Response to Intervention
FOR THE COMMON CORE STATE STANDARDS FOR MATHEMATICS
GRADE 4

INCLUDES
Tier 1 – Tier 2 – Tier 3 Correlations
Diagnostic Interviews for Every Common Core Cluster
Tier 1 Lessons, Tier 2 Prerequisite Skills, and Tier 3 Scaffolded Examples with Answers
Number and Operations - Fractions

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Write two fractions that are equivalent to $\frac{2}{6}$.

**Step 1** Make a model to represent $\frac{2}{6}$.

The rectangle is divided into 6 equal parts, with 2 parts shaded.

**Step 2** Divide the rectangle from Step 1 in half.

The rectangle is now divided into 12 equal parts, with 4 parts shaded.

The model shows the fraction $\frac{4}{12}$. So, $\frac{2}{6}$ and $\frac{4}{12}$ are equivalent.

**Step 3** Draw the same rectangle as in Step 1, but with only 3 equal parts. Keep the same amount of the rectangle shaded.

The rectangle is now divided into 3 equal parts, with 1 part shaded.

The model shows the fraction $\frac{1}{3}$. So, $\frac{2}{6}$ and $\frac{1}{3}$ are equivalent.

Use models to write two equivalent fractions.

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

   The model shows $\frac{1}{4}$ and $\frac{2}{8}$.

   Check students’ models. Possible answers are given.

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

   The model shows $\frac{2}{3}$ and $\frac{8}{12}$.
Equivalent Fractions

Use the model to write an equivalent fraction. Possible answers are given.

1. \(\frac{4}{6}\) = \(\frac{2}{3}\)

2. \(\frac{3}{4}\) = \(\frac{6}{8}\)

Tell whether the fractions are equivalent. Write = or ≠.

3. \(\frac{8}{10} = \frac{4}{5}\)
4. \(\frac{1}{2} \neq \frac{7}{12}\)
5. \(\frac{3}{4} \neq \frac{8}{12}\)
6. \(\frac{2}{3} = \frac{4}{6}\)

7. \(\frac{5}{8} \neq \frac{4}{10}\)
8. \(\frac{2}{6} = \frac{4}{12}\)
9. \(\frac{20}{100} = \frac{1}{5}\)
10. \(\frac{5}{8} \neq \frac{9}{10}\)

Problem Solving

11. Jamal finished \(\frac{5}{6}\) of his homework. Margaret finished \(\frac{3}{4}\) of her homework, and Steve finished \(\frac{10}{12}\) of his homework. Which two students finished the same amount of homework?

   Jamal and Steve

12. Sophia’s vegetable garden is divided into 12 equal sections. She plants carrots in 8 of the sections. Write two fractions that are equivalent to the part of Sophia’s garden that is planted with carrots.

   Possible answers: \(\frac{2}{3}, \frac{4}{6}\)
Write an equivalent fraction for \( \frac{4}{5} \).

**Step 1** Choose a whole number, like 2.

**Step 2** Create a fraction using 2 as the numerator and denominator: \( \frac{2}{2} \). This fraction is equal to 1. You can multiply a number by 1 without changing the value of the number.

**Step 3** Multiply \( \frac{4}{5} \) by \( \frac{2}{2} \): \( \frac{4 \times 2}{5 \times 2} = \frac{8}{10} \).

So, \( \frac{4}{5} \) and \( \frac{8}{10} \) are equivalent.

Write another equivalent fraction for \( \frac{4}{5} \).

**Step 1** Choose a different whole number, like 20.

**Step 2** Create a fraction using 20 as the numerator and denominator: \( \frac{20}{20} \).

**Step 3** Multiply \( \frac{4}{5} \) by \( \frac{20}{20} \): \( \frac{4 \times 20}{5 \times 20} = \frac{80}{100} \).

So, \( \frac{4}{5} \) and \( \frac{80}{100} \) are equivalent.

Write two equivalent fractions. Possible answers are given.

1. \( \frac{2}{6} \)

   \( \frac{6}{18}, \frac{8}{24} \)

2. \( \frac{4}{10} \)

   \( \frac{8}{20}, \frac{12}{30} \)

3. \( \frac{3}{8} \)

   \( \frac{9}{24}, \frac{18}{48} \)

4. \( \frac{3}{5} \)

   \( \frac{12}{20}, \frac{21}{35} \)
Name

Generate Equivalent Fractions

Write two equivalent fractions for each. Possible answers are given.

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

\[
\frac{1 \times 2}{3 \times 2} = \frac{2}{6} \quad \frac{4 \times 8}{6 \times 12} \quad \frac{2 \times 4}{4 \times 8} \quad \frac{8 \times 80}{10 \times 100}
\]

\[
\frac{1 \times 4}{3 \times 4} = \frac{4}{12}
\]

Tell whether the fractions are equivalent. Write $=$ or $\neq$.

5. $\frac{1}{4} = \frac{3}{12}$ 6. $\frac{4}{5} \neq \frac{5}{10}$ 7. $\frac{3}{8} \neq \frac{2}{6}$ 8. $\frac{3}{4} = \frac{6}{8}$

9. $\frac{5}{6} = \frac{10}{12}$ 10. $\frac{6}{12} \neq \frac{5}{8}$ 11. $\frac{2}{5} = \frac{4}{10}$ 12. $\frac{2}{4} \neq \frac{3}{12}$

Problem Solving Possible answers are given.

13. Jan has a 12-ounce milkshake. Four ounces in the milkshake are vanilla, and the rest is chocolate. What are two equivalent fractions that represent the fraction of the milkshake that is vanilla?

\[
\frac{1}{3} \quad \text{and} \quad \frac{2}{6}
\]

14. Kareem lives $\frac{4}{10}$ of a mile from the mall. Write two equivalent fractions that show what fraction of a mile Kareem lives from the mall.

\[
\frac{2}{5} \quad \text{and} \quad \frac{8}{20}
\]
A fraction is in **simplest form** when 1 is the only factor that the numerator and denominator have in common.

**Tell whether the fraction \( \frac{7}{8} \) is in simplest form.**

Look for common factors in the numerator and the denominator.

| Step 1 | The numerator of \( \frac{7}{8} \) is 7. List all the factors of 7. | 1 \times 7 = 7  
The factors of 7 are 1 and 7. |
|-------|-------------------------------------------------|--------------------------------------------------|
| Step 2 | The denominator of \( \frac{7}{8} \) is 8. List all the factors of 8. | 1 \times 8 = 8  
2 \times 4 = 8  
The factors of 8 are 1, 2, 4, and 8. |
| Step 3 | Check if the numerator and denominator of \( \frac{7}{8} \) have any common factors greater than 1. | The only common factor of 7 and 8 is 1. |

So, \( \frac{7}{8} \) is in simplest form.

**Tell whether the fraction is in simplest form. Write yes or no.**

1. \( \frac{4}{10} \)  
2. \( \frac{2}{8} \)  
3. \( \frac{3}{5} \)

   - no  
   - no  
   - yes

**Write the fraction in simplest form.**

4. \( \frac{4}{12} \)  
5. \( \frac{6}{10} \)  
6. \( \frac{3}{6} \)

   - \( \frac{1}{3} \)  
   - \( \frac{3}{5} \)  
   - \( \frac{1}{2} \)
Write the fraction in simplest form.

1. \(\frac{6}{10}\)
2. \(\frac{6}{8}\)
3. \(\frac{5}{5}\)
4. \(\frac{8}{12}\)

\[
\frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}
\]

\[
\frac{1}{1} \text{ or } 1
\]

5. \(\frac{100}{100}\)
6. \(\frac{2}{6}\)
7. \(\frac{2}{8}\)
8. \(\frac{4}{10}\)

\[
\frac{1}{1} \text{ or } 1
\]

\[
\frac{1}{3}
\]

\[
\frac{1}{4}
\]

\[
\frac{2}{5}
\]

Tell whether the fractions are equivalent.
Write = or ≠.

9. \(\frac{6}{12} \neq \frac{1}{12}\)
10. \(\frac{3}{4} \neq \frac{5}{6}\)
11. \(\frac{6}{10} = \frac{3}{5}\)
12. \(\frac{3}{12} \neq \frac{1}{3}\)

13. \(\frac{6}{10} = \frac{60}{100}\)
14. \(\frac{11}{12} \neq \frac{9}{10}\)
15. \(\frac{2}{5} = \frac{8}{20}\)
16. \(\frac{4}{8} = \frac{1}{2}\)

Problem Solving

17. At Memorial Hospital, 9 of the 12 babies born on Tuesday were boys. In simplest form, what fraction of the babies born on Tuesday were boys?

\[
\frac{3}{4}
\]

18. Cristina uses a ruler to measure the length of her math textbook. She says that the book is \(\frac{4}{10}\) meter long. Is her measurement in simplest form? If not, what is the length of the book in simplest form?

No; \(\frac{2}{5}\) meter
A common denominator is a common multiple of the denominators of two or more fractions.

Write $\frac{2}{3}$ and $\frac{3}{4}$ as a pair of fractions with common denominators.

**Step 1** Identify the denominators of $\frac{2}{3}$ and $\frac{3}{4}$.

$\frac{2}{3}$ and $\frac{3}{4}$

The denominators are 3 and 4.

**Step 2** List multiples of 3 and 4.

Circle common multiples.

3: 3, 6, 9, 12, 15, 18
4: 4, 8, 12, 16, 20

12 is a common multiple of 3 and 4.

**Step 3** Rewrite $\frac{2}{3}$ as a fraction with a denominator of 12.

$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

**Step 4** Rewrite $\frac{3}{4}$ as a fraction with a denominator of 12.

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

So, you can rewrite $\frac{2}{3}$ and $\frac{3}{4}$ as $\frac{8}{12}$ and $\frac{9}{12}$.

Write the pair of fractions as a pair of fractions with a common denominator. Possible answers are given.

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

   $\frac{3}{6}$

   $\frac{2}{6}$

2. $\frac{2}{4}$ and $\frac{5}{8}$

   $\frac{4}{8}$

   $\frac{5}{8}$

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

   $\frac{5}{10}$

   $\frac{6}{10}$

4. $\frac{1}{4}$ and $\frac{5}{6}$

   $\frac{3}{12}$

   $\frac{10}{12}$

5. $\frac{2}{5}$ and $\frac{2}{3}$

   $\frac{6}{15}$

   $\frac{10}{15}$

6. $\frac{4}{5}$ and $\frac{7}{10}$

   $\frac{8}{10}$

   $\frac{7}{10}$
Common Denominators

Write the pair of fractions as a pair of fractions with a common denominator. Possible answers are given.

1. \(\frac{2}{3}\) and \(\frac{3}{4}\)

Think: Find a common multiple.

3: 3, 6, 9, 12, 15
4: 4, 8, 12, 16, 20

\[
\begin{align*}
\frac{8}{12} & \quad \frac{9}{12} \\
\frac{12'}{12} & \quad \frac{12'}{12}
\end{align*}
\]

2. \(\frac{1}{4}\) and \(\frac{2}{3}\)

3. \(\frac{3}{10}\) and \(\frac{1}{2}\)

4. \(\frac{3}{5}\) and \(\frac{3}{4}\)

5. \(\frac{2}{4}\) and \(\frac{7}{8}\)

6. \(\frac{2}{3}\) and \(\frac{5}{12}\)

7. \(\frac{1}{4}\) and \(\frac{1}{6}\)

12 parts Possible answer: \(\frac{4}{10}\) and \(\frac{5}{10}\)

Tell whether the fractions are equivalent. Write \(=\) or \(\neq\).

8. \(\frac{1}{2}\) \(\neq\) \(\frac{2}{5}\)

9. \(\frac{1}{2}\) \(=\) \(\frac{3}{6}\)

10. \(\frac{3}{4}\) \(\neq\) \(\frac{5}{6}\)

11. \(\frac{6}{10}\) \(=\) \(\frac{3}{5}\)

12. \(\frac{6}{8}\) \(=\) \(\frac{3}{4}\)

13. \(\frac{3}{4}\) \(\neq\) \(\frac{2}{3}\)

14. \(\frac{2}{10}\) \(\neq\) \(\frac{4}{5}\)

15. \(\frac{1}{4}\) \(=\) \(\frac{3}{12}\)

Problem Solving

16. Adam drew two same size rectangles and divided them into the same number of equal parts. He shaded \(\frac{1}{3}\) of one rectangle and \(\frac{1}{4}\) of other rectangle. What is the least number of parts into which both rectangles could be divided?

12 parts

17. Mera painted equal sections of her bedroom wall to make a pattern. She painted \(\frac{2}{5}\) of the wall white and \(\frac{1}{2}\) of the wall lavender. Write an equivalent fraction for each using a common denominator.

Possible answer: \(\frac{4}{10}\) and \(\frac{5}{10}\)
Kyle’s mom bought bunches of balloons for a family party. Each bunch has 4 balloons, and \( \frac{1}{4} \) of the balloons are blue. If Kyle’s mom bought 5 bunches of balloons, how many balloons did she buy? How many of the balloons are blue?

### Read the Problem

**What do I need to find?**
I need to find how many balloons Kyle’s mom bought and how many of the balloons are blue.

**What information do I need to use?**
Each bunch has 1 out of 4 balloons that are blue, and there are 5 bunches.

**How will I use the information?**
I will make a table to find the total number balloons Kyle’s mom bought and the fraction of balloons that are blue.

### Solve the Problem

I can make a table.

<table>
<thead>
<tr>
<th>Number of Bunches</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Blue Balloons</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Total Number of Balloons</td>
<td>( \frac{1}{4} )</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

Kyle’s mom bought 20 balloons. 5 of the balloons are blue.

### Make a table to solve.

Check students’ tables.

1. Jackie is making a beaded bracelet. The bracelet will have no more than 12 beads. \( \frac{1}{3} \) of the beads on the bracelet will be green. What other fractions could represent the part of the beads on the bracelet that will be green?

\[
\frac{2}{6}, \frac{3}{9}, \frac{4}{12}
\]

2. Ben works in his dad’s bakery packing bagels. Each package can have no more than 16 bagels. \( \frac{3}{4} \) of the bagels in each package are plain. What other fractions could represent the part of the bagels in each package that will be plain?

\[
\frac{6}{8}, \frac{9}{12}, \frac{12}{16}
\]
Problem Solving • Find Equivalent Fractions

Solve each problem. Possible answers are given.

1. Miranda is braiding her hair. Then she will attach beads to the braid. She wants \( \frac{1}{3} \) of the beads to be red. If the greatest number of beads that will fit on the braid is 12, what other fractions could represent the part of the beads that are red?

\[
\frac{2}{6}, \frac{3}{9}, \frac{4}{12}
\]

2. Ms. Groves has trays of paints for students in her art class. Each tray has 5 colors. One of the colors is purple. What fraction of the colors in 20 trays is purple?

\[
\frac{20}{100} \text{ or } \frac{1}{5}
\]

3. Miguel is making an obstacle course for field day. At the end of every sixth of the course, there is a tire. At the end of every third of the course, there is a cone. At the end of every half of the course, there is a hurdle. At which locations of the course will people need to go through more than one obstacle?

At the \( \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \text{ and final locations} \)

4. Preston works in a bakery where he puts muffins in boxes. He makes the following table to remind himself how many blueberry muffins should go in each box.

<table>
<thead>
<tr>
<th>Number of Blueberry Muffins</th>
<th>2</th>
<th>4</th>
<th>8</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Muffins</td>
<td>6</td>
<td>12</td>
<td>24</td>
<td>36</td>
</tr>
</tbody>
</table>

How many blueberry muffins should Preston put in a box with 36 muffins?

12 blueberry muffins
Compare Fractions Using Benchmarks

A benchmark is a known size or amount that helps you understand a different size or amount. You can use \( \frac{1}{2} \) as a benchmark.

Sara reads for \( \frac{3}{6} \) hour every day after school. Connor reads for \( \frac{2}{3} \) hour. Who reads for a longer amount of time?

Compare the fractions. \( \frac{3}{6} \bigcirc \frac{2}{3} \)

Step 1 Divide one circle into 6 equal parts. Divide another circle into 3 equal parts.

Step 2 Shade \( \frac{3}{6} \) of the first circle. How many parts will you shade? 3 parts

Step 3 Shade \( \frac{2}{3} \) of the second circle. How many parts will you shade? 2 parts

Step 4 Compare the shaded parts of each circle. Half of Sara’s circle is shaded. More than half of Connor’s circle is shaded.

\( \frac{3}{6} \) is less than \( \frac{2}{3} \). \( \frac{3}{6} < \frac{2}{3} \)

So, Connor reads for a longer amount of time.

1. Compare \( \frac{2}{8} \) and \( \frac{3}{4} \). Write < or >.

Compare. Write < or >.

2. \( \frac{1}{4} < \frac{8}{10} \)
3. \( \frac{7}{8} > \frac{1}{3} \)
4. \( \frac{5}{12} < \frac{1}{2} \)
5. \( \frac{2}{8} < \frac{8}{12} \)
6. \( \frac{4}{6} > \frac{4}{8} \)
7. \( \frac{7}{12} > \frac{2}{4} \)

Number and Operations–Fractions
Compare Fractions Using Benchmarks

Compare. Write < or >.

1. \( \frac{1}{8} \) \( \text{<} \) \( \frac{6}{10} \)
   Think: \( \frac{1}{8} \) is less than \( \frac{1}{2} \), \( \frac{6}{10} \) is more than \( \frac{1}{2} \).

2. \( \frac{4}{12} \) \( \text{<} \) \( \frac{4}{6} \)

3. \( \frac{2}{8} \) \( \text{<} \) \( \frac{1}{2} \)

4. \( \frac{3}{5} \) \( \text{<} \) \( \frac{3}{3} \)

5. \( \frac{7}{8} \) \( \text{>} \) \( \frac{5}{10} \)

6. \( \frac{9}{12} \) \( \text{>} \) \( \frac{1}{3} \)

7. \( \frac{4}{6} \) \( \text{<} \) \( \frac{7}{8} \)

8. \( \frac{2}{4} \) \( \text{<} \) \( \frac{2}{3} \)

9. \( \frac{3}{5} \) \( \text{>} \) \( \frac{1}{4} \)

10. \( \frac{6}{10} \) \( \text{>} \) \( \frac{2}{5} \)

11. \( \frac{1}{8} \) \( \text{<} \) \( \frac{2}{10} \)

12. \( \frac{2}{3} \) \( \text{>} \) \( \frac{5}{12} \)

13. \( \frac{4}{5} \) \( \text{<} \) \( \frac{5}{6} \)

14. \( \frac{3}{5} \) \( \text{<} \) \( \frac{5}{8} \)

15. \( \frac{8}{8} \) \( \text{>} \) \( \frac{3}{4} \)

Problem Solving

16. Erika ran \( \frac{3}{8} \) mile. Maria ran \( \frac{3}{4} \) mile. Who ran farther?

   Maria

   Tyler

17. Carlos finished \( \frac{1}{3} \) of his art project on Monday. Tyler finished \( \frac{1}{2} \) of his art project on Monday. Who finished more of his art project on Monday?
Theo filled a beaker \( \frac{2}{4} \) full with water. Angelica filled a beaker \( \frac{3}{8} \) full with water. Whose beaker has more water?

Compare \( \frac{2}{4} \) and \( \frac{3}{8} \).

**Step 1** Divide one beaker into 4 equal parts. Divide another beaker into 8 equal parts.

**Step 2** Shade \( \frac{2}{4} \) of the first beaker.

**Step 3** Shade \( \frac{3}{8} \) of the second beaker.

**Step 4** Compare the shaded parts of each beaker.

Half of Theo’s beaker is shaded. Less than half of Angelica’s beaker is shaded.

\( \frac{2}{4} \) is greater than \( \frac{3}{8} \).

\[ \frac{2}{4} > \frac{3}{8} \]

So, Theo’s beaker has more water.

### Practice

1. Compare \( \frac{1}{2} \) and \( \frac{1}{4} \)

2. Compare \( \frac{2}{3} \) and \( \frac{3}{6} \)

**Compare. Write <, >, or =.**

3. \( \frac{1}{2} < \frac{3}{4} \)

4. \( \frac{6}{12} < \frac{5}{8} \)

5. \( \frac{2}{3} = \frac{4}{6} \)

6. \( \frac{3}{8} > \frac{1}{4} \)
Compare Fractions

Compare. Write <, >, or =.

1. \( \frac{3}{4} \) \( < \) \( \frac{5}{6} \)

Think: 12 is a common denominator.
\[
\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12} \\
\frac{5}{6} = \frac{5 \times 2}{6 \times 2} = \frac{10}{12} \\
\frac{9}{12} < \frac{10}{12}
\]

2. \( \frac{1}{5} \) \( = \) \( \frac{2}{10} \)

3. \( \frac{2}{4} \) \( > \) \( \frac{2}{5} \)

4. \( \frac{3}{5} \) \( < \) \( \frac{7}{10} \)

5. \( \frac{4}{12} \) \( > \) \( \frac{1}{6} \)

6. \( \frac{2}{6} \) \( = \) \( \frac{1}{3} \)

7. \( \frac{1}{3} \) \( < \) \( \frac{2}{4} \)

8. \( \frac{2}{5} \) \( < \) \( \frac{1}{2} \)

9. \( \frac{4}{8} \) \( = \) \( \frac{2}{4} \)

10. \( \frac{7}{12} \) \( > \) \( \frac{2}{4} \)

11. \( \frac{1}{8} \) \( < \) \( \frac{3}{4} \)

Problem Solving

12. A recipe uses \( \frac{2}{3} \) cup of flour and \( \frac{5}{8} \) cup of blueberries. Is there more flour or more blueberries in the recipe?

13. Peggy completed \( \frac{5}{6} \) of the math homework and Al completed \( \frac{4}{5} \) of the math homework. Did Peggy or Al complete more of the math homework?

flour

Peggy
Write $\frac{3}{8}, \frac{1}{4}, \text{ and } \frac{1}{2}$ in order from least to greatest.

**Step 1** Identify a common denominator.  
Multiples of 8: 16, 24  
Multiples of 4: 12, 16  
Multiples of 2: 2, 4, 6

Use 8 as a common denominator.

**Step 2** Use the common denominator to write equivalent fractions.

$\frac{3}{8}$  
$\frac{1}{4} = \frac{1 \times 2}{4 \times 2} = \frac{2}{8}$  
$\frac{1}{2} = \frac{1 \times 4}{2 \times 4} = \frac{4}{8}$

**Step 3** Compare the numerators.  
$2 < 3 < 4$

**Step 4** Order the fractions from least to greatest, using $<$ or $>$ symbols.

So, \( \frac{1}{4} < \frac{3}{8} < \frac{1}{2} \).

Write the fraction with the greatest value.

1. \( \frac{2}{3}, \frac{1}{4}, \frac{1}{6} \)  
   \[
   \frac{2}{3} > \frac{1}{4} > \frac{1}{6}
   \]

2. \( \frac{3}{10}, \frac{1}{2}, \frac{2}{5} \)  
   \[
   \frac{3}{10} > \frac{2}{5} > \frac{1}{2}
   \]

3. \( \frac{1}{8}, \frac{5}{12}, \frac{9}{10} \)  
   \[
   \frac{1}{8} < \frac{5}{12} < \frac{9}{10}
   \]

Write the fractions in order from least to greatest.

4. \( \frac{9}{10}, \frac{1}{2}, \frac{4}{5} \)  
   \[
   \frac{1}{2} < \frac{4}{5} < \frac{9}{10}
   \]

5. \( \frac{3}{4}, \frac{7}{8}, \frac{1}{2} \)  
   \[
   \frac{1}{2} < \frac{7}{8} < \frac{3}{4}
   \]

6. \( \frac{2}{3}, \frac{3}{4}, \frac{5}{6} \)  
   \[
   \frac{2}{3} < \frac{3}{4} < \frac{5}{6}
   \]
Compare and Order Fractions

Write the fractions in order from least to greatest.

1. \( \frac{5}{8}\), \( \frac{2}{12}\), \( \frac{8}{10}\)

2. \( \frac{1}{5}\), \( \frac{2}{3}\), \( \frac{5}{8}\)

Use benchmarks and a number line.

Think: \( \frac{5}{8}\) is close to \( \frac{1}{2}\), \( \frac{2}{12}\) is close to 0, \( \frac{8}{10}\) is close to 1.

\[ \frac{2}{12} < \frac{5}{8} < \frac{8}{10} \]

\[ \frac{1}{5} < \frac{5}{8} < \frac{2}{3} \]

3. \( \frac{1}{2}\), \( \frac{2}{5}\), \( \frac{6}{10}\)

4. \( \frac{4}{6}\), \( \frac{7}{12}\), \( \frac{5}{10}\)

5. \( \frac{1}{4}\), \( \frac{3}{6}\), \( \frac{1}{8}\)

6. \( \frac{1}{8}\), \( \frac{3}{6}\), \( \frac{7}{12}\)

7. \( \frac{8}{100}\), \( \frac{3}{5}\), \( \frac{7}{10}\)

8. \( \frac{3}{4}\), \( \frac{7}{8}\), \( \frac{1}{5}\)

Problem Solving

9. Amy’s math notebook weighs \( \frac{1}{2}\) pound, her science notebook weighs \( \frac{7}{8}\) pound, and her history notebook weighs \( \frac{3}{4}\) pound. What are the weights in order from lightest to heaviest?

\( \frac{1}{2}\) pound, \( \frac{3}{4}\) pound, \( \frac{7}{8}\) pound

10. Carl has three picture frames. The thicknesses of the frames are \( \frac{4}{5}\) inch, \( \frac{3}{12}\) inch, and \( \frac{5}{6}\) inch. What are the thicknesses in order from least to greatest?

\( \frac{3}{12}\) inch, \( \frac{4}{5}\) inch, \( \frac{5}{6}\) inch
Justin has $\frac{3}{8}$ pound of cheddar cheese and $\frac{2}{8}$ pound of brick cheese. How much cheese does he have in all?

**Step 1** Use fraction strips to model the problem.
- Use three $\frac{1}{8}$-strips to represent $\frac{3}{8}$ pound of cheddar cheese.

**Step 2** Join two more $\frac{1}{8}$-strips to represent the amount of brick cheese.

**Step 3** Count the number of $\frac{1}{8}$-strips. There are five $\frac{1}{8}$-strips. Write the amount as a fraction. Justin has $\frac{5}{8}$ pound of cheese.

**Step 4** Use the model to write an equation.

Suppose Justin eats $\frac{1}{8}$ pound of cheese. How much cheese is left?

**Step 1** Use five $\frac{1}{8}$-strips to represent the $\frac{5}{8}$ pound of cheese.

**Step 2** Remove one $\frac{1}{8}$-strip to show the amount eaten.

**Step 3** Count the number of $\frac{1}{8}$-strips left. There are four $\frac{1}{8}$ fraction strips. There is $\frac{4}{8}$ pound left.

**Step 4** Write an equation for the model.

---

Use the model to write an equation.

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

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

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

4. $\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$
Add and Subtract Parts of a Whole

Use the model to write an equation.

1. 

\[ \frac{3}{8} + \frac{2}{8} = \frac{5}{8} \]

Think: \( \frac{3}{8} + \frac{2}{8} = \frac{5}{8} \)

2. 

\[ \frac{4}{5} - \frac{3}{5} = \frac{1}{5} \]

3. 

\[ \frac{1}{4} + \frac{2}{4} = \frac{3}{4} \]

Use the model to solve the equation.

4. 

\[ \frac{2}{6} + \frac{3}{6} = \frac{5}{6} \]

5. 

\[ \frac{3}{5} - \frac{2}{5} = \frac{1}{5} \]

Problem Solving

6. Jake ate \( \frac{4}{8} \) of a pizza. Millie ate \( \frac{3}{8} \) of the same pizza. How much of the pizza was eaten by Jake and Millie?

\( \frac{7}{8} \) of the pizza

7. Kate ate \( \frac{1}{4} \) of her orange. Ben ate \( \frac{2}{4} \) of his banana. Did Kate and Ben eat \( \frac{1}{4} + \frac{2}{4} = \frac{3}{4} \) of their fruit? Explain.

No; one whole refers to an orange and the other whole to a banana.
A **unit fraction** tells the part of the whole that 1 piece represents. A unit fraction always has a numerator of 1.

Bryan has $\frac{4}{10}$ pound of clay for making clay figures. He wants to use $\frac{1}{10}$ pound of clay for each figure. How many clay figures can he make?

Use fraction strips to write $\frac{4}{10}$ as a sum of unit fractions.

**Step 1** Represent $\frac{4}{10}$ with fraction strips.

**Step 2** Each $\frac{1}{10}$ is a unit fraction. Write a $\frac{1}{10}$ addend for each $\frac{1}{10}$-strip you used to show $\frac{4}{10}$.

**Step 3** Count the number of addends. The number of addends represents the number of clay figures Bryan can make.

So, Bryan can make $\boxed{4}$ clay figures.

**Write the fraction as the sum of unit fractions.**

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

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

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

4. $\frac{5}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$
Write Fractions as Sums

Write the fraction as a sum of unit fractions.

1. \( \frac{4}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} \)

Think: Add \( \frac{1}{5} \) four times.

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

3. \( \frac{6}{12} = \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} \)

4. \( \frac{4}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} \)

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

5. \( \frac{7}{10} = \frac{2}{10} + \frac{3}{10} + \frac{2}{10} \)

\( \frac{7}{10} = \frac{4}{10} + \frac{2}{10} + \frac{1}{10} \)

\( \frac{7}{10} = \frac{5}{10} + \frac{1}{10} + \frac{1}{10} \)

6. \( \frac{6}{6} \)

Possible answers are given.

\( \frac{6}{6} = \frac{4}{6} + \frac{1}{6} + \frac{1}{6} \)

\( \frac{6}{6} = \frac{2}{6} + \frac{2}{6} + \frac{2}{6} \)

\( \frac{6}{6} = \frac{3}{6} + \frac{2}{6} + \frac{1}{6} \)

Problem Solving

7. Miguel’s teacher asks him to color \( \frac{4}{6} \) of his grid. He must use 3 colors: red, blue, and green. There must be more green sections than red sections. How can Miguel color the sections of his grid to follow all the rules?

\( \frac{1}{8} \) red, \( \frac{1}{8} \) blue, and \( \frac{2}{8} \) green

8. Petra is asked to color \( \frac{6}{6} \) of her grid. She must use 3 colors: blue, red, and pink. There must be more blue sections than red sections or pink sections. What are the different ways Petra can color the sections of her grid and follow all the rules?

\( \frac{3}{6} \) blue, \( \frac{2}{6} \) red, \( \frac{1}{6} \) pink;

\( \frac{4}{6} \) blue, \( \frac{1}{6} \) red, \( \frac{1}{6} \) pink;

\( \frac{3}{6} \) blue, \( \frac{1}{6} \) red, \( \frac{2}{6} \) pink
A mixed number is made up of a whole number and a fraction. You can use multiplication and addition to rename a mixed number as a fraction greater than 1.

Rename $2 \frac{5}{6}$ as a fraction.

First, multiply the denominator, or the number of parts in the whole, by the whole number.

$6 \times 2 = 12$

Then, add the numerator to your product.

$12 + 5 = 17$

So, $2 \frac{5}{6} = \frac{17}{6}$.

You can use division to write a fraction greater than 1 as a mixed number.

Rename $\frac{16}{3}$ as a mixed number.

To rename $\frac{16}{3}$ as a mixed number, divide the numerator by the denominator.

Use the quotient and remainder to write a mixed number.

So, $\frac{16}{3} = 5 \frac{1}{3}$.

Write the mixed number as a fraction.

1. $3 \frac{2}{3} = \frac{11}{3}$  
2. $4 \frac{3}{5} = \frac{23}{5}$  
3. $4 \frac{3}{8} = \frac{35}{8}$  
4. $2 \frac{1}{6} = \frac{13}{6}$

Write the fraction as a mixed number.

5. $\frac{32}{5} = 6 \frac{2}{5}$  
6. $\frac{19}{3} = 6 \frac{1}{3}$  
7. $\frac{15}{4} = 3 \frac{3}{4}$  
8. $\frac{51}{10} = 5 \frac{1}{10}$
Rename Fractions and Mixed Numbers

Write the mixed number as a fraction.

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

Think:

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

\[
\frac{13}{5}
\]

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

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

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

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

6. $1 \frac{7}{10}$

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

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

Write the fraction as a mixed number.

9. $\frac{31}{6}$

10. $\frac{20}{10}$

11. $\frac{15}{8}$

12. $\frac{13}{6}$

13. $\frac{51}{6}$

14. $\frac{2}{2}$

15. $\frac{17}{8}$

16. $\frac{21}{6}$

17. $\frac{23}{10}$

18. $\frac{19}{5}$

19. $\frac{11}{3}$

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

21. $\frac{23}{10}$

22. $\frac{34}{5}$

23. $\frac{32}{3}$

24. $\frac{41}{2}$

Problem Solving

17. A recipe calls for $2 \frac{3}{4}$ cups of raisins, but Julie only has a $\frac{1}{4}$-cup measuring cup. How many $\frac{1}{4}$ cups does Julie need to measure out $2 \frac{3}{4}$ cups of raisins?

18. If Nancy needs $3 \frac{1}{4}$ cups of oatmeal, how many $\frac{1}{4}$ cups of oatmeal will she use?

\[
\text{ten } \frac{1}{4} \text{ cups}
\]

\[
\text{thirteen } \frac{1}{4} \text{ cups}
\]
Add and Subtract Mixed Numbers

**OBJECTIVE** Add and subtract mixed numbers.

---

**Find the sum.** \( 3\frac{1}{4} + 2\frac{1}{4} \)

Add the whole number and fraction parts.

- Add the whole numbers: \( 3 + 2 = 5 \)
- Add the fractions: \( \frac{1}{4} + \frac{1}{4} = \frac{2}{4} \)

Write the sum as a mixed number, so the fractional part is less than 1. \( 3\frac{1}{4} + 2\frac{1}{4} = 5\frac{2}{4} \)

**Find the difference.** \( 4\frac{5}{8} - 3\frac{1}{8} \)

Subtract the fraction and the whole number parts.

- Subtract the fractions: \( \frac{5}{8} - \frac{1}{8} = \frac{4}{8} \)
- Subtract the whole numbers: \( 4 - 3 = 1 \)

\( 4\frac{5}{8} - 3\frac{1}{8} = 1\frac{4}{8} \)

---

**Find the sum or difference.**

1. \( \frac{3}{5} + \frac{4}{5} \)
2. \( \frac{7}{3} - \frac{3}{3} \)
3. \( \frac{47}{12} + \frac{5}{12} \)
4. \( \frac{123}{4} - \frac{61}{4} \)
5. \( \frac{23}{8} + \frac{81}{8} \)
6. \( \frac{119}{10} - \frac{37}{10} \)
7. \( \frac{7}{5} + \frac{4}{5} \)
8. \( \frac{8}{6} - \frac{3}{6} \)

---

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Add and Subtract Mixed Numbers

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

1. \( \frac{6\frac{4}{5}}{5} + \frac{3\frac{3}{5}}{5} = \frac{10\frac{2}{5}}{5} \)

2. \( \frac{4\frac{1}{2}}{2} + \frac{2\frac{1}{2}}{2} = \frac{7}{2} \)

3. \( \frac{2\frac{2}{3}}{3} + \frac{3\frac{2}{3}}{3} = \frac{6\frac{1}{3}}{3} \)

4. \( \frac{6\frac{4}{5}}{5} + \frac{7\frac{4}{5}}{5} = \frac{14\frac{3}{5}}{5} \)

5. \( \frac{9\frac{3}{6}}{6} + \frac{2\frac{2}{6}}{6} = \frac{11\frac{5}{6}}{6} \)

6. \( \frac{8\frac{4}{12}}{12} + \frac{3\frac{6}{12}}{12} = \frac{11\frac{10}{12}}{12} \)

7. \( \frac{4\frac{3}{8}}{8} + \frac{1\frac{5}{8}}{8} = \frac{6}{8} \)

8. \( \frac{9\frac{5}{10}}{10} + \frac{6\frac{3}{10}}{10} = \frac{15\frac{8}{10}}{10} \)

Write the fraction as a mixed number.

9. \( \frac{6\frac{7}{8}}{8} - \frac{4\frac{3}{8}}{8} = \frac{2\frac{4}{8}}{8} \)

10. \( \frac{4\frac{2}{3}}{3} - \frac{3\frac{1}{3}}{3} = \frac{1\frac{1}{3}}{3} \)

11. \( \frac{6\frac{4}{5}}{5} - \frac{3\frac{3}{5}}{5} = \frac{3\frac{1}{5}}{5} \)

12. \( \frac{7\frac{3}{4}}{4} - \frac{2\frac{1}{4}}{4} = \frac{5\frac{2}{4}}{4} \)

Problem Solving

13. James wants to send two gifts by mail. One package weighs \( 2\frac{3}{4} \) pounds. The other package weighs \( 1\frac{3}{4} \) pounds. What is the total weight of the packages?

14. Tierra bought \( 4\frac{3}{8} \) yards blue ribbon and \( 2\frac{1}{8} \) yards yellow ribbon for a craft project. How much more blue ribbon than yellow ribbon did Tierra buy?

\[ \frac{4\frac{2}{4}}{4} \text{ pounds} \]

\[ \frac{2\frac{2}{8}}{8} \text{ yards} \]
Fraction strips can help you subtract mixed numbers or subtract a mixed number from a whole number.

Find the difference. $3\frac{1}{3} - 2\frac{2}{3}$

Step 1 Model the number you are subtracting from, $3\frac{1}{3}$.

Step 2 Because you cannot subtract $\frac{2}{3}$ from $\frac{1}{3}$ without renaming, change one of the 1 strips to three $\frac{1}{3}$ strips. Then subtract by crossing out two wholes and two $\frac{1}{3}$ strips.

So, $3\frac{1}{3} - 2\frac{2}{3} = \frac{2}{3}$.

Find the difference. $2 - 1\frac{1}{4}$

Step 1 Model the number you are subtracting from, 2.

Step 2 Because you cannot subtract $\frac{1}{4}$ from 1 without renaming, change one of the 1 strips to four $\frac{1}{4}$ strips. Then subtract by crossing out one whole and one $\frac{1}{4}$ strip.

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

Find the difference.

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

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

3. $\frac{33}{5} - 2\frac{4}{5} = \frac{4}{5}$

4. $3\frac{1}{12} - 2\frac{11}{12} = \frac{2}{12}$

5. $4\frac{5}{8} - 2\frac{7}{8} = \frac{16}{8}$
Subtraction with Renaming

Find the difference.

1. \(5 \frac{1}{3} - 3 \frac{2}{3}\)  
   \(= 1 \frac{2}{3}\)

2. \(6 - 3 \frac{2}{3}\)  
   \(= 2 \frac{1}{3}\)

3. \(5 \frac{1}{4} - 2 \frac{3}{4}\)  
   \(= 2 \frac{1}{4}\)

4. \(9 \frac{3}{8} - 8 \frac{7}{8}\)  
   \(= 1 \frac{1}{4}\)

5. \(12 \frac{3}{10} - 7 \frac{7}{10}\)  
   \(= 4 \frac{6}{10} = 4 \frac{3}{5}\)

6. \(8 \frac{1}{6} - 3 \frac{5}{6}\)  
   \(= 4 \frac{2}{6} = 4 \frac{1}{3}\)

7. \(7 \frac{3}{5} - 4 \frac{4}{5}\)  
   \(= 2 \frac{4}{5}\)

8. \(10 \frac{1}{2} - 8 \frac{1}{2}\)  
   \(= 2\)

9. \(7 \frac{1}{6} - 2 \frac{5}{6}\)  
   \(= 4 \frac{2}{6} = 4 \frac{1}{3}\)

10. \(9 \frac{3}{12} - 4 \frac{7}{12}\)  
    \(= 4 \frac{8}{12} = 4 \frac{2}{3}\)

11. \(9 \frac{1}{10} - 8 \frac{7}{10}\)  
    \(= 4 \frac{4}{10} = 4 \frac{2}{5}\)

12. \(9 \frac{1}{3} - 2\)  
    \(= 4 \frac{8}{3}\)

13. \(3 \frac{1}{4} - 1 \frac{3}{4}\)  
    \(= 1 \frac{2}{4}\)

14. \(4 \frac{5}{8} - 1 \frac{7}{8}\)  
    \(= 2 \frac{6}{8} = 2 \frac{3}{4}\)

15. \(5 \frac{1}{12} - 3 \frac{8}{12}\)  
    \(= 1 \frac{5}{12}\)

16. \(7 - 1 \frac{3}{5}\)  
    \(= 5 \frac{2}{5}\)

Problem Solving

17. Alicia buys a 5-pound bag of rocks for a fish tank. She uses \(1 \frac{1}{8}\) pounds for a small fish bowl. How much is left?

   \(\frac{37}{8}\) pounds

18. Xavier made 25 pounds of roasted almonds for a fair. He has \(3 \frac{1}{2}\) pounds left at the end of the fair. How many pounds of roasted almonds did he sell at the fair?

   \(21 \frac{1}{2}\) pounds
Properties of addition can help you group and order addends so you can use mental math to find sums.

The **Commutative Property of Addition** states that when the order of two addends is changed, the sum is the same. \[ 6 + 3 = 3 + 6 \]

The **Associative Property of Addition** states that when the grouping of addends is changed, the sum is the same. \[ (3 + 6) + 4 = 3 + (6 + 4) \]

Use the properties and mental math to add \(10 \frac{3}{8} + 4 \frac{7}{8} + 6 \frac{5}{8} \).

**Step 1** Look for fractions that combine to make 1. \(10 \frac{3}{8} + 4 \frac{7}{8} + 6 \frac{5}{8} \)

**Step 2** Use the Commutative Property to order the addends so that the fractions with a sum of 1 are together. \(10 \frac{3}{8} + 4 \frac{7}{8} + 6 \frac{5}{8} = 10 \frac{3}{8} + 6 \frac{5}{8} + 4 \frac{7}{8} \)

**Step 3** Use the Associative Property to group the addends that you can add mentally. \[ = (10 \frac{3}{8} + 6 \frac{5}{8}) + 4 \frac{7}{8} \]

**Step 4** Add the grouped numbers and then add the other mixed number. \[ = (17) + 4 \frac{7}{8} \]

**Step 5** Write the sum. \[ = 21 \frac{7}{8} \]

Use the properties and mental math to find the sum.

1. \( (3 \frac{1}{5} + 1 \frac{2}{5}) + 4 \frac{4}{5} \) \[ = \frac{9}{5} \]

2. \( (5 \frac{7}{10} + 1 \frac{4}{10}) + 6 \frac{3}{10} \) \[ = \frac{13}{10} \]

3. \( \frac{7}{4} + (5 + 3 \frac{1}{4}) \) \[ = 16 \]

4. \( (2 \frac{5}{12} + 3 \frac{11}{12}) + 1 \frac{7}{12} \) \[ = \frac{7\frac{11}{12}}{} \]

5. \( 4 \frac{7}{8} + (6 \frac{3}{8} + \frac{1}{8}) \) \[ = 11 \frac{3}{8} \]

6. \( 9 \frac{2}{6} + (4 \frac{1}{6} + 7 \frac{4}{6}) \) \[ = 21 \frac{1}{6} \]
Fractions and Properties of Addition

Use the properties and mental math to find the sum.

1. \(5 \frac{1}{3} + \left( \frac{2}{3} + \frac{1}{3} \right) = \frac{5}{3} + (4) = \frac{9}{3} = 3\)

2. \(10 \frac{1}{8} + \left( \frac{5}{8} + 2 \frac{7}{8} \right) = 16 \frac{5}{8}\)

3. \(8 \frac{1}{5} + \left( \frac{2}{5} + \frac{4}{5} \right) = 17 \frac{2}{5}\)

4. \(6 \frac{3}{4} + \left( \frac{2}{4} + \frac{1}{4} \right) = \frac{16}{4} = 4\)

5. \(6 \frac{3}{6} + 10 \frac{4}{6} + 9 \frac{2}{6} = 26 \frac{3}{6} = 4\)

6. \(6 \frac{2}{5} + 1 \frac{4}{5} + 3 \frac{1}{5} = 11 \frac{2}{5}\)

7. \(7 \frac{7}{8} + \left( \frac{1}{8} + \frac{1}{8} \right) = 8 \frac{1}{8}\)

8. \(14 \frac{1}{10} + \left( 20 \frac{2}{10} + 15 \frac{7}{10} \right) = 50\)

9. \(13 \frac{2}{12} + 8 \frac{7}{12} + 9 \frac{5}{12} = 31 \frac{2}{12}\)

Problem Solving

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

\[\text{11 feet}\]

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

\[7 \frac{1}{4} \text{ bags}\]
Fractions with like denominators have the same denominator. You can add fractions with like denominators using a number line.

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

Step 1 Draw a number line labeled with sixths. Model the fraction $\frac{4}{6}$ by starting at 0 and shading 4 sixths.

Step 2 Add the fraction $\frac{1}{6}$ by shading 1 more sixth.

Step 3 How many sixths are there in all? 5 sixths
Write the number of sixths as a fraction.

$5 \text{ sixths} = \frac{5}{6}$

$\frac{4}{6} + \frac{1}{6} = \frac{5}{6}$

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

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

Find the sum. Use a model to help.

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

$\frac{6}{10}$

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

$\frac{2}{4}$
Add Fractions Using Models

Find the sum. Use fraction strips to help.

1. \(\frac{2}{6} + \frac{1}{6} = \frac{3}{6}\)

2. \(\frac{4}{10} + \frac{5}{10} = \frac{9}{10}\)

3. \(\frac{1}{3} + \frac{2}{3} = \frac{3}{3}\)

4. \(\frac{2}{4} + \frac{1}{4} = \frac{3}{4}\)

5. \(\frac{2}{12} + \frac{4}{12} = \frac{6}{12}\)

6. \(\frac{1}{6} + \frac{2}{6} = \frac{3}{6}\)

7. \(\frac{3}{12} + \frac{9}{12} = \frac{12}{12}\)

8. \(\frac{3}{8} + \frac{4}{8} = \frac{7}{8}\)

9. \(\frac{3}{4} + \frac{1}{4} = \frac{4}{4}\)

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

Problem Solving

11. Lola walks \(\frac{4}{10}\) mile to her friend’s house. Then she walks \(\frac{5}{10}\) mile to the store. How far does she walk in all?

\(\frac{9}{10}\) mile

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

\(\frac{3}{8}\) of the pan

13. Jacqueline buys \(\frac{2}{4}\) yard of green ribbon and \(\frac{1}{4}\) yard of pink ribbon. How many yards of ribbon does she buy in all?

\(\frac{3}{4}\) yard

14. Shu mixes \(\frac{2}{3}\) pound of peanuts with \(\frac{1}{3}\) pound of almonds. How many pounds of nuts does Shu mix in all?

\(\frac{3}{3}\) pound
You can subtract fractions with like denominators using fraction strips.

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

Step 1 Shade the eighths you start with.
   Shade 5 eighths.

Step 2 Subtract $\frac{2}{8}$.
   Think: How many eighths are taken away?
   Cross out 2 of the shaded eighths.

Step 3 Count the shaded eighths that remain.
   There are 3 eighths remaining.

Step 4 Write the number of eighths that remain as a fraction.
   $3 \text{ eighths} = \frac{3}{8}$
   $\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$

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

Subtract. Use fraction strips to help.

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

3. $\frac{6}{10} - \frac{3}{10}$
   $\frac{6}{10} - \frac{3}{10} = \frac{3}{10}$
Subtract Fractions Using Models

Subtract. Use fraction strips to help.

1. \( \frac{4}{5} - \frac{1}{5} = \frac{3}{5} \)

2. \( \frac{3}{4} - \frac{1}{4} = \frac{2}{4} \)

3. \( \frac{5}{6} - \frac{1}{6} = \frac{4}{6} \)

4. \( \frac{7}{8} - \frac{1}{8} = \frac{6}{8} \)

5. \( 1 - \frac{2}{3} = \frac{1}{3} \)

6. \( \frac{8}{10} - \frac{2}{10} = \frac{6}{10} \)

7. \( \frac{3}{4} - \frac{1}{4} = \frac{2}{4} \)

8. \( \frac{7}{6} - \frac{5}{6} = \frac{2}{6} \)

Problem Solving

Use the table for 9 and 10.

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

\[ \frac{5}{8} \text{ pound} \]

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

\[ \frac{2}{8} \text{ pound} \]
You can find and record the sums and the differences of fractions.

Add. \( \frac{2}{6} + \frac{4}{6} \)

**Step 1** Model it.

**Step 2** Think: How many sixths are there in all?
There are 6 sixths.

\[ \frac{6}{6} \]

**Step 3** Record it.
Write the sum as an addition equation.

\[ \frac{2}{6} + \frac{4}{6} = \frac{6}{6} \]

Subtract. \( \frac{6}{10} - \frac{2}{10} \)

**Step 1** Model it.

**Step 2** Think: There are 6 tenths. I take away 2 tenths. How many tenths are left?
There are 4 tenths left.

\[ \frac{4}{10} \]

**Step 3** Record it.
Write the difference as a subtraction equation.

\[ \frac{6}{10} - \frac{2}{10} = \frac{4}{10} \]

Find the sum or difference.

1. 7 eighth-size parts \(-\) 4 eighth-size parts = \[ \frac{3}{8} \]

2. \[ \frac{11}{12} - \frac{4}{12} = \frac{7}{12} \]

3. \[ \frac{2}{10} + \frac{2}{10} = \frac{4}{10} \]

4. \[ \frac{6}{8} - \frac{4}{8} = \frac{2}{8} \]

5. \[ \frac{2}{4} + \frac{2}{4} = \frac{4}{4} \]

6. \[ \frac{4}{5} - \frac{3}{5} = \frac{1}{5} \]

7. \[ \frac{1}{3} + \frac{2}{3} = \frac{3}{3} \]
Name

Add and Subtract Fractions

Find the sum or difference.

1. \( \frac{4}{12} + \frac{8}{12} = \frac{12}{12} \)
2. \( \frac{3}{6} - \frac{1}{6} = \frac{2}{6} \)
3. \( \frac{4}{5} - \frac{3}{5} = \frac{1}{5} \)
4. \( \frac{6}{10} + \frac{3}{10} = \frac{9}{10} \)
5. \( 1 - \frac{3}{8} = \frac{5}{8} \)
6. \( \frac{1}{4} + \frac{2}{4} = \frac{3}{4} \)
7. \( \frac{9}{12} - \frac{5}{12} = \frac{4}{12} \)
8. \( \frac{5}{6} - \frac{2}{6} = \frac{3}{6} \)
9. \( \frac{2}{3} + \frac{1}{3} = \frac{3}{3} \)

Problem Solving

Use the table for 10 and 11.

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

\[ \frac{5}{10} \text{ mile} \]

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

\[ \frac{10}{10} \text{ mile} \]
Jeff runs $\frac{3}{5}$ mile each day. He wants to know how many days he needs to run until he has run a whole number of miles.

**Read the Problem**

**What do I need to find?**
I need to find how many days Jeff needs to run $\frac{3}{5}$ mile until he has run a whole number of miles.

**What information do I need to use?**
Jeff runs $\frac{3}{5}$ mile a day. He wants the distance run to be a whole number.

**How will I use the information?**
I can use a number line and patterns to act out the problem.

**Solve the Problem**

Describe how to act it out.
Use a number line.

Day 1: $\frac{3}{5}$ mile
Day 2: $\frac{6}{5}$ mile $\frac{3}{5} + \frac{3}{5} = \frac{6}{5}$

1 whole mile and $\frac{1}{5}$ mile more

Day 3: $\frac{9}{5}$ mile $\frac{3}{5} + \frac{3}{5} + \frac{3}{5} = \frac{9}{5}$

1 whole mile and $\frac{4}{5}$ mile more

Day 4: $\frac{12}{5}$ mile $\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} = \frac{12}{5}$

2 whole miles and $\frac{2}{5}$ mile more

Day 5: $\frac{15}{5}$ mile $\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} = \frac{15}{5}$

3 whole miles

So, Jeff will run a total of 3 miles in 5 days.

1. Lena runs $\frac{2}{3}$ mile each day. She wants to know how many days she has to run before she has run a whole number of miles.

   3 days

2. Mack is repackaging $\frac{6}{8}$-pound bags of birdseed into 1-pound bags of birdseed. What is the least number of $\frac{6}{8}$-pound bags of birdseed he needs in order to fill 1-pound bags without leftovers?

   four $\frac{6}{8}$ pound bags
Read each problem and solve.

1. Each child in the Smith family was given an orange cut into 8 equal sections. Each child ate \( \frac{5}{8} \) of the orange. After combining the leftover sections, Mrs. Smith noted that there were exactly 3 full oranges left. How many children are in the Smith family?

There are 8 addends, so there are 8 children in the Smith family.

\[
\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = 3
\]

2. Val walks 2\( \frac{3}{5} \) miles each day. Bill runs 10 miles once every 4 days. In 4 days, who covers the greater distance?

Val

3. Chad buys peanuts in 2-pound bags. He repackages them into bags that hold \( \frac{5}{6} \) pound of peanuts. How many 2-pound bags of peanuts should Chad buy so that he can fill the \( \frac{5}{6} \)-pound bags without having any peanuts left over?

five 2-pound bags

4. A carpenter has several boards of equal length. He cuts \( \frac{3}{5} \) of each board. After cutting the boards, the carpenter notices that he has enough pieces left over to make up the same length as 4 of the original boards. How many boards did the carpenter start with?

10 boards
A unit fraction is a fraction with a numerator of 1. You can write a fraction as the product of a whole number and a unit fraction.

Write $\frac{7}{10}$ as the product of a whole number and a unit fraction.

Write $\frac{7}{10}$ as the sum of unit fractions.

$$\frac{7}{10} = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

Use multiplication to show repeated addition.

$$\frac{7}{10} = 7 \times \frac{1}{10}$$

So, $\frac{7}{10} = 7 \times \frac{1}{10}$.

The product of a number and a counting number is a multiple of the number. You can find multiples of unit fractions.

List the next 4 multiples of $\frac{1}{8}$.

Make a table and use repeated addition.

<table>
<thead>
<tr>
<th>$1 \times \frac{1}{8}$</th>
<th>$2 \times \frac{1}{8}$</th>
<th>$3 \times \frac{1}{8}$</th>
<th>$4 \times \frac{1}{8}$</th>
<th>$5 \times \frac{1}{8}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{8}$</td>
<td>$\frac{1}{8}$</td>
<td>$\frac{1}{8} + \frac{1}{8}$</td>
<td>$\frac{1}{8} + \frac{1}{8} + \frac{1}{8}$</td>
<td>$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$</td>
</tr>
<tr>
<td>$\frac{1}{8}$</td>
<td>$\frac{2}{8}$</td>
<td>$\frac{3}{8}$</td>
<td>$\frac{4}{8}$</td>
<td>$\frac{5}{8}$</td>
</tr>
</tbody>
</table>

The next 4 multiples of $\frac{1}{8}$ are $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, and $\frac{5}{8}$.

Write the fraction as the product of a whole number and a unit fraction.

1. $\frac{2}{5} = 2 \times \frac{1}{5}$

List the next four multiples of the unit fraction.

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

5. $\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, $\frac{5}{6}$
Name

Multiples of Unit Fractions

Write the fraction as a product of a whole number and a unit fraction.

1. $\frac{5}{6} = 5 \times \frac{1}{6}$
2. $\frac{7}{8} = 7 \times \frac{1}{8}$
3. $\frac{5}{3} = 5 \times \frac{1}{3}$

4. $\frac{9}{10} = 9 \times \frac{1}{10}$
5. $\frac{3}{4} = 3 \times \frac{1}{4}$
6. $\frac{11}{12} = 11 \times \frac{1}{12}$

7. $\frac{4}{6} = 4 \times \frac{1}{6}$
8. $\frac{8}{20} = 8 \times \frac{1}{20}$
9. $\frac{13}{100} = 13 \times \frac{1}{100}$

List the next four multiples of the unit fraction.

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

Problem Solving

12. So far, Monica has read $\frac{5}{6}$ of a book. She has read the same number of pages each day for 5 days. What fraction of the book does Monica read each day?

$\frac{1}{6}$ of the book

13. Nicholas buys $\frac{3}{8}$ pound of cheese. He puts the same amount of cheese on 3 sandwiches. How much cheese does Nicholas put on each sandwich?

$\frac{1}{8}$ pound
You have learned to write multiples of unit fractions. You can also write multiples of other fractions.

**Write the next 4 multiples of \( \frac{2}{5} \).**

Make a table.

<table>
<thead>
<tr>
<th>(1 \times \frac{2}{5})</th>
<th>(2 \times \frac{2}{5})</th>
<th>(3 \times \frac{2}{5})</th>
<th>(4 \times \frac{2}{5})</th>
<th>(5 \times \frac{2}{5})</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{2}{5})</td>
<td>(\frac{2}{5} + \frac{2}{5})</td>
<td>(\frac{2}{5} + \frac{2}{5} + \frac{2}{5})</td>
<td>(\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5})</td>
<td>(\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5})</td>
</tr>
<tr>
<td>(\frac{2}{5})</td>
<td>(\frac{4}{5})</td>
<td>(\frac{6}{5})</td>
<td>(\frac{8}{5})</td>
<td>(\frac{10}{5})</td>
</tr>
</tbody>
</table>

So, the next 4 multiples of \( \frac{2}{5} \) are \(\frac{4}{5}, \frac{6}{5}, \frac{8}{5}, \) and \(\frac{10}{5}\).

**Write \(3 \times \frac{2}{5}\) as the product of a whole number and a unit fraction.**

Use a number line. Make three jumps of \( \frac{2}{5} \).

\[3 \times \frac{2}{5} = \frac{6}{5}\]

So, \(3 \times \frac{2}{5} = \frac{6}{5}\) or \(6 \times \frac{1}{5}\).

List the next four multiples of the fraction.

1. \(\frac{3}{4}, \frac{6}{4}, \frac{9}{4}, \frac{12}{4}, \frac{15}{4}\)

2. \(\frac{5}{6}, \frac{10}{6}, \frac{15}{6}, \frac{20}{6}, \frac{25}{6}\)

Write as the product of a whole number and a unit fraction.

3. \(3 \times \frac{3}{8} = \frac{9}{8}\)

4. \(4 \times \frac{2}{3} = \frac{8}{3}\)
Multiples of Fractions

List the next four multiples of the fraction.

1. \( \frac{3}{5}, \frac{6}{5}, \frac{9}{5}, \frac{12}{5}, \frac{15}{5} \)

2. \( \frac{2}{6}, \frac{4}{6}, \frac{6}{6}, \frac{8}{6}, \frac{10}{6} \)

3. \( \frac{4}{8}, \frac{8}{8}, \frac{12}{8}, \frac{16}{8}, \frac{20}{8} \)

4. \( \frac{5}{10}, \frac{10}{10}, \frac{15}{10}, \frac{20}{10}, \frac{25}{10} \)

Write the product as the product of a whole number and a unit fraction.

5. \( 2 \times \frac{4}{5} = 8 \times \frac{1}{5} \)

6. \( 5 \times \frac{2}{3} = 10 \times \frac{1}{3} \)

Problem Solving

7. Jessica is making 2 loaves of banana bread. She needs \( \frac{3}{4} \) cup of sugar for each loaf. Her measuring cup can only hold \( \frac{1}{4} \) cup of sugar. How many times will Jessica need to fill the measuring cup in order to get enough sugar for both loaves of bread?

6

8. A group of four students is performing an experiment with salt. Each student must add \( \frac{3}{8} \) teaspoon of salt to a solution. The group only has a \( \frac{1}{8} \) teaspoon measuring spoon. How many times will the group need to fill the measuring spoon in order to perform the experiment?

12
Multiply a Fraction by a Whole Number Using Models

You can use a model to multiply a fraction by a whole number.

Find the product of $4 \times \frac{3}{5}$.

Use fraction strips. Show 4 groups of $\frac{3}{5}$ each.

1 group of $\frac{3}{5} = \frac{3}{5}$

2 groups of $\frac{3}{5} = \frac{6}{5}$

3 groups of $\frac{3}{5} = \frac{9}{5}$

4 groups of $\frac{3}{5} = \frac{12}{5}$

So, $4 \times \frac{3}{5} = \frac{12}{5}$.

Multiply.

1. \[2 \times \frac{5}{6} = \frac{10}{6}\]

2. \[3 \times \frac{7}{8} = \frac{21}{8}\]

3. \[6 \times \frac{2}{3} = \frac{12}{3}\]

4. \[2 \times \frac{9}{10} = \frac{18}{10}\]

5. \[5 \times \frac{3}{4} = \frac{15}{4}\]

6. \[4 \times \frac{5}{8} = \frac{20}{8}\]

7. \[7 \times \frac{2}{5} = \frac{14}{5}\]

8. \[8 \times \frac{4}{6} = \frac{32}{6}\]
Multiply a Fraction by a Whole Number Using Models

Multiply.

1. \(2 \times \frac{5}{6} = \frac{10}{6}\)  
2. \(3 \times \frac{2}{5} = \frac{6}{5}\)  
3. \(7 \times \frac{3}{10} = \frac{21}{10}\)  

4. \(3 \times \frac{5}{12} = \frac{15}{12}\)  
5. \(6 \times \frac{3}{4} = \frac{18}{4}\)  
6. \(4 \times \frac{2}{8} = \frac{8}{8}\)

7. \(5 \times \frac{2}{3} = \frac{10}{3}\)  
8. \(2 \times \frac{7}{8} = \frac{14}{8}\)  
9. \(6 \times \frac{4}{5} = \frac{24}{5}\)

Problem Solving

10. Matthew walks \(\frac{5}{8}\) mile to the bus stop each morning. How far will he walk in 5 days?

\[\text{25 miles}\]

11. Emily uses \(\frac{2}{3}\) cup of milk to make one batch of muffins. How many cups of milk will Emily use if she makes 3 batches of muffins?

\[\text{6 cups}\]
To multiply a fraction by a whole number, multiply the numerators. Then multiply the denominators.

A recipe for one loaf of bread calls for $2\frac{1}{4}$ cups of flour. How many cups of flour will you need for 2 loaves of bread?

**Step 1** Write and solve an equation.

\[ 2 \times 2\frac{1}{4} = \frac{9}{4} \]

Write 2 as $\frac{2}{1}$. Write $2\frac{1}{4}$ as a fraction.

\[ = \frac{2 \times 9}{1 \times 4} \]

Multiply the numerators. Then multiply the denominators.

\[ = \frac{18}{4} \]

Simplify.

**Step 2** Write the product as a mixed number.

\[ \frac{18}{4} = 1 + \frac{4}{4} + \frac{1}{4} + \frac{1}{4} \]

Combine the wholes. Then combine the remaining parts.

\[ = \frac{4 \frac{2}{4}}{4} \text{, or } \frac{4 \frac{1}{2}}{2} \]

Add. Write the sum as a mixed number.

So, you will need $4\frac{1}{2}$ cups of flour.

**Multiply.** Write the product as a mixed number.

1. \[ 3 \times \frac{2}{5} = \frac{6}{5} = 1\frac{1}{5} \]
2. \[ 4 \times \frac{3}{8} = \frac{12}{8} = 1\frac{1}{2} \]
3. \[ 5 \times \frac{1}{3} = \frac{5}{3} = 1\frac{2}{3} \]
4. \[ 2 \times 1\frac{3}{10} = \frac{26}{10} = 2\frac{6}{10} \]
5. \[ 4 \times 1\frac{2}{3} = \frac{22}{3} = 6\frac{2}{3} \]
6. \[ 7 \times 1\frac{1}{6} = \frac{8}{6} = 8\frac{1}{6} \]
Multiply. Write the product as a mixed number.

1. \( 5 \times \frac{3}{10} = \frac{15}{10} \)  
2. \( 3 \times \frac{3}{5} = \frac{14}{5} \)  
3. \( 5 \times \frac{3}{4} = \frac{33}{4} \)

4. \( 4 \times 1\frac{1}{5} = \frac{44}{5} \)  
5. \( 2 \times 2\frac{1}{3} = \frac{42}{3} \)  
6. \( 5 \times 1\frac{1}{6} = \frac{55}{6} \)

7. \( 2 \times 2\frac{7}{8} = \frac{56}{8} \)  
8. \( 7 \times 1\frac{3}{4} = \frac{121}{4} \)  
9. \( 8 \times 1\frac{3}{5} = \frac{124}{5} \)

Problem Solving

10. Brielle exercises for \( \frac{3}{4} \) hour each day for 6 days in a row. Altogether, how many hours does she exercise during the 6 days?

\[ \frac{42}{4} \text{ hours} \]

11. A recipe for quinoa calls for \( 2\frac{2}{3} \) cups of milk. Conner wants to make 4 batches of quinoa. How much milk does he need?

\[ 10\frac{2}{3} \text{ cups} \]
The Great Salt Lake in Utah is about \( \frac{4}{5} \) mile above sea level. Lake Titicaca in South America is about 3 times as high above sea level as the Great Salt Lake. About how high above sea level is Lake Titicaca?

### Read the Problem

**What do I need to find?**

I need to find **about how high above sea level Lake Titicaca is.**

**What information do I need to use?**

The Great Salt Lake is about \( \frac{4}{5} \) mile above sea level. Lake Titicaca is about \( 3 \) times as high above sea level.

**How will I use the information?**

I can **draw a diagram** to compare the heights.

### Solve the Problem

Draw a comparison model. Compare the heights above sea level of the Great Salt Lake and Lake Titicaca, in miles.

<table>
<thead>
<tr>
<th>Great Salt Lake</th>
<th>Lake Titicaca</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{4}{5} )</td>
<td>( \frac{4}{5} \times 3 = \frac{12}{5} )</td>
</tr>
</tbody>
</table>

Write an equation and solve. \( t \) is the height above sea level of Lake Titicaca in miles.

\[
t = \frac{3}{5} \times \frac{4}{5}
\]

Multiply.

\[
t = \frac{12}{5} = 2\frac{2}{5}
\]

Write the fraction as a mixed number.

So, Lake Titicaca is about \( 2\frac{2}{5} \) miles above sea level.

---

1. Amelia is training for a triathlon. She swims \( \frac{3}{5} \) mile. Then she runs about 6 times farther than she swims. About how far does Amelia run?

   **\( \frac{3}{5} \) miles**

2. Last week, Meg bought \( 1\frac{3}{4} \) pounds of fruit at the market. This week, she buys 4 times as many pounds of fruit as last week. In pounds, how much fruit does Meg buy this week?

   **7 pounds**
Problem Solving • Comparison Problems with Fractions

Read each problem and solve.

1. A shrub is $1 \frac{2}{3}$ feet tall. A small tree is 3 times as tall as the shrub. How tall is the tree?

   $t$ is the height of the tree, in feet.
   
   $t = 3 \times 1 \frac{2}{3}$
   
   $t = 3 \times \frac{5}{3}$
   
   $t = \frac{15}{3}$
   
   $t = 5$
   
   So, the tree is 5 feet tall.

2. You run $1 \frac{3}{4}$ miles each day. Your friend runs 4 times as far as you do. How far does your friend run each day?

   7 miles

3. At the grocery store, Ayla buys $1 \frac{1}{3}$ pounds of ground turkey. Tasha buys 2 times as much ground turkey as Ayla. How much ground turkey does Tasha buy?

   2 $\frac{2}{3}$ pounds

4. When Nathan’s mother drives him to school, it takes $\frac{1}{5}$ hour. When Nathan walks to school, it takes him 4 times as long to get to school. How long does it take Nathan to walk to school?

   4 $\frac{4}{5}$ hour
Lori ran $\frac{20}{100}$ mile. How many tenths of a mile did she run?

Write $\frac{20}{100}$ as an equivalent fraction with a denominator of 10.

**Step 1** Think: 10 is a common factor of the numerator and the denominator.

**Step 2** Divide the numerator and denominator by 10.

$$\frac{20}{100} = \frac{20 \div 10}{100 \div 10} = \frac{2}{10}$$

So, Lori ran $\frac{2}{10}$ mile.

Use a place-value chart.

**Step 1** Write $\frac{20}{100}$ as an equivalent decimal.

<table>
<thead>
<tr>
<th>Ones</th>
<th>·</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>·</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

**Step 2** Think: 20 hundredths is ___ tenths __________ hundredths

<table>
<thead>
<tr>
<th>Ones</th>
<th>·</th>
<th>Tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>·</td>
<td>2</td>
</tr>
</tbody>
</table>

So, Lori ran 0.2 mile.

**Write the number as hundredths in fraction form and decimal form.**

1. $\frac{9}{10}$
2. 0.6
3. $\frac{4}{10}$

$$\frac{90}{100} ; 0.90 \quad \frac{60}{100} ; 0.60 \quad \frac{40}{100} ; 0.40$$

**Write the number as tenths in fraction form and decimal form.**

4. $\frac{70}{100}$
5. $\frac{80}{100}$
6. 0.50

$$\frac{7}{10} ; 0.7 \quad \frac{8}{10}; 0.8 \quad \frac{5}{10}; 0.5$$
Equivalent Fractions and Decimals

Write the number as hundredths in fraction form and decimal form.

1. \( \frac{5}{10} \)  
   \[
   \frac{5}{10} = \frac{5 \times 10}{10 \times 10} = \frac{50}{100}
   \]
   Think: 5 tenths is the same as 5 tenths and 0 hundredths. Write 0.50.

2. \( \frac{9}{10} \)

3. 0.2

4. 0.8

Write the number as tenths in fraction form and decimal form.

5. \( \frac{40}{100} \)

6. \( \frac{10}{100} \)

7. 0.60

Problem Solving

8. Billy walks \( \frac{6}{10} \) mile to school each day. Write \( \frac{6}{10} \) as hundredths in fraction form and in decimal form.

9. Four states have names that begin with the letter A. This represents 0.08 of all the states. Write 0.08 as a fraction.
Add Fractional Parts of 10 and 100

OBJECTIVE Add fractions when the denominators are 10 or 100.

Sam uses 100 glass beads for a project. Of the beads, \( \frac{35}{100} \) are gold and \( \frac{4}{10} \) are silver. What fraction of the glass beads are gold or silver?

Add \( \frac{35}{100} \) and \( \frac{4}{10} \).

Step 1 Decide on a common denominator. Use 100.

Step 2 Write \( \frac{4}{10} \) as an equivalent fraction with a denominator of 100.

\[
\frac{4}{10} = \frac{4 \times 10}{10 \times 10} = \frac{40}{100}
\]

Step 3 Add \( \frac{35}{100} \) and \( \frac{40}{100} \).

\[
\frac{35}{100} + \frac{40}{100} = \frac{75}{100}
\]

So, \( \frac{75}{100} \) of the glass beads are gold or silver.

Add \$0.26\) and \$0.59.

Step 1 Write each amount as a fraction of a dollar.

\[
\$0.26 = \frac{26}{100} \text{ of a dollar} \quad \text{and} \quad \$0.59 = \frac{59}{100} \text{ of a dollar}
\]

Step 2 Add \( \frac{26}{100} \) and \( \frac{59}{100} \).

\[
\frac{26}{100} + \frac{59}{100} = \frac{85}{100}
\]

Step 3 Write the sum as a decimal.

\[
\frac{85}{100} = 0.85
\]

So, \( \$0.26 + \$0.59 = \$0.85 \).

Find the sum.

1. \( \frac{75}{100} + \frac{2}{10} = \frac{95}{100} \)

2. \( \$0.73 + \$0.25 = \$0.98 \)

\[
\frac{73}{100} + \frac{25}{100} = \frac{98}{100}
\]
**Add Fractional Parts of 10 and 100**

Find the sum.

1. \( \frac{2}{10} + \frac{43}{100} \)
   - Think: Write \( \frac{2}{10} \) as a fraction with a denominator of 100:
     \[ \frac{2 \times 10}{10 \times 10} = \frac{20}{100} \]
   - \( \frac{20}{100} + \frac{43}{100} = \frac{63}{100} \)

2. \( \frac{17}{100} + \frac{6}{10} \)

3. \( \frac{9}{100} + \frac{4}{10} \)

4. \( \frac{7}{10} + \frac{23}{100} \)

5. \$0.48 + \$0.30

6. \$0.25 + \$0.34

7. \$0.66 + \$0.06

\( \frac{77}{100} \)

\( \frac{49}{100} \)

\( \frac{93}{100} \)

\( \$0.78 \)

\( \$0.59 \)

\( \$0.72 \)

**Problem Solving**

8. Ned’s frog jumped \( \frac{38}{100} \) meter. Then his frog jumped \( \frac{4}{10} \) meter. How far did Ned’s frog jump in all?

9. Keiko walks \( \frac{5}{10} \) kilometer from school to the park. Then she walks \( \frac{19}{100} \) kilometer from the park to her home. How far does Keiko walk in all?

\( \frac{78}{100} \) meter

\( \frac{69}{100} \) kilometer
Write the fraction and the decimal that are shown by the point on the number line.

Step 1  Count the number of equal parts of the whole shown on the number line. There are ten equal parts.
This tells you that the number line shows tenths.

Step 2  Label the number line with the missing fractions.
What fraction is shown by the point on the number line?

The fraction shown by the point on the number line is \( \frac{8}{10} \).

Step 3  Label the number line with the missing decimals.
What decimal is shown by the point on the number line?

The decimal shown by the point on the number line is 0.8.

So, the fraction and decimal shown by the point on the number line are \( \frac{8}{10} \) and 0.8.

Write the fraction or mixed number and the decimal shown by the model.

1. \( \frac{2}{10} ; 0.2 \)

2. \( 2 \frac{6}{10} ; 2.6 \)
Relate Tenths and Decimals

Write the fraction or mixed number and the decimal shown by the model.

1. Think: The model is divided into 10 equal parts. Each part represents one tenth.

2. 

$\frac{6}{10} = 0.6$

3. 

$\frac{2}{10} = 0.2$

4. 

$\frac{4}{10} = 0.4$;

$\frac{5}{10} = 0.5$

$\frac{10}{10} = 1.0$

Write the fraction or mixed number as a decimal.

5. $\frac{4}{10} = 0.4$

6. $\frac{3}{10} + \frac{1}{10} = \frac{4}{10} = 0.4$

7. $\frac{7}{10} = 0.7$

8. $\frac{6}{10} + \frac{5}{10} = \frac{11}{10} = 1.1$

9. $\frac{9}{10} = 0.9$

Problem Solving

10. There are 10 sports balls in the equipment closet. Three are kickballs. Write the portion of the balls that are kickballs as a fraction, as a decimal, and in word form.

$\frac{3}{10} = 0.3$; three tenths

11. Peyton has 2 pizzas. Each pizza is cut into 10 equal slices. She and her friends eat 14 slices. What part of the pizzas did they eat? Write your answer as a decimal.

14 slices out of 20 slices per pizza = $\frac{14}{20} = 0.7$; 1.4 pizzas
Write the fraction or mixed number and the decimal shown by the model.

1.

2.

Step 1 Count the number of shaded squares in the model and the total number of squares in the whole model.

<table>
<thead>
<tr>
<th>Number of shaded squares</th>
<th>Total number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>100</td>
</tr>
</tbody>
</table>

Step 2 Write a fraction to represent the part of the model that is shaded.

\[
\frac{\text{Number of shaded squares}}{\text{Total number of squares}} = \frac{53}{100}
\]

The fraction shown by the model is \( \frac{53}{100} \).

Step 3 Write the fraction in decimal form.

Think: The fraction shown by the model is \( \frac{53}{100} \).

0.53 names the same amount as \( \frac{53}{100} \).

The decimal shown by the model is 0.53.

The fraction and decimal shown by the model are \( \frac{53}{100} \) and 0.53.
Relate Hundredths and Decimals

Write the fraction or mixed number and the decimal shown by the model.

1. Think: The whole is divided into one hundred equal parts, so each part is one hundredth.

\[
\frac{77}{100} \quad 0.77
\]

2.

\[
\frac{29}{100} \quad 0.29
\]

3.

\[
\frac{154}{100} \quad 1.54
\]

4.

\[
\frac{462}{100} \quad 4.62
\]

Write the fraction or mixed number as a decimal.

5. \(\frac{37}{100}\) \quad 0.37

6. \(\frac{811}{100}\) \quad 8.11

7. \(\frac{98}{100}\) \quad 0.98

8. \(\frac{2550}{100}\) \quad 25.50

9. \(\frac{6}{100}\) \quad 0.06

Problem Solving

10. There are 100 pennies in a dollar. What fraction of a dollar is 61 pennies? Write it as a fraction, as a decimal, and in word form.

\[
\frac{61}{100} \quad 0.61; \text{ sixty-one hundredths}
\]

11. Kylee has collected 100 souvenir thimbles from different places she has visited with her family. Twenty of the thimbles are carved from wood. Write the fraction of thimbles that are wooden as a decimal.

\[
\frac{20}{100} \quad 0.20\]
Write the total money amount. Then write the amount as a fraction and as a decimal in terms of a dollar.

Step 1 Count the value of coins from greatest to least. Write the total money amount.

$0.25 \rightarrow $0.35 \rightarrow $0.40 \rightarrow $0.45 \rightarrow $0.50

Step 2 Write the total money amount as a fraction of a dollar.
The total money amount is $0.50, which is the same as 50 cents.
Think: There are 100 cents in a dollar.
So, the total amount written as a fraction of a dollar is: \( \frac{50 \text{ cents}}{100 \text{ cents}} = \frac{50}{100} \)

Step 3 Write the total money amount as a decimal.
Think: I can write $0.50 as 0.50.
The total money amount is \( \frac{50}{100} \) written as a fraction of a dollar, and 0.50 written as a decimal.

Write the total money amount. Then write the amount as a fraction or a mixed number and as a decimal in terms of a dollar.

1. $0.80; \frac{80}{100}; 0.80

2. $1.45; \frac{145}{100}; 1.45
Relate Fractions, Decimals, and Money

Write the total money amount. Then write the amount as a fraction or a mixed number and as a decimal in terms of dollars.

1.

$0.18; \frac{18}{100}; 0.18

2.

$0.56; \frac{56}{100}; 0.56

Write as a money amount and as a decimal in terms of dollars.

3. $\frac{25}{100}$

4. $\frac{79}{100}$

5. $\frac{31}{100}$

6. $\frac{8}{100}$

7. $\frac{42}{100}$

$0.25; 0.25

$0.79; 0.79

$0.31; 0.31

$0.08; 0.08

$0.42; 0.42

Write the money amount as a fraction in terms of dollars.

8. $0.87$

9. $0.03$

10. $0.66$

11. $0.95$

12. $1.00$

$\frac{87}{100}$

$\frac{3}{100}$

$\frac{66}{100}$

$\frac{95}{100}$

$\frac{100}{100}$ or 1

Write the total money amount. Then write the amount as a fraction and as a decimal in terms of dollars.

13. 2 quarters 2 dimes

14. 3 dimes 4 pennies

15. 8 nickels 12 pennies

$0.70; \frac{70}{100}; 0.70

$0.34; \frac{34}{100}; 0.34

$0.52; \frac{52}{100}; 0.52

Problem Solving

16. Kate has 1 dime, 4 nickels, and 8 pennies. Write Kate’s total amount as a fraction in terms of a dollar.

$\frac{38}{100}$

17. Nolan says he has $\frac{75}{100}$ of a dollar. If he only has 3 coins, what are the coins?

three quarters
Alfie found 0.2 of a dollar and Gemma found 0.23 of a dollar. Which friend found more money?

To compare decimals, you can use a number line.

**Step 1** Locate each decimal on a number line.

0.0 0.10 0.20 0.30

**Step 2** The number farther to the right is greater.

0.23 > 0.2, so Gemma found more money.

To compare decimals, you can compare equal-size parts.

**Step 1** Write 0.2 as a decimal in hundredths.

0.2 is 2 tenths, which is equivalent to 0.20 hundredths.

0.2 = 0.20

**Step 2** Compare.

23 hundredths is greater than 20 hundredths.

so 0.23 > 0.2.

So, Gemma found more money.

Compare. Write <, >, or =.

1. 0.17 > 0.13  
2. 0.8 > 0.08  
3. 0.36 < 0.63  
4. 0.4 = 0.40

5. 0.75 > 0.69  
6. 0.3 < 0.7  
7. 0.45 > 0.37  
8. 0.96 > 0.78
Compare Decimals

Compare. Write <, >, or =.

1. $0.35 < 0.53$
2. $0.6 = 0.60$
3. $0.24 < 0.31$

Think: 3 tenths is less than 5 tenths.
So, $0.35 < 0.53$

4. $0.94 > 0.9$
5. $0.3 < 0.32$
6. $0.45 > 0.28$
7. $0.39 < 0.93$

Use the number line to compare. Write true or false.

8. $0.8 > 0.78$
9. $0.4 > 0.84$
10. $0.7 < 0.70$
11. $0.4 > 0.04$

true
false
false
true

Compare. Write true or false.

12. $0.09 > 0.1$
13. $0.24 = 0.42$
14. $0.17 < 0.32$
15. $0.85 > 0.82$

false
false
true
true

Problem Solving

16. Kelly walks 0.7 mile to school. Mary walks 0.49 mile to school. Write an inequality using <, >, or = to compare the distances they walk to school.

Possible answer: $0.7 > 0.49$

17. Tyrone shades two decimal grids. He shades 0.03 of the squares on one grid blue. He shades 0.3 of another grid red. Which grid has the greater part shaded?

The grid shaded red