Chapter 8

Name _____

Add and Subtract Fractions with Unlike Denominators

Show What You Know

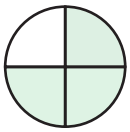
Part of a Whole Write a fraction to name the shaded part.

1. 

number of shaded parts _____

number of total parts _____

fraction _____

2. 

number of shaded parts _____

number of total parts _____

fraction _____

Add and Subtract Fractions Write the sum or difference.

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

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

5. $\frac{7}{8} - \frac{3}{8} =$ _____

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

Multiples Write the first six nonzero multiples.

7. 5 _____

8. 3 _____

9. 7 _____

MATH in the Real World

There are 30 senators and 60 members of the House of Representatives in the Arizona Legislature. Suppose 20 senators and 25 representatives came to a committee meeting. Explain how you would write a fraction that compares the number of legislators that attended to the total number of legislators.

Vocabulary Builder

Go Online For more help

Visualize It

Use the ✓ words to complete the H-diagram.

Add and Subtract Fractions with Like		Add and Subtract Fractions with Unlike
_____		_____

Connect to Vocabulary

Review Words

benchmark
✓ common multiple
✓ denominators
✓ difference
✓ equivalent fractions
✓ numerators
✓ sum

Preview Words

✓ common denominator

Understand Vocabulary

Draw a line to match the word with its definition.

1. common multiple
2. benchmark
3. common denominator
4. equivalent fractions

- a number that is a multiple of two or more numbers
- a common multiple of two or more denominators
- a familiar number used as a point of reference
- fractions that name the same amount or part

Name _____

Represent Addition with Unlike Denominators

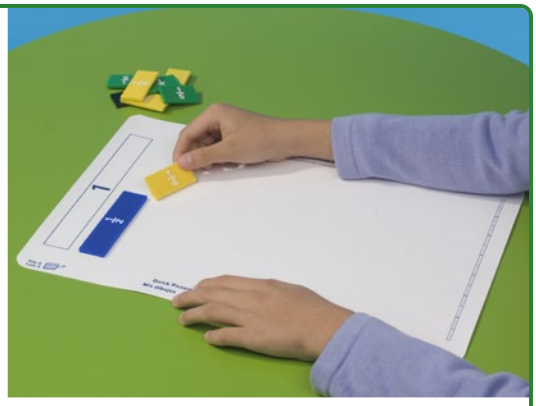
Florida's B.E.S.T.

- **Fractions** 5.FR.2.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1

I Can use visual models to add fractions that have unlike denominators.

Investigate

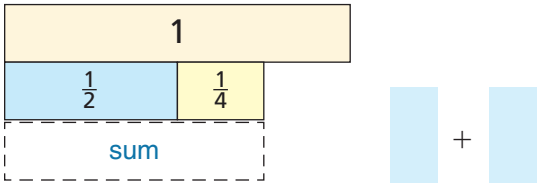
Hilary is making a tote bag for her friend. She uses $\frac{1}{2}$ yard of blue fabric and $\frac{1}{4}$ yard of red fabric. How much fabric does Hilary use?



Materials ■ fraction strips ■ MathBoard

A. Find $\frac{1}{2} + \frac{1}{4}$. Place a $\frac{1}{2}$-strip and a $\frac{1}{4}$-strip under the 1-whole strip on your MathBoard.

B. Find fraction strips, all with the same denominator, that are equivalent to $\frac{1}{2}$ and $\frac{1}{4}$ and fit exactly under the sum $\frac{1}{2} + \frac{1}{4}$. Record the addends, using like denominators.



_____ + _____

C. Record the sum. $\frac{1}{2} + \frac{1}{4} =$ _____

So, Hilary uses _____ yard of fabric.

Math Talk

MTR 3.1 Complete tasks with mathematical fluency.

How can you tell if the sum of the fractions is less than 1?

Draw Conclusions

1. Describe how you determined what fraction strips, all with the same denominator, would fit exactly under $\frac{1}{2} + \frac{1}{3}$. What are they?

2. **MTR** Explain the difference between finding fraction strips with the same denominator for $\frac{1}{2} + \frac{1}{3}$ and $\frac{1}{2} + \frac{1}{4}$.

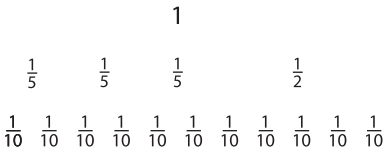
Make Connections

Sometimes, the sum of two fractions is greater than 1. When adding fractions with unlike denominators, you can use the 1-whole strip to help determine if a sum is greater than 1 or less than 1.

Use fraction strips to solve. $\frac{3}{5} + \frac{1}{2}$

STEP 1

Work with another student. Place three $\frac{1}{5}$-fraction strips under the 1-whole strip on your MathBoard. Then place a $\frac{1}{2}$-fraction strip beside the three $\frac{1}{5}$-strips.



STEP 2

Find fraction strips, all with the same denominator, that are equivalent to $\frac{3}{5}$ and $\frac{1}{2}$. Place the fraction strips under the sum. Draw a picture of the model and write the equivalent fractions.

$\frac{3}{5} =$ _____ $\frac{1}{2} =$ _____

STEP 3

Add the fractions with like denominators. Use the 1-whole strip to rename the sum.

Think: How many fraction strips with the same denominator are equal to 1 whole?

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

= _____, or _____

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

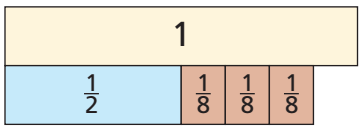
In what step did you find out that the answer is greater than 1? Explain.

Share and Show

Math Board

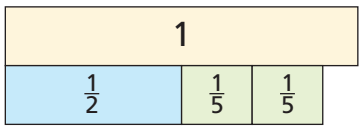
Use fraction strips or *i*Tools to find the sum.

1.



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

2.

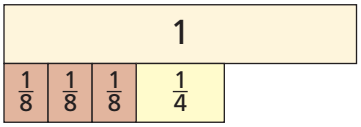


$\frac{1}{2} + \frac{2}{5} =$ _____ + _____ = _____

Name _____

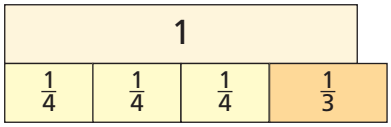
Use fraction strips or *i*Tools to find the sum.

3.



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

4.



$\frac{3}{4} + \frac{1}{3} =$ _____ + _____ = _____

Use fraction strips to find the sum.

5. $\frac{2}{5} + \frac{3}{10} =$ _____

6. $\frac{1}{4} + \frac{1}{12} =$ _____

7. $\frac{1}{2} + \frac{3}{10} =$ _____

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

9. $\frac{5}{8} + \frac{1}{4} =$ _____

10. $\frac{1}{2} + \frac{1}{5} =$ _____

On Your Own

11. WRITE *Math* Explain how using fraction strips with like denominators makes it possible to add fractions with unlike denominators.

12. Luis is making two batches of muffins for a school picnic. One batch of muffins uses $\frac{1}{4}$ cup of oats and $\frac{1}{3}$ cup of flour. What is the total number of cups of oats and flour needed for two batches? Explain how you use fraction strips to solve the problem.

13. Maya makes trail mix by combining $\frac{1}{3}$ cup of mixed nuts, $\frac{1}{4}$ cup of dried fruit, and $\frac{1}{6}$ cup of chocolate morsels. What is the total amount of ingredients in her trail mix?

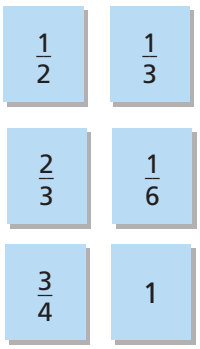
MATH on the Spot

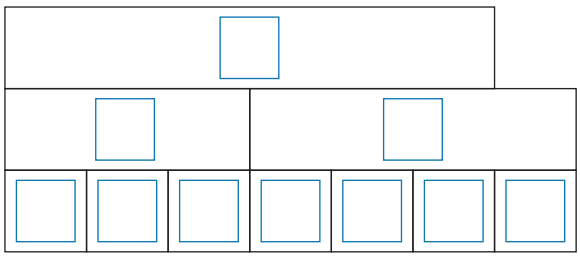
14. Write a new problem using different amounts for ingredients Maya used. Each amount should be a fraction with a denominator of 2, 3, or 4.

15. MTR Solve the problem you wrote. Draw a picture of the fraction strips you use to solve your problem.

16. Explain why you chose the amounts you did for your problem.

17. Alexandria used $\frac{1}{2}$ cup of grapes and $\frac{2}{3}$ cup of raisins combined to make a fruit snack. How many cups of grapes and raisins did she use? Use the tiles to complete the fraction strip model to show how you found your answer. The fractions may be used more than once or not at all.





_____ cups of grapes and raisins

Name _____

Represent Addition with Unlike Denominators

Go Online
Interactive Examples

Use fraction strips to find the sum.

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

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

$1\frac{1}{4}$

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

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

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

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

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

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

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

9. $\frac{7}{8} + \frac{1}{2}$

Problem Solving Real World

10. Brandus bought $\frac{1}{3}$ pound of ground turkey and $\frac{3}{4}$ pound of ground beef to make sausages. How many pounds of meat did he buy?

11. To make a ribbon and bow for a hat, Stacey needs $\frac{5}{6}$ yard of black ribbon and $\frac{2}{3}$ yard of red ribbon. How much total ribbon does she need?

12. WRITE Math Write a story problem that involves adding fractions with unlike denominators. Include the solution.

Lesson Check

13. Hirva ate $\frac{5}{8}$ of a medium pizza. Elizabeth ate $\frac{1}{4}$ of the pizza. How much pizza did they eat altogether?

14. Bill ate $\frac{1}{4}$ pound of trail mix on his first break during a hiking trip. On his second break, he ate $\frac{1}{6}$ pound. How many pounds of trail mix did he eat during both breaks?

Spiral Review

15. In 782,341,693, what digit is in the ten thousands place?

16. Matt ran 8 laps in 1,256 seconds. If he ran each lap in the same amount of time, how many seconds did it take him to run 1 lap?

17. Gilbert bought 3 shirts for $15.90 each, including tax. How much did he spend?

18. Canda has 14 pounds of nuts. There are 16 ounces in one pound. How many ounces of nuts does she have?

Name _____

Represent Subtraction with Unlike Denominators

Florida's B.E.S.T.

- **Fractions** 5.FR.2.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1

I Can use visual models to subtract fractions that have unlike denominators.

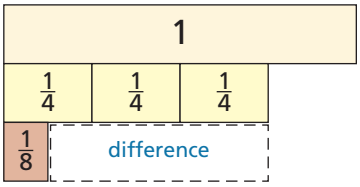
Investigate

Mario fills a hummingbird feeder with $\frac{3}{4}$ cup of sugar water on Friday. On Monday, Mario sees that $\frac{1}{8}$ cup of sugar water is left. How much sugar water did the hummingbirds drink?

Materials ■ fraction strips ■ MathBoard

A. Find $\frac{3}{4} - \frac{1}{8}$. Place three $\frac{1}{4}$-strips under the 1-whole strip on your MathBoard. Then place a $\frac{1}{8}$-strip under the $\frac{1}{4}$-strips.

B. Find fraction strips, all with the same denominator, that fit exactly under the difference $\frac{3}{4} - \frac{1}{8}$.



C. Record the difference. $\frac{3}{4} - \frac{1}{8} =$ _____

So, the hummingbirds drank _____ cup of sugar water.

Math Talk

MTR 3.1 Complete tasks with mathematical fluency.

How can you tell if the difference of the fractions is less than 1? Explain.

Draw Conclusions

1. Describe how you determined what fraction strips, all with the same denominator, would fit exactly under the difference. What are they?

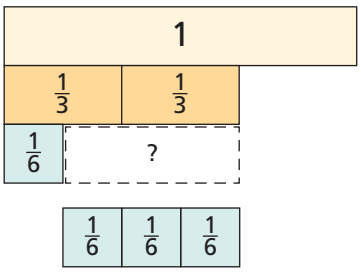
2. **MTR** Explain whether you could have used fraction strips with any other denominator to find the difference. If so, what is the denominator?

Make Connections

Sometimes you can use different sets of same-denominator fraction strips to find the difference. All the answers will be correct.

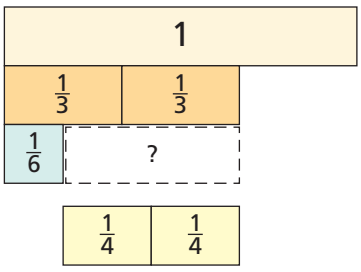
Solve. $\frac{2}{3} - \frac{1}{6}$

A Find fraction strips, all with the same denominator, that fit exactly under the difference $\frac{2}{3} - \frac{1}{6}$.



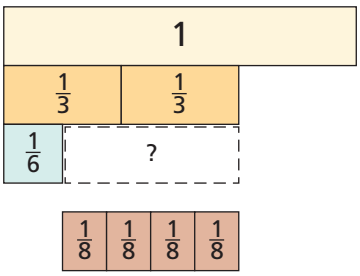
$\frac{2}{3} - \frac{1}{6} = \frac{3}{6}$

B Find another set of fraction strips, all with the same denominator, that fit exactly under the difference $\frac{2}{3} - \frac{1}{6}$. Draw the fraction strips you used.



$\frac{2}{3} - \frac{1}{6} =$ _____

C Find other fraction strips, all with the same denominator, that fit exactly under the difference $\frac{2}{3} - \frac{1}{6}$. Draw the fraction strips you used.



$\frac{2}{3} - \frac{1}{6} =$ _____

While each answer appears different, all the answers can be simplified to _____.

Math Talk

MTR 2.1 Demonstrate understanding in multiple ways.

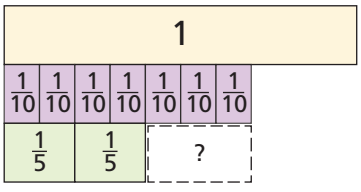
Which other fraction strips with the same denominator could fit exactly under the difference $\frac{2}{3} - \frac{1}{6}$?

Share and Show

Math Board

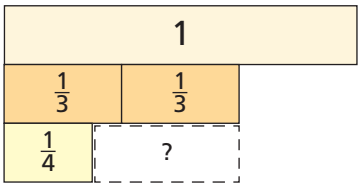
Use fraction strips to find the difference.

1.



$\frac{7}{10} - \frac{2}{5} =$ _____

2.

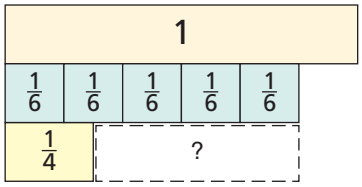


$\frac{2}{3} - \frac{1}{4} =$ _____

Name _____

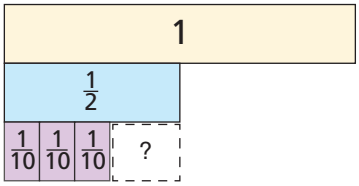
Use fraction strips to find the difference.

3.



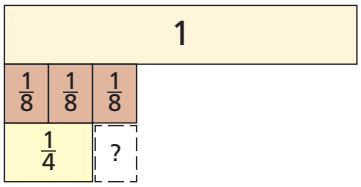
$\frac{5}{6} - \frac{1}{4} =$ _____

4.



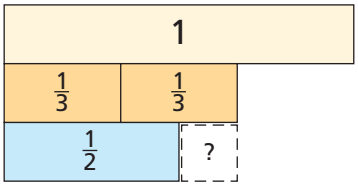
$\frac{1}{2} - \frac{3}{10} =$ _____

5.



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

6.



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

Use fraction strips to find the difference.

7. $\frac{3}{5} - \frac{3}{10} =$ _____

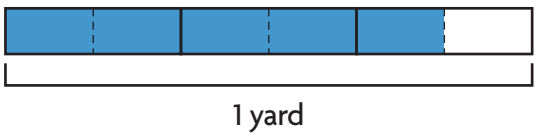
8. $\frac{5}{12} - \frac{1}{3} =$ _____

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

On Your Own

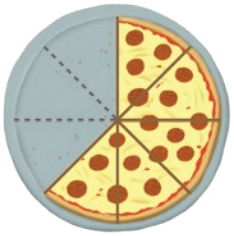
10. MTR Explain how your model for $\frac{3}{5} - \frac{1}{2}$ is different from your model for $\frac{3}{5} - \frac{3}{10}$.

11. The shaded part of the diagram shows what Tina had left from a yard of fabric. She now uses $\frac{1}{3}$ yard of fabric for one project and $\frac{1}{6}$ yard for a second project. How much of the original yard of fabric does Tina have left after the two projects?



UNLOCK the Problem Real World

12. The picture at the right shows how much pizza was left over from lunch. Jason eats $\frac{1}{4}$ of the whole pizza for dinner. Write a fraction that represents the amount of pizza that is remaining after dinner.



MATH on the Spot

a. What problem are you being asked to solve? _____

_____

b. How will you use the diagram to solve the problem? _____

_____

_____

c. Jason eats $\frac{1}{4}$ of the whole pizza. How many slices does he eat? _____

d. Redraw the diagram of the pizza. Shade the sections of pizza that are remaining after Jason eats his dinner.

e. Complete the sentence.

There is _____ of the pizza remaining after dinner.

13. The shaded part of the diagram shows what Margie had left over from a roll of construction paper that measured one yard. She will use $\frac{3}{4}$ yard of paper to make a poster. She wants to determine how much paper she will have remaining after making the poster. For 13a–13c, select True or False for each statement.

1 yd

13a. To determine how much paper will be left after making the poster, Margie must find $1 - \frac{3}{4}$. ○ True ○ False

13b. The fractions $\frac{3}{4}$ and $\frac{6}{8}$ are equivalent. ○ True ○ False

13c. Margie will have $\frac{1}{8}$ yard of paper remaining. ○ True ○ False

Name _____

Represent Subtraction with Unlike Denominators

Go Online
Interactive Examples

Use fraction strips to find the difference.

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

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

$\frac{1}{6}$

2. $\frac{3}{4} - \frac{3}{8}$

_____

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

_____

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

_____

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

_____

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

_____

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

_____

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

_____

9. $\frac{7}{10} - \frac{1}{2}$

_____

Problem Solving Real World

10. Amber had $\frac{3}{8}$ of a cake left after her party. She wrapped a piece that was $\frac{1}{4}$ of the original cake for her best friend. What fractional part did she have left for herself?

_____

11. Wesley bought $\frac{1}{2}$ pound of nails for a project. When he finished the project, he had $\frac{1}{4}$ pound of nails left. How many pounds of nails did he use?

_____

12. WRITE Math Explain how modeling subtraction with fraction strips is different from modeling addition with fraction strips.

_____

_____

Lesson Check

13. A meatloaf recipe calls for $\frac{7}{8}$ cup of bread crumbs for the loaf and the topping. If $\frac{3}{4}$ cup is used for the loaf, what fraction of a cup is used for the topping?

14. Jamariah bought $\frac{3}{4}$ yard of felt for a project. She used $\frac{1}{8}$ yard. What fraction of a yard of felt did she have left over?

Spiral Review

15. Jasmine's race time was 34.287 minutes. Round her race time to the nearest tenth of a minute.

16. The Art Club is having a fundraiser, and 198 people are attending. If 12 people can sit at each table, what is the least number of tables needed?

17. During the day, Sam spent $4.85 on lunch. He also bought 2 books for $7.95 each. At the end of the day, he had $8.20 left. How much money did he start with?

18. What is the product of 7.5 and 1,000?

Name _____

Estimate Fraction Sums and Differences

Florida's B.E.S.T.
- **Fractions** 5.FR.2.1
- **Algebraic Reasoning** 5.AR.1.2
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1

I Can make reasonable estimates of fraction sums and differences.

UNLOCK the Problem Real World

Kimberly will be riding her bike to school this year. The distance from her house to the end of the street is $\frac{1}{6}$ mile. The distance from the end of the street to the school is $\frac{3}{8}$ mile. About how far is Kimberly's house from school?

You can use benchmarks to find reasonable estimates by rounding fractions to 0, $\frac{1}{2}$, or 1.

One Way Use a number line.

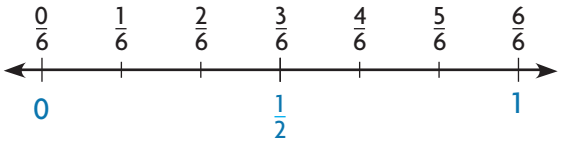
Estimate. $\frac{1}{6} + \frac{3}{8}$

STEP 1 Place a point at $\frac{1}{6}$ on the number line.

The fraction is between _____ and _____.

The fraction $\frac{1}{6}$ is closer to the benchmark _____.

Round to _____.

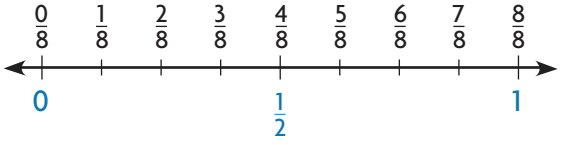


STEP 2 Place a point at $\frac{3}{8}$ on the number line.

The fraction is between _____ and _____.

The fraction $\frac{3}{8}$ is closer to the benchmark _____.

Round to _____.



STEP 3 Add the rounded fractions.

$$\frac{1}{6} \rightarrow \square$$
$$+\frac{3}{8} \rightarrow +\square$$
$$\square$$

So, Kimberly's house is about _____ mile from the school.

Another Way Use mental math.

You can compare the numerator and the denominator to round a fraction and find a reasonable estimate.

Estimate. $\frac{9}{10} - \frac{5}{8}$

STEP 1 Round $\frac{9}{10}$. **Think:** The numerator is about the same as the denominator.

Round the fraction $\frac{9}{10}$ to _____.

STEP 2 Round $\frac{5}{8}$. **Think:** The numerator is about half the denominator.

Round the fraction $\frac{5}{8}$ to _____.

STEP 3 Subtract.

$$\begin{array}{r} \frac{9}{10} \\ -\frac{5}{8} \\ \hline \end{array} \quad \rightarrow \quad \begin{array}{r} \square \\ -\ \square \\ \hline \square \end{array}$$

So, $\frac{9}{10} - \frac{5}{8}$ is about _____.

Remember

A fraction with the same numerator and denominator, such as $\frac{2}{2}$, $\frac{5}{5}$, $\frac{12}{12}$, or $\frac{96}{96}$, is equal to 1.

Math Talk

MTR 2.1 Demonstrate understanding in multiple ways.

Explain another way you could use benchmarks to estimate $\frac{9}{10} - \frac{5}{8}$.

Try This! Estimate.

A $2\frac{7}{8} - \frac{2}{5}$

B $1\frac{8}{9} + 4\frac{8}{10}$

Name _____

Share and Show

Math Board

Estimate the sum or difference.

1. $\frac{5}{6} + \frac{3}{8}$

a. Round $\frac{5}{6}$ to its closest benchmark. _____

b. Round $\frac{3}{8}$ to its closest benchmark. _____

c. Add to find the estimate. _____ + _____ = _____

2. $\frac{5}{9} - \frac{3}{8}$

3. $\frac{6}{7} + 2\frac{4}{5}$

4. $\frac{5}{6} + \frac{2}{5}$

Math Talk

MTR 6.1 Assess the reasonableness of solutions.

Explain how you know whether your estimate for $\frac{9}{10} + 3\frac{6}{7}$ would be greater than or less than the actual sum.

On Your Own

Estimate the sum or difference.

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

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

7. $\frac{6}{7} - \frac{1}{5}$

8. $\frac{11}{12} + \frac{6}{10}$

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

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

11. Liza and Valerie are picnicking in Trough Creek State Park in Pennsylvania. Liza has brought a salad that she made with $\frac{3}{4}$ cup of strawberries, $\frac{7}{8}$ cup of peaches, and $\frac{1}{6}$ cup of blueberries. They ate $\frac{11}{12}$ cup of salad. About how many cups of fruit salad are left?

_____

Problem Solving • Applications

12. At Trace State Park in Mississippi, there is a 40-mile mountain bike trail. Tommy rode $\frac{1}{2}$ of the trail on Saturday and $\frac{1}{5}$ of the trail on Sunday. He estimates that he rode more than 22 miles over the two days. Is Tommy's estimate reasonable?

MATH on the Spot

13. MTR Explain how you know that $\frac{5}{8} + \frac{6}{10}$ is greater than 1.

14. WRITE Math Nick estimated that $\frac{5}{8} + \frac{4}{7}$ is about 2. Explain how you know his estimate is not reasonable.

15. Aisha painted for $\frac{5}{6}$ hour in the morning and $2\frac{1}{5}$ hours in the afternoon. Estimate how long Aisha painted. For 15a–15c, choose the number that makes each sentence true.

15a. Aisha painted for about [0, $\frac{1}{2}$, 1] hour in the morning.

15b. Aisha painted for about [1, 2, $2\frac{1}{2}$, 3] hour(s) in the afternoon.

15c. Aisha painted for about [1, 2, $2\frac{1}{2}$, 3] hours in the morning and afternoon combined.

Name _____

Estimate Fraction Sums and Differences

Go Online
Interactive Examples

Estimate the sum or difference.

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

Think: $\frac{1}{3}$ is closer to $\frac{1}{2}$ than to 0.

Estimate: 0

2. $\frac{1}{8} + \frac{1}{4}$

Estimate: _____

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

Estimate: _____

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

Estimate: _____

5. $\frac{1}{5} + \frac{3}{7}$

Estimate: _____

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

Estimate: _____

7. $2\frac{2}{3} + \frac{3}{4}$

Estimate: _____

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

Estimate: _____

9. $4\frac{1}{8} - \frac{3}{4}$

Estimate: _____

Problem Solving Real World

10. For a fruit salad recipe, Jenna combined $\frac{3}{8}$ cup of raisins, $\frac{7}{8}$ cup of oranges, and $\frac{3}{4}$ cup of apples. About how many cups of fruit are in the salad?

11. Tyler had $2\frac{7}{16}$ yards of fabric. He used $\frac{3}{4}$ yard to make a vest. About how much fabric did he have left?

12. WRITE Math What is an instance when you might want to find an estimate for fraction sums or differences rather than an exact answer?

Lesson Check

13. Helen's house is located on a rectangular lot that is $1\frac{1}{8}$ miles by $\frac{9}{10}$ mile. Estimate the distance around the lot.

14. Keith bought a package with $2\frac{9}{16}$ pounds of ground meat to make hamburgers. He has $\frac{2}{5}$ pound of ground meat left. About how many pounds of ground meat did he use for the hamburgers?

Spiral Review

15. Jaxon bought two identical boxes of nails. One box weighs 168 ounces. What is the total weight in ounces of the nails Jaxon bought?

16. Darius wants to divide 345 sheets of construction paper evenly among his 23 classmates. How many sheets will be left over?

17. What is the most reasonable estimate for $23.63 \div 6$?

18. What is a rule for the sequence shown?

1.8, 2.85, 3.90, 4.95, 6

Name _____

Rewrite Fractions with Common Denominators

Florida's B.E.S.T.

- **Fractions** 5.FR.2.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1, MTR.5.1, MTR.6.1, MTR.7.1

I Can rewrite a pair of fractions so that they have a common denominator.

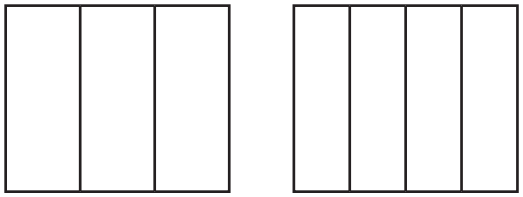
UNLOCK the Problem Real World

Sarah planted two 1-acre gardens. One had three sections of flowers and the other had 4 sections of flowers. She plans to divide both gardens into more sections so that they have the same number of equal-sized sections. How many sections will each garden have?

You can use a **common denominator** or a common multiple of two or more denominators to write fractions that name the same part of a whole.

One Way Multiply the denominators.

THINK



Think: Divide each $\frac{1}{3}$ into fourths and divide each $\frac{1}{4}$ into thirds. Each of the wholes will be divided into the same-sized parts, twelfths.

So, both gardens will have _____ sections.

RECORD

- Multiply the denominators to find a common denominator.

  A common denominator of $\frac{1}{3}$ and $\frac{1}{4}$ is _____.

- Write $\frac{1}{3}$ and $\frac{1}{4}$ as equivalent fractions using the common denominator.

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

Another Way Use a list.

- Make a list of the first eight nonzero multiples of 3 and 4.

  Multiples of 3: 3, 6, 9, _____, _____, _____, _____, _____

  Multiples of 4: 4, 8, _____, _____, _____, _____, _____, _____

- Circle the common multiples.
- Use one of the common multiples as a common denominator to write equivalent fractions for $\frac{1}{3}$ and $\frac{1}{4}$.

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

So, both gardens can have _____ or _____ sections.

Math Talk MTR 4.1 Engage in discussions on mathematical thinking.

Explain what a common denominator of two fractions represents.

Example Use a common denominator.

Find a common denominator of $\frac{3}{4}$ and $\frac{1}{6}$. Use a common denominator to write an equivalent fraction for each fraction.

STEP 1 List nonzero multiples of the denominators. Find a common multiple.

Multiples of 4: _____

Multiples of 6: _____

So, a common denominator of $\frac{3}{4}$ and $\frac{1}{6}$ is _____.

STEP 2 Using a common denominator, write an equivalent fraction for each fraction.

Think: What number multiplied by the denominator of the fraction will result in a common denominator?

$\frac{3}{4} = \frac{?}{12} = \frac{3 \times 3}{4 \times 3} = \frac{\square}{\square}$ → common denominator

$\frac{1}{6} = \frac{?}{12} = \frac{1 \times \square}{6 \times \square} = \frac{\square}{\square}$ → common denominator

$\frac{3}{4}$ can be rewritten as _____ and $\frac{1}{6}$ can be rewritten as _____.

Share and Show

Math Board

Math Talk

MTR 2.1 Demonstrate understanding in multiple ways.

Explain two methods for finding a common denominator of two fractions.

1. Find a common denominator of $\frac{1}{6}$ and $\frac{1}{9}$. Rewrite the pair of fractions using the common denominator.

- Multiply the denominators.
  A common denominator of $\frac{1}{6}$ and $\frac{1}{9}$ is _____.
- Rewrite the pair of fractions using the common denominator.

$\frac{1}{6} = \frac{\square}{\square}$ $\frac{1}{9} = \frac{\square}{\square}$

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

2. $\frac{1}{3}, \frac{1}{5}$ common denominator: _____

3. $\frac{2}{3}, \frac{5}{9}$ common denominator: _____

4. $\frac{2}{9}, \frac{1}{15}$ common denominator: _____

Name _____

On Your Own

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

5. $\frac{5}{9}, \frac{4}{15}$

6. $\frac{1}{6}, \frac{4}{21}$

7. $\frac{5}{14}, \frac{8}{42}$

8. $\frac{7}{12}, \frac{5}{18}$

MTR **Write the unknown number for each ■.**

9. $\frac{1}{5}, \frac{1}{8}$ common denominator: ■

■ = _____

10. $\frac{2}{5}, \frac{1}{■}$ common denominator: 15

■ = _____

11. $\frac{3}{■}, \frac{5}{6}$ common denominator: 42

■ = _____

12. Arnold had three pieces of different colored strings that are all the same length. Arnold cut the blue string into 2 equal-size lengths. He cut the red string into 3 equal-size lengths, and the green string into 6 equal-size lengths. He needs to cut the strings so each color has the same number of equal-size lengths. What is the least number of equal-sized lengths each color string could have?

MATH on the Spot

_____

13. One tray of granola bars was cut into 4 equal-size pieces. A second tray was cut into 12 equal-size pieces, and a third was cut into 8 equal-size pieces. Jan wants to continue cutting until all three trays have the same number of pieces. How many pieces will there be on each tray?

_____

14. Mr. Nickelson tells the class that they double a common denominator for $\frac{1}{2}$, $\frac{3}{5}$, and $\frac{9}{15}$ to find the number of the day. What number is the number of the day?

_____

Problem Solving · Applications Real World

15. Katie made two pies for the bake sale. One was cut into three equal slices and the other into 5 equal slices. She will continue to cut the pies so each one has the same number of equal-sized slices. How many equal-sized slices could each pie have?

a. What information are you given? _____

_____

b. What problem are you being asked to solve? _____

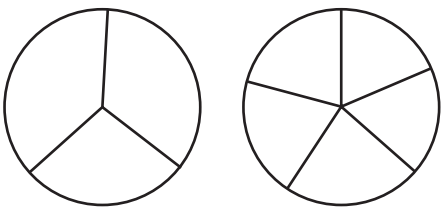
_____

c. When Katie cuts the pies more, can she cut each pie the same number of times and have all the slices be the same size? Explain. _____

_____

_____

d. Use the diagram to show the steps you use to solve the problem.



e. Complete the sentences.

A common denominator of $\frac{1}{3}$ and $\frac{1}{5}$ is _____.

Katie can cut each piece of the first pie into _____ and each piece of the second pie into _____.

That means that Katie can cut each pie into pieces that are _____ of the whole pie.

16. Moriah bought $\frac{5}{8}$ pound of almonds and $\frac{3}{4}$ pound of walnuts. Choose the pairs of fractions that are equivalent to the amounts that Moriah bought. Mark all that apply.

Ⓐ $\frac{5}{8}$ and $\frac{6}{8}$ Ⓑ $\frac{10}{16}$ and $\frac{14}{16}$ Ⓒ $\frac{20}{32}$ and $\frac{23}{32}$ Ⓓ $\frac{15}{24}$ and $\frac{18}{24}$

Name _____

Rewrite Fractions with Common Denominators

Go Online
Interactive Examples

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

1. $\frac{1}{5}, \frac{1}{2}$ common denominator: 10

Think: 10 is a multiple of 5 and 2. Find equivalent fractions with a denominator of 10.

$\frac{2}{10}, \frac{5}{10}$

2. $\frac{1}{4}, \frac{2}{3}$ common denominator: _____

3. $\frac{5}{6}, \frac{1}{3}$ common denominator: _____

4. $\frac{3}{5}, \frac{1}{3}$ common denominator: _____

5. $\frac{1}{2}, \frac{3}{8}$ common denominator: _____

6. $\frac{1}{6}, \frac{1}{4}$ common denominator: _____

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

7. $\frac{5}{6}, \frac{2}{9}$

8. $\frac{1}{12}, \frac{3}{8}$

9. $\frac{5}{9}, \frac{2}{15}$

Problem Solving Real World

10. Ella spends $\frac{2}{3}$ hour practicing the piano each day. She also spends $\frac{1}{2}$ hour jogging. What is a common denominator of the fractions?

11. In a science experiment, a plant grew $\frac{3}{4}$ inch one week and $\frac{1}{2}$ inch the next week. Use a common denominator to write an equivalent fraction for each fraction.

12. WRITE Math Describe how you would rewrite the fractions $\frac{1}{6}$ and $\frac{1}{4}$ with a common denominator.

Lesson Check

13. Name a pair of fractions that use a common denominator and are equivalent to $\frac{9}{10}$ and $\frac{5}{6}$.

14. Jose says that there is $\frac{5}{8}$ of a ham sandwich left and $\frac{1}{2}$ of a turkey sandwich left. What is NOT a pair of equivalent fractions for $\frac{5}{8}$ and $\frac{1}{2}$?

Spiral Review

15. Matthew had the following times in two races: 3.032 minutes and 3.023 minutes. Use $>$, $<$, or $=$ to make the sentence true.

3.032 ◯ 3.023

16. Serenity's class collected 3,591 bottle caps in 57 days. The same number of bottle caps were collected each day. How many bottle caps did the class collect per day?

17. Thanh multiplied 0.63 by 1.8. What is the correct product?

18. What is the value of $(17 + 8) - 6 \times 2$?

Name _____

Add and Subtract Fractions with Unlike Denominators

Florida's B.E.S.T.
- **Fractions** 5.FR.2.1
- **Algebraic Thinking** 5.AR.1.2
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.4.1,MTR.5.1, MTR.6.1, MTR.7.1

I Can use a common denominator to add and subtract fractions with unlike denominators.

CONNECT You can use what you have learned about common denominators to add or subtract fractions with unlike denominators.

UNLOCK the Problem Real World

Malia bought shell beads and glass beads to weave into designs in her baskets. She bought $\frac{1}{4}$ pound of shell beads and $\frac{3}{8}$ pound of glass beads. How many pounds of beads did she buy?

- Underline the question you need to answer.
- Draw a circle around the information you will use.

Add. $\frac{1}{4} + \frac{3}{8}$

Find a common denominator by multiplying the denominators.

$4 \times 8 =$ _____ ← common denominator

Use the common denominator to write equivalent fractions with like denominators. Then add.

$$\frac{1}{4} = \frac{1 \times \square}{4 \times \square} = \square$$

$$+\frac{3}{8} = +\frac{3 \times \square}{8 \times \square} = + \square$$

$$\square \text{ or } \square$$

So, Malia bought _____ pound of beads.

1. **MTR** Explain how you know whether your answer is reasonable.

_____

_____

Example

When subtracting two fractions with unlike denominators, follow the same steps you follow when adding two fractions. However, instead of adding the fractions, subtract.

Subtract. $\frac{9}{10} - \frac{2}{5}$

$\frac{9}{10} =$

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

Describe the steps you took to solve the problem.

2. MTR Explain how you know whether your answer is reasonable.

Share and Show

Math Board

Find the sum or difference.

1. $\frac{5}{12} + \frac{1}{3}$

2. $\frac{2}{5} + \frac{3}{7}$

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

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

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

6. $\frac{9}{10} - \frac{1}{4}$

Math Talk

MTR 6.1 Assess reasonableness of solutions.

Why is it important to check your answer for reasonableness?

Name _____

On Your Own

Find the sum or difference.

7. $\frac{1}{3} + \frac{4}{18}$

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

9. $\frac{3}{10} + \frac{1}{6}$

10. $\frac{1}{2} + \frac{4}{9}$

11. $\frac{1}{2} - \frac{3}{8}$

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

13. $\frac{4}{9} - \frac{1}{6}$

14. $\frac{11}{12} - \frac{7}{15}$

MTR **Find the unknown number.**

15. $\frac{9}{10} - \square = \frac{1}{5}$

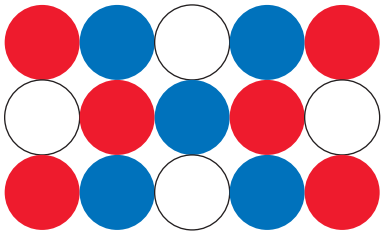
$\square =$ _____

16. $\frac{5}{12} + \square = \frac{1}{2}$

$\square =$ _____

Problem Solving · Applications

Use the picture for Problems 17 and 18.



17. Sara is making a key chain using the bead design shown. What fraction of the beads in her design are either blue or red?

_____

18. In making the key chain, Sara uses the pattern of beads 3 times. After the key chain is complete, what fraction of the beads in the key chain are either white or blue?

MATH on the Spot

_____

19. Tom has $\frac{7}{8}$ cup of olive oil. He uses $\frac{1}{2}$ cup to make salad dressing and $\frac{1}{4}$ cup to make tomato sauce. How much olive oil does Tom have left?

_____

20. On Friday, $\frac{1}{6}$ of band practice was spent trying on uniforms. The band spent $\frac{1}{4}$ of practice on marching. The remaining practice time was spent playing music. What fraction of practice time was spent playing music?

21. MTR Zander had $\frac{4}{5}$ of a spool of twine. He then used $\frac{1}{2}$ of the spool of twine to make friendship knots. He claims to have $\frac{3}{10}$ of the original spool of twine left over. Explain how you know whether Zander's claim is reasonable.

22. Mr. Barber used $\frac{7}{9}$ yard of wire to put up a ceiling fan. He used $\frac{1}{3}$ yard of wire to fix a switch.

Complete the calculations to write equivalent fractions with a common denominator.

$\frac{7}{9} = \frac{7 \times \square}{9 \times \square} = \frac{\square}{\square}$ $\qquad$ $\frac{1}{3} = \frac{1 \times \square}{3 \times \square} = \frac{\square}{\square}$

How much wire did Mr. Barber use to put up the ceiling fan and fix the switch combined? Explain how you found your answer.

Name _____

Add and Subtract Fractions with Unlike Denominators

Go Online
Interactive Examples

Find the sum or difference.

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

$\frac{1}{2} \rightarrow \frac{7}{14}$
$-\frac{1}{7} \rightarrow -\frac{2}{14}$
$\frac{5}{14}$

2. $\frac{7}{10} - \frac{1}{2}$ _____

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

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

5. $\frac{9}{10} - \frac{1}{3}$ _____

6. $\frac{3}{4} - \frac{2}{5}$ _____

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

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

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

Problem Solving Real World

10. Kaylin mixed two liquids for a science experiment. One container held $\frac{7}{8}$ cup and the other held $\frac{9}{10}$ cup. What is the total amount of the mixture?

_____

11. Hector bought $\frac{1}{4}$ pound of screws and $\frac{2}{5}$ pound of nails to build a skateboard ramp. What is the total weight of the screws and nails?

_____

12. WRITE Math How is $\frac{1}{2} + \frac{1}{4}$ solved differently than $\frac{1}{2} + \frac{1}{3}$?

_____

_____

Lesson Check

13. Lyle bought $\frac{3}{8}$ pound of red grapes and $\frac{5}{12}$ pound of green grapes. How many pounds of grapes did he buy?

14. Jennifer had a $\frac{7}{8}$-foot board. She cut off a $\frac{1}{4}$-foot piece that was for a project. In feet, how much of the board is left?

Spiral Review

15. Ivan has 15 yards of green felt and 12 yards of blue felt to make 3 quilts. If Ivan uses the same total number of yards for each quilt, how many yards does he use for each quilt?

16. Eight identical shirts cost a total of $152. How much does one shirt cost?

17. Mel bought a pencil for $0.34, an eraser for $0.22, and a notebook for $0.98. What is a reasonable estimate for the amount Mel spent?

18. The 12 members in Dante's hiking club shared 176 ounces of trail mix equally. How many ounces of trail mix did each member receive?

Name _____

Chapter 8

Chapter Review

1. Hannah runs for $\frac{1}{6}$ hour in class and $\frac{5}{8}$ hour at home. About how long does she run in all? Choose the correct benchmarks and sum.

1a. Hannah runs for about [0 / $\frac{1}{2}$ / 1] hour in class.

1b. Hannah runs for about [0 / $\frac{1}{2}$ / 1] hour at home.

1c. Hannah runs for about [$\frac{1}{2}$ / 1 / $1\frac{1}{2}$ / 2] hour(s) in all.

2. Deval makes a batch of oat bars using $\frac{1}{2}$ cup of oats and $\frac{1}{4}$ cup of flour. What is the total number of cups of oats and flour Deval needs for three batches? Explain how you can use fraction strips to find the answer.

_____

_____

_____

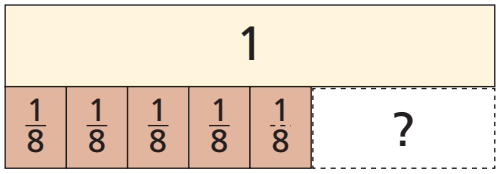
3. Kendra bought $\frac{3}{8}$ pound of peaches and $\frac{15}{16}$ pound of grapes for a fruit salad.

3a. Rounded to the closest benchmark, Kendra bought about ☐ pound of peaches.

3b. Rounded to the closest benchmark, Kendra bought about ☐ pound of grapes.

3c. Kendra has about ☐ pounds of fruit for the fruit salad.

4. Use fraction strips to find the difference.



$\frac{5}{8} - \frac{1}{4} =$ _____

5. Write $\frac{2}{5}$ and $\frac{1}{3}$ as equivalent fractions using a common denominator.

☐ and ☐

6. Subtract.

$\frac{9}{10} - \frac{1}{5} =$ _____

Name _____

7. The shaded part of the diagram shows what Genie has left from a meter of string. She will use $\frac{3}{5}$ meter of string to make bracelets. She wants to determine how much of the string she will have remaining after making the bracelets. For problems 7a–7c, select True or False for each statement.

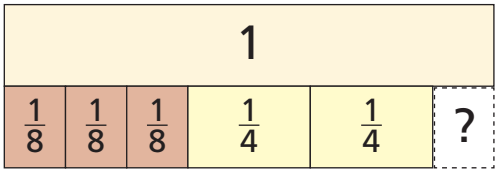
1 m

7a. To determine how much string will be left after making the bracelets, Genie must find $\frac{9}{10} - \frac{3}{5}$. ○ True ○ False

7b. The fractions $\frac{3}{5}$ and $\frac{6}{10}$ are equivalent. ○ True ○ False

7c. Genie will have $\frac{1}{5}$ meter of string left. ○ True ○ False

8. Use fraction strips to find the sum.



$\frac{3}{8} + \frac{2}{4} =$ _____

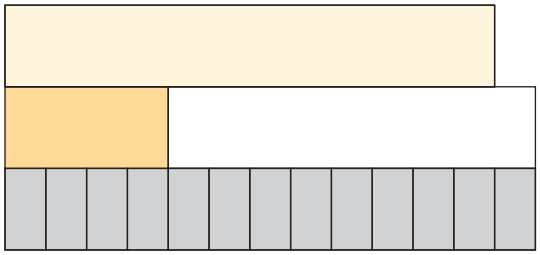
9. Write the unknown number for each ▢.

$\frac{1}{3}, \frac{5}{▢}$

common denominator: 24

▢ = _____

10. Jeffrey walked $\frac{1}{3}$ mile on Monday and jogged $\frac{3}{4}$ mile on Tuesday. How far did he walk and jog on Monday and Tuesday combined? Use the tiles to complete the fraction strip model to show how you found your answer. The fractions may be used more than once or not at all.



$\frac{1}{2}$	$\frac{1}{3}$
$\frac{1}{4}$	$\frac{3}{4}$
$\frac{1}{12}$	1

_____ mile(s)

11. In a science experiment, Sahil uses $\frac{9}{12}$ liter of the blue solution and $\frac{5}{8}$ liter of the red solution.

For each part, identify the common denominator, show your work, and then write your answer in simplest terms.

Part A

How much solution did Sahil use in all?

common denominator: _____

_____ liters of solution

Part B

How much more of the blue solution than the red solution did Sahil use?

common denominator: _____

_____ liter more

Name _____

12. Alana bought $\frac{3}{8}$ pound of Swiss cheese and $\frac{1}{4}$ pound of American cheese. Which pairs of fractions are equivalent to the amounts Alana bought? Mark all that apply.

Ⓐ $\frac{24}{64}$ and $\frac{8}{64}$

Ⓑ $\frac{6}{16}$ and $\frac{4}{16}$

Ⓒ $\frac{12}{32}$ and $\frac{6}{32}$

Ⓓ $\frac{15}{40}$ and $\frac{10}{40}$

13. Four students spent time working the booth for the math club at the school carnival. The table shows how much time each student worked the booth.

Working the Booth	
Student	**Time (in hours)**
Axel	$\frac{1}{2}$
Keaton	$\frac{3}{4}$
Makai	$\frac{9}{10}$
Shea	$\frac{7}{12}$

Match each pair of students with how much time they worked the booth in all.

Keaton and Shea ●	● $1\frac{1}{12}$ hours
Axel and Makai ●	● $1\frac{1}{3}$ hours
Shea and Axel ●	● $1\frac{2}{5}$ hours

14. For problems 14a–14d, tell which expressions will have a sum that is a fraction greater than 1. Write the expression and its sum in the correct box.

14a. $\frac{1}{3} + \frac{2}{4}$

14b. $\frac{3}{4} + \frac{7}{8}$

14c. $\frac{2}{3} + \frac{11}{12}$

14d. $\frac{1}{5} + \frac{2}{3}$

Sum is less than 1.	Sum is greater than 1.

15. Jose used $\frac{3}{4}$ cup of avocado oil and $\frac{2}{3}$ cup of balsamic vinegar to make salad dressing. For problems 15a–15c, select True or False for each statement.

15a.	A common denominator of the fractions is 12.	○ True	○ False
15b.	The amount of avocado oil can be written as $\frac{15}{24}$ cup.	○ True	○ False
15c.	Jose made $1\frac{5}{12}$ cups of salad dressing.	○ True	○ False

16. Tom exercised $\frac{4}{5}$ hour on Monday and $\frac{5}{6}$ hour on Tuesday.

Part A

Complete the calculations below to write equivalent fractions with a common denominator.

$$\frac{4}{5} = \frac{4 \times \square}{5 \times \square} = \frac{\square}{\square} \qquad \frac{5}{6} = \frac{5 \times \square}{6 \times \square} = \frac{\square}{\square}$$

Part B

How much time did Tom spend exercising on Monday and Tuesday combined? Explain how you found your answer.

Part C

How much longer did Tom spend exercising on Tuesday than he spent on Monday? Explain how you found your answer.