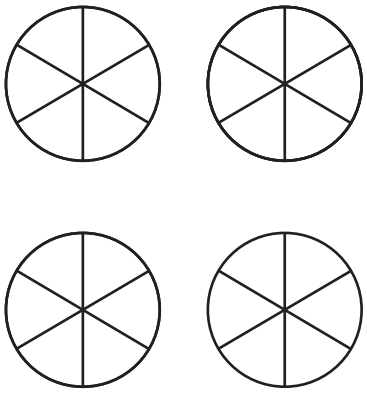
Alejandro had $3\frac{4}{6}$ quesadillas. His family ate $2\frac{3}{6}$ of the quesadillas. How many quesadillas are left?

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

MODEL

Shade the model to show $3\frac{4}{6}$.

Then cross out $2\frac{3}{6}$ to model the subtraction.



The difference is _____.

RECORD

Subtract the fractional parts of the mixed numbers.

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

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

So, there are _____ quesadillas left.

Share and Show MATH BOARD

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

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

Add whole numbers. Add fractions.

$\square + \square$ $\qquad$ $\frac{\square}{\square} + \frac{\square}{\square}$

$\square + \square = $ _____

2. $1\frac{4}{5} + 7\frac{2}{5}$

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

Name _____

Find the difference.

4. $3\frac{7}{12} - 2\frac{5}{12}$

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

6. $6\frac{9}{10} - 3\frac{7}{10}$

Math Talk MATHEMATICAL PRACTICES

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.

7. $7\frac{4}{6} + 4\frac{3}{6}$

8. $8\frac{1}{3} + 3\frac{2}{3}$

9. $5\frac{4}{8} + 3\frac{5}{8}$

10. $3\frac{5}{12} + 4\frac{2}{12}$

Find the difference.

11. $5\frac{7}{8} - 2\frac{3}{8}$

12. $5\frac{7}{12} - 4\frac{1}{12}$

13. $3\frac{5}{10} - 1\frac{3}{10}$

14. $7\frac{3}{4} - 2\frac{2}{4}$

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

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

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

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

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

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

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

Problem Solving REAL WORLD

Solve. Write your answer as a mixed number.

SHOW YOUR WORK

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

24. H.O.T. During the Samson family trip, they drove from home to a ski lodge, 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. **Test Prep** Jeff used $4\frac{7}{8}$ cups of orange juice and $3\frac{1}{8}$ cups of pineapple juice to make tropical punch. How much more orange juice than pineapple juice did Jeff use?

Ⓐ $\frac{3}{4}$ cup

Ⓑ $1\frac{3}{4}$ cups

Ⓒ $1\frac{7}{8}$ cups

Ⓓ 8 cups

FOR MORE PRACTICE:
Standards Practice Book, pp. P145–P146

Name _____

Subtraction with Renaming

Essential Question How can you rename a mixed number to help you subtract?

UNLOCK the Problem REAL WORLD

Bruce, Chandler, and Chase go bike riding on weekends. On one weekend, Chase rode his bike for 3 hours, Chandler rode her bike for $2\frac{1}{4}$ hours, and Bruce rode his bike for $1\frac{3}{4}$ hours. How much longer did Chandler ride her bike than Bruce did?

- Which operation will you use?

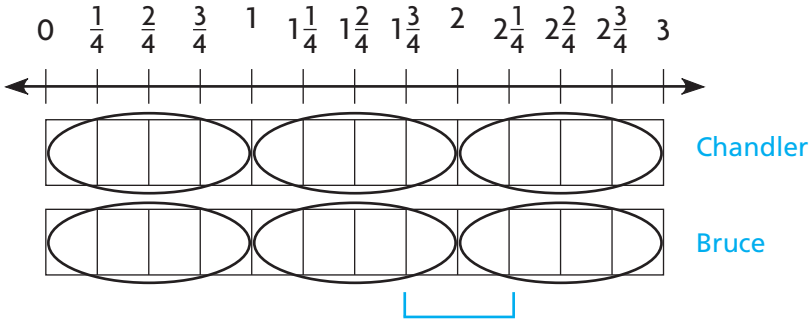
_____

- In the problem, circle the numbers that you need to use to find a solution.

Use a model. Find $2\frac{1}{4} - 1\frac{3}{4}$.

Shade the model to show how long Chandler rode her bike.

Then shade the model to show how long Bruce rode his bike.



Think: The difference is _____.

So, Chandler rode her bike _____ hour longer than Bruce did.

1. If you have 1 fourth-size part, can you take away 3 fourth-size parts? **Explain.**

_____

2. If you have 1 whole and 1 fourth-size part, can you take away 3 fourth-size parts? **Explain.**

_____

_____

MATHEMATICAL PRACTICES

Math Talk **Explain** how you can find how much longer Chase rode his bike than Chandler did.

One Way Rename the first mixed number.

Find the difference. $5\frac{1}{8} - 3\frac{3}{8}$

STEP 1

Rename $5\frac{1}{8}$ as a mixed number with a fraction greater than 1.

Think:

$$5\frac{1}{8} = 4 + 1 + \frac{1}{8}$$

$$= 4 + \frac{\square}{8} + \frac{1}{8}$$

$$= \square$$

Math Talk MATHEMATICAL PRACTICES

Explain why you need to rename $5\frac{1}{8}$.

STEP 2

Subtract the mixed numbers.

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

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

$$\square$$

Another Way Rename both mixed numbers.

Find the difference. $3\frac{4}{12} - 1\frac{6}{12}$

STEP 1

Rename both mixed numbers as fractions greater than 1.

$$3\frac{4}{12} = \frac{\square}{12} \qquad 1\frac{6}{12} = \frac{\square}{12}$$

STEP 2

Subtract the fractions greater than 1.

$$\frac{\square}{12}$$

$$-\frac{\square}{12}$$

$$\square$$

- **Explain** how you could rename 5 to subtract $3\frac{1}{4}$.

Name _____

Share and Show

1. Rename both mixed numbers as fractions. Find the difference.

$$3\frac{3}{6} = \frac{\square}{6}$$
$$-1\frac{4}{6} = -\frac{\square}{6}$$

Find the difference.

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

3. $4\frac{7}{10} - 1\frac{9}{10}$

4. $3\frac{5}{12} - \frac{8}{12}$

Math Talk MATHEMATICAL PRACTICES

Describe how you would model $\frac{13}{6} - \frac{8}{6}$.

On Your Own

Find the difference.

5. $8\frac{1}{10} - 2\frac{9}{10}$

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

7. $4\frac{1}{5} - 3\frac{2}{5}$

Practice: Copy and Solve Find the difference.

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

9. $6\frac{9}{12} - 3\frac{10}{12}$

10. $3\frac{3}{10} - \frac{7}{10}$

11. $4 - 2\frac{3}{5}$

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

13. $3\frac{9}{12} - 1\frac{11}{12}$

14. $7\frac{3}{10} - 4\frac{7}{10}$

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

Problem Solving REAL WORLD

Rename the fractions to solve.

Many instruments are coiled or curved so that they are easier for the musician to play, but they would be quite long if straightened out completely.

SHOW YOUR WORK

16. Trumpets and cornets are brass instruments. Fully stretched out, the length of a trumpet is $5\frac{1}{4}$ feet and the length of a cornet is $4\frac{2}{4}$ feet. The trumpet is how much longer than the cornet?

17. Bassoons and double bassoons are woodwind instruments. Fully stretched out, the length of a bassoon is $9\frac{2}{12}$ feet and the length of a double bassoon is $18\frac{1}{12}$ feet. The double bassoon is how much longer than the bassoon?

18. Tubas, trombones, and French horns are brass instruments. Fully stretched out, the length of a tuba is 18 feet, the length of a trombone is $9\frac{11}{12}$ feet, and the length of a French horn is $17\frac{1}{12}$ feet. The tuba is how much longer than the French horn? The French horn is how much longer than the trombone?

19. H.O.T. The pitch of a musical instrument is related to its length. In general, the greater the length of a musical instrument, the lower its pitch. Order the brass instruments identified on this page from lowest pitch to the highest pitch.

20. **Test Prep** Sam ran $2\frac{2}{5}$ miles on Saturday and $1\frac{4}{5}$ miles on Monday. How many more miles did Sam run on Saturday than on Monday?

Ⓐ $\frac{3}{5}$ mile Ⓒ $1\frac{2}{5}$ miles

Ⓑ $\frac{4}{5}$ mile Ⓓ $1\frac{4}{5}$ miles

FOR MORE PRACTICE:
Standards Practice Book, pp. P147–P148

Name _____

Fractions and Properties of Addition

Essential Question How can you 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, $(5 + 8) + 4 = 5 + (8 + 4)$.

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

$70\frac{5}{10} + 43\frac{6}{10} + 34\frac{5}{10} = \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_$

$= (\_\_\_\_\_ + \_\_\_\_\_) + \_\_\_\_\_$

$= (\_\_\_\_\_) + \_\_\_\_\_$

$= \_\_\_\_\_$

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.

$$\left(3\frac{4}{10} + 5\frac{2}{10}\right) + \frac{6}{10} = \left(5\frac{2}{10} + 3\frac{4}{10}\right) + \underline{\quad}$$ _____

$$= 5\frac{2}{10} + \left(3\frac{4}{10} + \underline{\quad}\right)$$ _____

$$= 5\frac{2}{10} + \underline{\quad}$$

$$= \underline{\quad}$$

MATHEMATICAL PRACTICES

Math Talk **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. $\left(2\frac{7}{8} + 3\frac{2}{8}\right) + 1\frac{1}{8}$

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

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. $(12\frac{4}{9} + 1\frac{2}{9}) + 3\frac{5}{9}$

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

Name _____

On Your Own

Use the properties and mental math to find the sum.

8. $\left(45\frac{1}{3} + 6\frac{1}{3}\right) + 38\frac{2}{3}$

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

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

11. $1\frac{4}{10} + \left(37\frac{3}{10} + \frac{6}{10}\right)$

12. $\left(\frac{3}{12} + 10\frac{5}{12}\right) + \frac{9}{12}$

13. $5\frac{7}{8} + \left(6\frac{3}{8} + \frac{1}{8}\right)$

Use the expressions in the box for 14–15.

14. Which property of addition would be best to solve Expression A?

_____

15. H.O.T. 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	$\frac{1}{3} + \frac{4}{3} + \frac{2}{3}$

16. **Test Prep** Shari represented the perimeter of a triangle she measured using the expression $1\frac{1}{2} + \left(2 + 2\frac{1}{2}\right)$. How could Shari rewrite the expression using both the Associative and Commutative Properties?

Ⓐ $3 + 2\frac{1}{2}$

Ⓑ $1\frac{1}{2} + \left(2\frac{1}{2} + 2\right)$

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

Ⓓ $\left(1\frac{1}{2} + 2\frac{1}{2}\right) + 2$

Problem Solving REAL WORLD

Pose a Problem

17. 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. Alice 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.

Costume Fabric (in Yards)

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, Alice used the properties of addition.

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

Alice 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

Solve your problem. Check your solution.

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

FOR MORE PRACTICE:
Standards Practice Book, pp. P149–P150

Name _____

Problem Solving • Multistep Fraction Problems

Essential Question How can you use the strategy *act it out* to solve multistep problems with fractions?

UNLOCK the Problem REAL WORLD

A gift shop sells walnuts in $\frac{3}{4}$-pound bags. Ann will buy some bags of walnuts and repackage them into 1-pound bags. What is the least number of $\frac{3}{4}$-pound bags Ann could buy, if she wants to fill each 1-pound bag, without leftovers?

Read the Problem

What do I need to find?

I need to find how many

_____ bags of walnuts Ann needs to make 1-pound bags of walnuts, without leftovers.

What information do I need to use?

The bags she will buy contain

_____ pound of walnuts. She will repackage the walnuts into

_____ -pound bags.

How will I use the information?

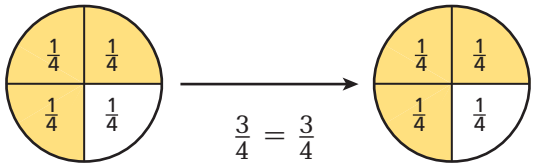
I can use fraction circles to

_____ the problem.

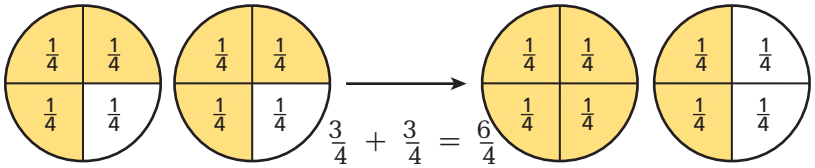
Solve the Problem

Describe how to act it out. Use fraction circles.

One $\frac{3}{4}$-pound bag — Not enough for a 1-pound bag



Two $\frac{3}{4}$-pound bags — One 1-pound bag with $\frac{2}{4}$ pound left over



Three $\frac{3}{4}$-pound bags have $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{\square}{4}$ pounds of walnuts. This makes _____ 1-pound bags with _____ pound left over.

Four $\frac{3}{4}$-pound bags have $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{\square}{4}$-pounds of walnuts.

This makes _____ 1-pound bags with _____ left over.

So, Ann could buy _____ $\frac{3}{4}$-pound bags of walnuts.

Try Another Problem

At the end of dinner, a restaurant had several dishes of quiche, each with 2 sixth-size pieces of quiche. The chef was able to combine these pieces to make 2 whole quiches, with no leftovers. How many dishes did the chef combine?

Read the Problem	Solve the Problem
What do I need to find?	**Describe how to act it out.**
What information do I need to use?	
How will I use the information?	

So, the chef combined _____ dishes each with $\frac{2}{6}$ quiche.

Name _____

Share and Show

MATH BOARD

UNLOCK the Problem Tips

- Underline the question.
- Circle the important facts.
- Cross out unneeded information.

1. Last week, Sia ran $1\frac{1}{4}$ miles each day for 5 days and then took 2 days off. Did she run at least 6 miles last week?

SHOW YOUR WORK

First, model the problem. Describe your model.

_____

_____

_____

_____

Then, regroup the parts in the model to find the number of whole miles Sia ran.

Sia ran _____ whole miles and _____ mile.

Finally, compare the total number of miles she ran to 6 miles.

$6\frac{1}{4}$ miles ◯ 6 miles

So, Sia _____ run at least 6 miles last week.

2. **What if** Sia ran only ran $\frac{3}{4}$ mile each day. Would she have run at least 6 miles last week? **Explain.**

_____

_____

3. A quarter is $\frac{1}{4}$ dollar. Noah has 20 quarters. How much money does he have? **Explain.**

_____

_____

_____

4. H.O.T. How many $\frac{2}{5}$ parts are in 2 wholes?

_____

On Your Own

Choose a STRATEGY

- Act It Out
- Draw a Diagram
- Find a Pattern
- Make a Table or List
- Solve a Simpler Problem

SHOW YOUR WORK

5. A company shipped 15,325 boxes of apples and 12,980 boxes of oranges. How many more boxes of apples than oranges did the company ship?

6. A fair sold a total of 3,300 tickets on Friday and Saturday. It sold 100 more on Friday than on Saturday. How many tickets did the fair sell on Friday?

7. **Write Math** Emma walked $\frac{1}{4}$ mile on Monday, $\frac{2}{4}$ mile on Tuesday, and $\frac{3}{4}$ mile on Wednesday. If the pattern continues, how many miles will she walk on Friday? **Explain** how you found the number of miles.

8. **H.O.T.** Jared painted a mug $\frac{5}{12}$ red and $\frac{4}{12}$ blue. What part of the mug is **not** red or blue?

9. **Test Prep** Sophia spent $\frac{3}{4}$ hour reading about the Warwick Applefest. Then she spent $\frac{1}{4}$ hour writing a paragraph about the festival. How long did Sophia spend reading and writing about the festival?

   Ⓐ $\frac{1}{4}$ hour Ⓒ 1 hour

   Ⓑ $\frac{2}{4}$ hour Ⓓ $1\frac{1}{4}$ hours

FOR MORE PRACTICE:
Standards Practice Book, pp. P151–P152

Name _____

Chapter Review/Test

Vocabulary

Choose the best term from the box.

Vocabulary
mixed number
simplest form
unit fraction

1. A number represented by a whole number and a fraction is a _____. (p. 289)

2. A fraction that always has a numerator of 1 is a _____. (p. 271)

Check Concepts

Write the fraction as a sum of unit fractions.

3. $\frac{4}{5} =$ _____

4. $\frac{5}{10} =$ _____

Write the mixed number as a fraction.

5. $1\frac{3}{8} =$ _____

6. $4\frac{2}{3} =$ _____

7. $2\frac{3}{5} =$ _____

Write the fraction as a mixed number.

8. $\frac{12}{10} =$ _____

9. $\frac{10}{3} =$ _____

10. $\frac{15}{6} =$ _____

Find the sum or difference.

11. $2\frac{3}{8} + 1\frac{6}{8} =$ _____

12. $\frac{9}{12} - \frac{2}{12} =$ _____

13. $5\frac{7}{10} - 4\frac{5}{10} =$ _____

14. $4\frac{1}{6} - 2\frac{5}{6} =$ _____

15. $3\frac{2}{5} - 1\frac{4}{5} =$ _____

16. $\frac{4}{12} + \frac{6}{12} =$ _____

Use the properties and mental math to find the sum.

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

18. $2\frac{4}{6} + \left(2\frac{3}{6} + 2\frac{2}{6}\right)$

19. $\frac{3}{10} + \left(2\frac{4}{10} + \frac{7}{10}\right)$

GO Online Assessment Options Chapter Test

Fill in the bubble completely to show your answer.

20. Eddie cut $2\frac{2}{4}$ feet of balsa wood for the length of a kite. He cut $\frac{3}{4}$ foot for the width of the kite. How much longer is the length of the kite than the width?

Ⓐ $1\frac{1}{4}$ feet

Ⓑ $1\frac{3}{4}$ feet

Ⓒ 2 feet

Ⓓ $3\frac{1}{4}$ feet

21. On a trip to the art museum, Lily rode the subway for $\frac{7}{10}$ mile and walked for $\frac{3}{10}$ mile. How much farther did she ride on the subway than walk?

Ⓐ $\frac{3}{10}$ mile

Ⓑ $\frac{4}{10}$ mile

Ⓒ $\frac{7}{10}$ mile

Ⓓ 1 mile

22. 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 ?

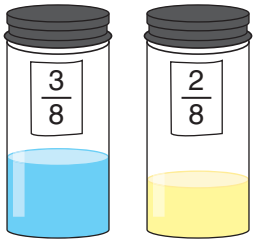
Ⓐ $1\frac{5}{8}$ miles

Ⓑ $12\frac{1}{8}$ miles

Ⓒ $19\frac{4}{8}$ miles

Ⓓ $19\frac{5}{8}$ miles

23. Cindy has two jars of paint.



Which fraction below represents how much paint Cindy has?

Ⓐ $\frac{1}{8}$

Ⓑ $\frac{4}{8}$

Ⓒ $\frac{5}{8}$

Ⓓ $\frac{7}{8}$

Name _____

24. Cole grew $2\frac{3}{4}$ inches last year. Kelly grew the same amount. Which fraction below represents the number of inches that Kelly grew last year?

Ⓐ $\frac{3}{4}$

Ⓑ $\frac{5}{4}$

Ⓒ $\frac{11}{4}$

Ⓓ $\frac{14}{4}$

25. Olivia's dog is 4 years old. Her cat is $1\frac{1}{2}$ years younger. How old is Olivia's cat?

Ⓐ $5\frac{1}{2}$ years old

Ⓑ $3\frac{1}{2}$ years old

Ⓒ $2\frac{1}{2}$ years old

Ⓓ $1\frac{1}{2}$ years old

26. Lisa mixed $4\frac{4}{6}$ cups of orange juice with $3\frac{1}{6}$ cups of milk to make a health shake. She drank $3\frac{3}{6}$ cups of the health shake. How much of the health shake did Lisa not drink?

Ⓐ $\frac{2}{6}$ cups

Ⓑ $4\frac{2}{6}$ cups

Ⓒ $7\frac{5}{6}$ cups

Ⓓ $11\frac{2}{6}$ cups

27. Keiko entered a contest to design a new school flag. Five twelfths of her flag has stars and $\frac{3}{12}$ has stripes. What fraction of Keiko's flag has stars and stripes?

Ⓐ $\frac{8}{12}$

Ⓑ $\frac{8}{24}$

Ⓒ $\frac{2}{12}$

Ⓓ $\frac{2}{24}$

Constructed Response

28. Ela is knitting a scarf from a pattern. The pattern calls for $4\frac{2}{12}$ yards of yarn. She has only $2\frac{11}{12}$ yards of yarn. How much more yarn does Ela need to finish knitting the scarf? **Explain** how you found your answer.

Performance Task

29. 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.

A How much greater is the fraction of the fairground with rides than the fraction with farm exhibits? Draw a model to prove your answer is correct.

B What fraction of the fairground has games and farm exhibits? Write an equation to show your answer.

C The rest of the fairground is refreshment booths. What fraction of the fairground is refreshment booths? **Describe** the steps you follow to solve the problem.