1. Draw a number bond, and write the number sentence to match each tape diagram. The first one is done for you.

a. \[1 = \frac{1}{3} + \frac{1}{3} + \frac{1}{3}\]
2. Draw and label tape diagrams to model each decomposition.

a. \(1 = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}\)

b. \(\frac{4}{5} = \frac{1}{5} + \frac{2}{5} + \frac{1}{5}\)

c. \(\frac{7}{8} = \frac{3}{8} + \frac{3}{8} + \frac{1}{8}\)

d. \(\frac{11}{8} = \frac{7}{8} + \frac{1}{8} + \frac{3}{8}\)

e. \(\frac{12}{10} = \frac{6}{10} + \frac{4}{10} + \frac{2}{10}\)
f. \( \frac{15}{12} = \frac{9}{12} + \frac{3}{12} + \frac{4}{12} \)

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

h. \( 1\frac{5}{8} = 1 + \frac{1}{8} + \frac{1}{8} + \frac{3}{8} \)
1. Complete the number bond, and write the number sentence to match the tape diagram.

![Tape diagram image]

2. Draw and label tape diagrams to model each number sentence.

   a. \[ \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} \]

   b. \[ \frac{5}{6} = \frac{2}{6} + \frac{2}{6} + \frac{1}{6} \]
1. Draw a number bond, and write the number sentence to match each tape diagram. The first one is done for you.

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

a. \[ \text{Diagram} \]

b. \[ \text{Diagram} \]

c. \[ \text{Diagram} \]

d. \[ \text{Diagram} \]

e. \[ \text{Diagram} \]

f. \[ \text{Diagram} \]
2. Draw and label tape diagrams to match each number sentence.

a. \( \frac{5}{8} = \frac{2}{8} + \frac{2}{8} + \frac{1}{8} \)

b. \( \frac{12}{8} = \frac{6}{8} + \frac{2}{8} + \frac{4}{8} \)

c. \( \frac{11}{10} = \frac{5}{10} + \frac{5}{10} + \frac{1}{10} \)

d. \( \frac{13}{12} = \frac{7}{12} + \frac{1}{12} + \frac{5}{12} \)

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

f. \( 1 \frac{2}{7} = 1 + \frac{2}{7} \)
1. Step 1: Draw and shade a tape diagram of the given fraction.
   Step 2: Record the decomposition as a sum of unit fractions.
   Step 3: Record the decomposition of the fraction two more ways.
   (The first one has been done for you.)

   a. \( \frac{5}{8} \)

   \[
   \frac{5}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}
   \]

   \[
   \frac{5}{8} = \frac{2}{8} + \frac{2}{8} + \frac{1}{8}
   \]

   \[
   \frac{5}{8} = \frac{2}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}
   \]

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

   c. \( \frac{3}{2} \)
2. Step 1: Draw and shade a tape diagram of the given fraction.
   Step 2: Record the decomposition of the fraction in three different ways using number sentences.

   a. \( \frac{7}{8} \)

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

   c. \( \frac{7}{5} \)

   d. \( 1 \frac{1}{3} \)
Step 1: Draw and shade a tape diagram of the given fraction.
Step 2: Record the decomposition of the fraction in three different ways using number sentences.

\[
\frac{4}{7}
\]

\[
\frac{1}{6}
\]
1. Step 1: Draw and shade a tape diagram of the given fraction.
   Step 2: Record the decomposition as a sum of unit fractions.
   Step 3: Record the decomposition of the fraction two more ways.
   (The first one has been done for you.)

   a. \( \frac{5}{6} \)

   
   \[
   \frac{5}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} \]

   b. \( \frac{6}{8} \)

   
   \[
   \frac{5}{6} = \frac{2}{6} + \frac{2}{6} + \frac{1}{6} \]

   \[
   \frac{5}{6} = \frac{1}{6} + \frac{4}{6} \]

   \[
   \frac{5}{6} = \frac{1}{6} + \frac{4}{6} \]

   c. \( \frac{7}{10} \)

   Using a tape diagram, students will decompose fractions as a sum of fractions.
2. Step 1: Draw and shade a tape diagram of the given fraction.
   Step 2: Record the decomposition of the fraction in three different ways using number sentences.

   a. \( \frac{10}{12} \)

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

   c. \( \frac{6}{5} \)

   d. \( 1 \frac{1}{4} \)
1. Decompose each fraction modeled by a tape diagram as a sum of unit fractions. Write the equivalent multiplication sentence. The first one has been done for you.

a. 
\[
\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} = 3 \times \frac{1}{4}
\]

b. 

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

c. 

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

d. 

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

e. 

\[
\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} = 3 \times \frac{1}{4}
\]
2. Write the following fractions greater than 1 as the sum of two products.

a. 

![Diagram showing 1 as a sum of two parts]

b. 

![Diagram showing 1 as a sum of two parts]

3. Draw a tape diagram, and record the given fraction’s decomposition into unit fractions as a multiplication sentence.

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

b. \( \frac{5}{8} \)

c. \( \frac{7}{12} \)

d. \( \frac{7}{4} \)

e. \( \frac{7}{6} \)
1. Decompose each fraction modeled by a tape diagram as a sum of unit fractions. Write the equivalent multiplication sentence.
   a. 
   ![Tape diagram](image)
   b. 
   ![Tape diagram](image)

2. Draw a tape diagram, and record the given fraction's decomposition into unit fractions as a multiplication sentence.
   \[
   \frac{6}{12}
   \]
1. Decompose each fraction modeled by a tape diagram as a sum of unit fractions. Write the equivalent multiplication sentence. The first one has been done for you.

a. \[
\frac{2}{3} = \frac{1}{3} + \frac{1}{3} \quad \frac{2}{3} = 2 \times \frac{1}{3}
\]

b. [Diagram with 1 unit interval divided into 4 equal parts, 1 shaded]

c. [Diagram with 1 unit interval divided into 5 equal parts, 1 shaded]

d. [Diagram with 1 unit interval divided into 6 equal parts, 1 shaded]
2. Write the following fractions greater than 1 as the sum of two products.

   a. [Diagram showing 1 as a sum of two parts]

   b. [Diagram showing 1 as a sum of two parts]

3. Draw a tape diagram, and record the given fraction's decomposition into unit fractions as a multiplication sentence.

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

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

   c. \( \frac{8}{5} \)

   d. \( \frac{12}{4} \)
1. On each object, trace at least one pair of lines that appear to be perpendicular.

2. How do you know if two lines are perpendicular?
3. In the square and triangular grids below, use the given segments in each grid to draw a segment that is perpendicular using a straightedge.

4. Use the right angle template that you created in class to determine which of the following figures have a right angle. Mark each right angle with a small square. For each right angle you find, name the corresponding pair of perpendicular sides. (Problem 4(a) has been started for you.)

a. 

\[ \overline{AB} \perp \overline{BD} \]

c. 

b. 

\[ \overline{HI} \perp \overline{JK} \]

d.
Lesson 4: Given a figure, the student will identify and use symbolic notation to describe perpendicular lines.
5. Mark each right angle on the following figure with a small square. (Note: A right angle does not have to be inside the figure.) How many pairs of perpendicular sides does this figure have?

6. True or false? Shapes that have at least one right angle also have at least one pair of perpendicular sides. Explain your thinking.
Use a right angle template to measure the angles in the following figures. Mark each right angle with a small square. Then, name all pairs of perpendicular sides.

1. \( \overline{BC} \perp _____ \)

2. \( \overline{MN} \perp _____ \)
1. On each object, trace at least one pair of lines that appear to be perpendicular.

2. How do you know if two lines are perpendicular?
3. In the square and triangular grids below, use the given segments in each grid to draw a segment that is perpendicular. Use a straightedge.
4. Use the right angle template that you created in class to determine which of the following figures have a right angle. Mark each right angle with a small square. For each right angle you find, name the corresponding pair of perpendicular sides. (Problem 4(a) has been started for you.)

a. 

\[ \overrightarrow{CA} \perp \overrightarrow{AB} \]

c. 

d. 

e. 

f. 

g. 

h. 

Lesson 4: Given a figure, the student will identify and use symbolic notation to describe perpendicular lines.
5. Use your right angle template as a guide, and mark each right angle in the following figure with a small square. (Note: A right angle does not have to be inside the figure.) How many pairs of perpendicular sides does this figure have?

6. True or false? Shapes that have no right angles also have no perpendicular segments. Draw some figures to help explain your thinking.
1. Draw horizontal lines to decompose each rectangle into the number of rows as indicated. Use the model to give the shaded area as both a sum of unit fractions and as a multiplication sentence.

a. 2 rows

\[
\frac{1}{4} = \frac{2}{8} \\
\frac{1}{4} = \frac{1}{8} + \frac{1}{8} \\
\frac{1}{4} = 2 \times \frac{1}{8}
\]

b. 2 rows

c. 4 rows
2. Draw area models to show the decompositions represented by the number sentences below. Represent the decomposition as a sum of unit fractions and as a multiplication sentence.

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

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

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

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

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

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

3. Explain why \( \frac{1}{12} + \frac{1}{12} + \frac{1}{12} \) is the same as \( \frac{1}{4} \).
1. Draw horizontal lines to decompose each rectangle into the number of rows as indicated. Use the model to give the shaded area as both a sum of unit fractions and as a multiplication sentence.

   a. 2 rows

   ![Diagram](image)

   b. 3 rows

   ![Diagram](image)

2. Draw an area model to show the decomposition represented by the number sentence below. Represent the decomposition as a sum of unit fractions and as a multiplication sentence.

   \[
   \frac{3}{5} = \frac{6}{10}
   \]
1. Draw horizontal lines to decompose each rectangle into the number of rows as indicated. Use the model
to give the shaded area as both a sum of unit fractions and as a multiplication sentence.

a. 3 rows

\[
\frac{1}{2} = \frac{3}{6}
\]

\[
\frac{1}{2} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6}
\]

\[
\frac{1}{2} = 3 \times \frac{1}{6} = \frac{3}{6}
\]

b. 2 rows

c. 4 rows
2. Draw area models to show the decompositions represented by the number sentences below. Represent the decomposition as a sum of unit fractions and as a multiplication sentence.

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

b. $\frac{1}{3} = \frac{3}{9}$

c. $\frac{1}{3} = \frac{4}{12}$

d. $\frac{1}{3} = \frac{5}{15}$

e. $\frac{1}{5} = \frac{2}{10}$

f. $\frac{1}{5} = \frac{3}{15}$

3. Explain why $\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$ is the same as $\frac{3}{3}$. 

Lesson 5: Using area models, the student will find equivalent fractions by decomposing unit fractions.
1. Each rectangle represents 1. Draw horizontal lines to decompose each rectangle into the fractional units as indicated. Use the model to give the shaded area as a sum and as a product of unit fractions. Use parentheses to show the relationship between the number sentences. The first one has been partially done for you.

   a. Sixths

   \[
   \frac{2}{3} = \frac{4}{6} = \frac{2}{3} + \frac{2}{3} = \left(\frac{1}{6} + \frac{1}{6}\right) + \left(\frac{1}{6} + \frac{1}{6}\right) = \frac{4}{6} = \frac{2}{3} \times \frac{2}{3} = \frac{4}{9}
   \]

   b. Tenths

   \[
   \frac{2}{3} = \frac{4}{10} = \frac{2}{3} + \frac{2}{3} = \left(\frac{1}{10} + \frac{1}{10}\right) + \left(\frac{1}{10} + \frac{1}{10}\right) = \frac{4}{10} = \frac{2}{3} \times \frac{2}{3} = \frac{4}{9}
   \]
c. Twelfths

2. Draw area models to show the decompositions represented by the number sentences below. Express each as a sum and product of unit fractions. Use parentheses to show the relationship between the number sentences.

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

b. \( \frac{3}{4} = \frac{6}{8} \)
3. Step 1: Draw an area model for a fraction with units of thirds, fourths, or fifths.
   
   Step 2: Shade in more than one fractional unit.
   
   Step 3: Partition the area model again to find an equivalent fraction.
   
   Step 4: Write the equivalent fractions as a number sentence. (If you’ve written a number sentence like this one already on this Practice Set, start over.)
1. The rectangle below represents 1. Draw horizontal lines to decompose the rectangle into eighths. Use the model to give the shaded area as a sum and as a product of unit fractions. Use parentheses to show the relationship between the number sentences.

2. Draw an area model to show the decomposition represented by the number sentence below.

\[
\frac{4}{5} = \frac{8}{10}
\]
1. Each rectangle represents 1. Draw horizontal lines to decompose each rectangle into the fractional units as indicated. Use the model to give the shaded area as a sum and as a product of unit fractions. Use parentheses to show the relationship between the number sentences. The first one has been partially done for you.

a. Tenths

\[
\frac{2}{5} = \frac{4}{10} + \frac{1}{10} + \frac{1}{10} = \frac{4}{10} = 2 \times \frac{1}{10} + 2 \times \frac{1}{10} = \frac{4}{10}
\]

\[
\frac{2}{5} = 4 \times \frac{1}{5} = \frac{4}{5}
\]

b. Eighths
c. Fifteenths

2. Draw area models to show the decompositions represented by the number sentences below. Express each as a sum and product of unit fractions. Use parentheses to show the relationship between the number sentences.

   a. \[ \frac{2}{3} = \frac{4}{6} \]

   b. \[ \frac{4}{5} = \frac{8}{10} \]
3. Step 1: Draw an area model for a fraction with units of thirds, fourths, or fifths.

Step 2: Shade in more than one fractional unit.

Step 3: Partition the area model again to find an equivalent fraction.

Step 4: Write the equivalent fractions as a number sentence. (If you have written a number sentence like this one already in this Homework, start over.)
Name ____________________________ Date __________________

Each rectangle represents 1.

1. The shaded unit fractions have been decomposed into smaller units. Express the equivalent fractions in a number sentence using multiplication. The first one has been done for you.

a. \[
\begin{array}{c}
\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}
\end{array}
\]

b. 

c. 

d. 

The student will use the area model and multiplication to show the equivalence of two fractions.
2. Decompose the shaded fractions into smaller units using the area models. Express the equivalent fractions in a number sentence using multiplication.

   a. 
   b. 

   c. 
   d. 

   e. What happened to the size of the fractional units when you decomposed the fraction?

   f. What happened to the total number of units in the whole when you decomposed the fraction?
3. Draw three different area models to represent 1 third by shading. Decompose the shaded fraction into (a) sixths, (b) ninths, and (c) twelfths. Use multiplication to show how each fraction is equivalent to 1 third.

   a. 

   b. 

   c.
Name ___________________________________________  Date _________________________

Draw two different area models to represent 1 fourth by shading.
Decompose the shaded fraction into (a) eighths and (b) twelfths.
Use multiplication to show how each fraction is equivalent to 1 fourth.

a.

b.
Name ______________________ Date ______________

Each rectangle represents 1.

1. The shaded unit fractions have been decomposed into smaller units. Express the equivalent fractions in a number sentence using multiplication. The first one has been done for you.
   a. 
   
   \[
   \frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}
   \]
   b. 

2. Decompose the shaded fractions into smaller units using the area models. Express the equivalent fractions in a number sentence using multiplication.
   a. 
   b. 

3. Draw three different area models to represent 1 fourth by shading. Decompose the shaded fraction into (a) eighths, (b) twelfths, and (c) sixteenths. Use multiplication to show how each fraction is equivalent to 1 fourth.

a. 

b. 

c. 

RICHMOND MATH Lesson 7 Homework 4-5

EUREKA MATH Lesson 7: The student will use the area model and multiplication to show the equivalence of two fractions.
Each rectangle represents 1.

1. The shaded fractions have been decomposed into smaller units. Express the equivalent fractions in a number sentence using multiplication. The first one has been done for you.

   a. \[ \frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6} \]

   b. 

   c. 

   d. 

Lesson 8: Use the area model and multiplication to show the equivalence of two fractions.
2. Decompose the shaded fractions into smaller units, as given below. Express the equivalent fractions in a number sentence using multiplication.

   a. Decompose into tenths.

   b. Decompose into fifteenths.
3. Draw area models to prove that the following number sentences are true.
   a. \( \frac{2}{5} = \frac{4}{10} \) 
   b. \( \frac{2}{3} = \frac{8}{12} \) 
   c. \( \frac{3}{6} = \frac{6}{12} \) 
   d. \( \frac{4}{6} = \frac{8}{12} \)

4. Use multiplication to find an equivalent fraction for each fraction below.
   a. \( \frac{3}{4} \) 
   b. \( \frac{4}{5} \) 
   c. \( \frac{7}{6} \) 
   d. \( \frac{12}{8} \)

5. Determine which of the following are true number sentences. Correct those that are false by changing the right-hand side of the number sentence.
   a. \( \frac{4}{3} = \frac{8}{9} \) 
   b. \( \frac{5}{4} = \frac{10}{8} \) 
   c. \( \frac{4}{5} = \frac{12}{10} \) 
   d. \( \frac{4}{6} = \frac{12}{18} \)
Name ___________________________________  Date __________________

1. Use multiplication to create an equivalent fraction for the fraction below.

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

2. Determine if the following is a true number sentence. If needed, correct the statement by changing the right-hand side of the number sentence.

\[
\frac{3}{4} = \frac{9}{8}
\]
Each rectangle represents 1.

1. The shaded fractions have been decomposed into smaller units. Express the equivalent fractions in a number sentence using multiplication. The first one has been done for you.
   a. \[
   \frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}
   \]
   b. 
   c. 
   d. 

2. Decompose both shaded fractions into twelfths. Express the equivalent fractions in a number sentence using multiplication.
   a. 
   b. 

Lesson 8: Use the area model and multiplication to show the equivalence of two fractions.
3. Draw area models to prove that the following number sentences are true.

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

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

c. \( \frac{5}{8} = \frac{10}{16} \)

d. \( \frac{3}{6} = \frac{9}{18} \)

4. Use multiplication to create an equivalent fraction for each fraction below.

a. \( \frac{2}{3} \)

b. \( \frac{5}{6} \)

c. \( \frac{6}{5} \)

d. \( \frac{10}{8} \)

5. Determine which of the following are true number sentences. Correct those that are false by changing the right-hand side of the number sentence.

a. \( \frac{2}{3} = \frac{4}{9} \)

b. \( \frac{5}{6} = \frac{10}{12} \)

c. \( \frac{3}{5} = \frac{6}{15} \)

d. \( \frac{7}{4} = \frac{21}{12} \)
Each rectangle represents 1.

1. Compose the shaded fractions into larger fractional units. Express the equivalent fractions in a number sentence using division. The first one has been done for you.

   a. \[
   \begin{array}{c}
   \frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2}
   \end{array}
   \]

   b. 

   c. 

   d. 

2. Compose the shaded fractions into larger fractional units. Express the equivalent fractions in a number sentence using division.

   a. 
   
   b. 
   
   c. 
   
   d. 
   

   e. What happened to the size of the fractional units when you composed the fraction?

   f. What happened to the total number of units in the whole when you composed the fraction?
3. a. In the first area model, show 2 sixths. In the second area model, show 3 ninths. Show how both fractions can be renamed as the same unit fraction.

[Diagram of two rectangles divided into sixths and ninths]

b. Express the equivalent fractions in a number sentence using division.

4. a. In the first area model, show 2 eighths. In the second area model, show 3 twelfths. Show how both fractions can be composed, or renamed, as the same unit fraction.

[Diagram of two rectangles divided into eighths and twelfths]

b. Express the equivalent fractions in a number sentence using division.
a. In the first area model, show 2 sixths. In the second area model, show 4 twelfths. Show how both fractions can be composed, or renamed, as the same unit fraction.

b. Express the equivalent fractions in a number sentence using division.
Each rectangle represents 1.

1. Compose the shaded fractions into larger fractional units. Express the equivalent fractions in a number sentence using division. The first one has been done for you.

a. \[
\frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2}
\]

b. 

c. 

d. 

EUREKA MATH | Lesson 9: The student will use the area model and division to show the equivalence of two fractions.
2. Compose the shaded fractions into larger fractional units. Express the equivalent fractions in a number sentence using division.

a. 

b. 

c. 

d. 

e. What happened to the size of the fractional units when you composed the fraction?

f. What happened to the total number of units in the whole when you composed the fraction?
3. a. In the first area model, show 4 eighths. In the second area model, show 6 twelfths. Show how both fractions can be composed, or renamed, as the same unit fraction.

![Diagram showing 4 eighths and 6 twelfths]

b. Express the equivalent fractions in a number sentence using division.

4. a. In the first area model, show 4 eighths. In the second area model, show 8 sixteenths. Show how both fractions can be composed, or renamed, as the same unit fraction.

![Diagram showing 4 eighths and 8 sixteenths]

b. Express the equivalent fractions in a number sentence using division.
Each rectangle represents 1.

1. Compose the shaded fraction into larger fractional units. Express the equivalent fractions in a number sentence using division. The first one has been done for you.

a. \[
\frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}
\]

b. 

c. 

d. 

Lesson 10: Use the area model and division to show the equivalence of two fractions
2. Compose the shaded fractions into larger fractional units. Express the equivalent fractions in a number sentence using division.

   a. \[\frac{4}{10} = \frac{4 + 2}{10 + 2} = \frac{2}{5}\]

   b. \[\frac{6}{9} = \frac{6 + 3}{9 + 3} = \frac{2}{3}\]

3. Draw an area model to represent each number sentence below.
4. Use division to rename each fraction given below. Draw a model if that helps you. See if you can use the largest common factor.

a. \( \frac{4}{8} \)

b. \( \frac{12}{16} \)

c. \( \frac{12}{20} \)

d. \( \frac{16}{20} \)
Draw an area model to show why the fractions are equivalent. Show the equivalence in a number sentence using division.

\[
\frac{4}{10} = \frac{2}{5}
\]
Each rectangle represents 1.

1. Compose the shaded fraction into larger fractional units. Express the equivalent fractions in a number sentence using division. The first one has been done for you.

   a. \[
   \frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}
   \]

   b. \[
   \frac{3}{6}
   \]

   c. \[
   \frac{5}{6}
   \]

   d. \[
   \frac{4}{6}
   \]
2. Compose the shaded fractions into larger fractional units. Express the equivalent fractions in a number sentence using division.

a. \[ \frac{6}{15} = \frac{6+3}{15+3} = \frac{2}{5} \]

b. \[ \frac{6}{18} = \frac{6+3}{18+3} = \frac{2}{6} \]

3. Draw an area model to represent each number sentence below.

a. \[ \frac{6}{15} = \frac{6+3}{15+3} = \frac{2}{5} \]

b. \[ \frac{6}{18} = \frac{6+3}{18+3} = \frac{2}{6} \]
4. Use division to rename each fraction given below. Draw a model if that helps you. See if you can use the largest common factor.

a. \( \frac{6}{12} \)

b. \( \frac{4}{12} \)

c. \( \frac{8}{12} \)

d. \( \frac{12}{18} \)
1. Label each number line with the fractions shown on the tape diagram. Circle the fraction that labels the point on the number line that also names the shaded part of the tape diagram.

   a.  
   
   b.  
   
   c.  

Lesson 11: The student will explain fraction equivalence using the number line, and relate that to the use of multiplication and division.
2. Write number sentences using multiplication to show:
   a. The fraction represented in 1(a) is equivalent to the fraction represented in 1(b).
   b. The fraction represented in 1(a) is equivalent to the fraction represented in 1(c).

3. Use each shaded tape diagram below as a ruler to draw a number line. Mark each number line with the fractional units shown on the tape diagram, and circle the fraction that labels the point on the number line that also names the shaded part of the tape diagram.
   a. 
      ![Diagram](image)
   b. 
      ![Diagram](image)
   c. 
      ![Diagram](image)
4. Write number sentences using division to show:

   a. The fraction represented in 3(a) is equivalent to the fraction represented in 3(b).

   b. The fraction represented in 3(a) is equivalent to the fraction represented in 3(c).

5. a. Partition a number line from 0 to 1 into fifths. Decompose $\frac{2}{5}$ into 4 equal lengths.

   b. Write a number sentence using multiplication to show what fraction represented on the number line is equivalent to $\frac{2}{5}$.

   c. Write a number sentence using division to show what fraction represented on the number line is equivalent to $\frac{2}{5}$. 
Name ________________________________ Date _________________

1. Partition a number line from 0 to 1 into sixths. Decompose $\frac{2}{6}$ into 4 equal lengths.

2. Write a number sentence using multiplication to show what fraction represented on the number line is equivalent to $\frac{2}{6}$.

3. Write a number sentence using division to show what fraction represented on the number line is equivalent to $\frac{2}{6}$.
1. Label each number line with the fractions shown on the tape diagram. Circle the fraction that labels the point on the number line that also names the shaded part of the tape diagram.

a. 

![Number line a]

b. 

![Number line b]

c. 

![Number line c]

---

Lesson 11: The student will explain fraction equivalence using the number line, and relate that to the use of multiplication and division.
2. Write number sentences using multiplication to show:
   a. The fraction represented in 1(a) is equivalent to the fraction represented in 1(b).
   b. The fraction represented in 1(a) is equivalent to the fraction represented in 1(c).

3. Use each shaded tape diagram below as a ruler to draw a number line. Mark each number line with the fractional units shown on the tape diagram, and circle the fraction that labels the point on the number line that also names the shaded part of the tape diagram.
   a. 
   ![Tape Diagram A]
   b. 
   ![Tape Diagram B]
   c. 
   ![Tape Diagram C]
4. Write a number sentence using division to show the fraction represented in 3(a) is equivalent to the fraction represented in 3(b).

5. a. Partition a number line from 0 to 1 into fourths. Decompose $\frac{3}{4}$ into 6 equal lengths.

b. Write a number sentence using multiplication to show what fraction represented on the number line is equivalent to $\frac{3}{4}$.

c. Write a number sentence using division to show what fraction represented on the number line is equivalent to $\frac{3}{4}$. 

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Lesson 11: The student will explain fraction equivalence using the number line, and relate that to the use of multiplication and division.
1. a. Plot the following points on the number line without measuring.
   i. \( \frac{1}{3} \)  
   ii. \( \frac{5}{6} \)  
   iii. \( \frac{7}{12} \)

   \[ 0 \quad \frac{1}{2} \quad 1 \]

b. Use the number line in Part (a) to compare the fractions by writing >, <, or = on the lines.
   i. \( \frac{7}{12} \quad \frac{1}{2} \)  
   ii. \( \frac{7}{12} \quad \frac{5}{6} \)

2. a. Plot the following points on the number line without measuring.
   i. \( \frac{11}{12} \)  
   ii. \( \frac{1}{4} \)  
   iii. \( \frac{3}{8} \)

   \[ 0 \quad \frac{1}{2} \quad 1 \]

b. Select two fractions from Part (a), and use the given number line to compare them by writing >, <, or =.

c. Explain how you plotted the points in Part (a).
3. Compare the fractions given below by writing > or < on the lines.

Give a brief explanation for each answer referring to the benchmarks 0, $\frac{1}{2}$, and 1.

a. \(\frac{1}{2} \quad \frac{3}{4}\)
b. \(\frac{1}{2} \quad \frac{7}{8}\)

c. \(\frac{2}{3} \quad \frac{2}{5}\)
d. \(\frac{9}{10} \quad \frac{3}{5}\)

e. \(\frac{2}{3} \quad \frac{7}{8}\)
f. \(\frac{1}{3} \quad \frac{2}{4}\)

g. \(\frac{2}{3} \quad \frac{5}{10}\)
h. \(\frac{11}{12} \quad \frac{2}{5}\)

i. \(\frac{49}{100} \quad \frac{51}{100}\)
j. \(\frac{7}{16} \quad \frac{51}{100}\)
1. Plot the following points on the number line without measuring.
   a. $\frac{8}{10}$
   b. $\frac{3}{5}$
   c. $\frac{1}{4}$

   0 ——— 1/2 ——— 1

2. Use the number line in Problem 1 to compare the fractions by writing $>$, $<$, or $=$ on the lines.
   a. $\frac{1}{4}$ ——— $\frac{1}{2}$
   b. $\frac{8}{10}$ ——— $\frac{3}{5}$
   c. $\frac{1}{2}$ ——— $\frac{3}{5}$
   d. $\frac{1}{4}$ ——— $\frac{8}{10}$
Name ___________________________________________ Date ________________

1. a. Plot the following points on the number line without measuring.

   i. \( \frac{2}{3} \)  
   ii. \( \frac{1}{6} \)  
   iii. \( \frac{4}{10} \)

   0  \[\text{---\ Hague\ ---} \]  \( \frac{1}{2} \)  \( 1 \)

b. Use the number line in Part (a) to compare the fractions by writing >, <, or = on the lines.

   i. \( \frac{2}{3} \)  \( \frac{1}{2} \)  
   ii. \( \frac{4}{10} \)  \( \frac{1}{6} \)

2. a. Plot the following points on the number line without measuring.

   i. \( \frac{5}{12} \)  
   ii. \( \frac{3}{4} \)  
   iii. \( \frac{2}{6} \)

   0  \[\text{---\ Hague\ ---} \]  \( \frac{1}{2} \)  \( 1 \)

b. Select two fractions from Part (a), and use the given number line to compare them by writing >, <, or =.

c. Explain how you plotted the points in Part (a).
3. Compare the fractions given below by writing > or < on the lines.

   Give a brief explanation for each answer referring to the benchmark of 0, $\frac{1}{2}$, and 1.

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

   b. $\frac{6}{8}$ ______ $\frac{1}{2}$

   c. $\frac{3}{4}$ ______ $\frac{3}{5}$

   d. $\frac{4}{6}$ ______ $\frac{9}{12}$

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

   f. $\frac{4}{5}$ ______ $\frac{8}{12}$

   g. $\frac{1}{3}$ ______ $\frac{3}{6}$

   h. $\frac{7}{8}$ ______ $\frac{3}{5}$

   i. $\frac{51}{100}$ ______ $\frac{5}{10}$

   j. $\frac{8}{14}$ ______ $\frac{49}{100}$
Application Problem

Instructional Focus/ Guided Practice

1.

2.

number line
1. Compare the pairs of fractions by reasoning about the size of the units. Use >, <, or =.
   a. 1 fourth ____ 1 fifth
   b. 3 fourths ____ 3 fifths
   c. 1 tenth ____ 1 twelfth
   d. 7 tenths ____ 7 twelfths

2. Compare by reasoning about the following pairs of fractions with the same or related numerators. Use >, <, or =. Explain your thinking using words, pictures, or numbers. Problem 2(b) has been done for you.
   a. \(\frac{3}{5} \quad \frac{3}{4}\)
   b. \(\frac{2}{5} \quad \frac{4}{9}\)
      because \(\frac{2}{5} = \frac{4}{10}\)
      4 tenths is less than 4 ninths because tenths are smaller than ninths.
   c. \(\frac{7}{11} \quad \frac{7}{9}\)
   d. \(\frac{6}{7} \quad \frac{12}{12}\)
3. Draw two tape diagrams to model each pair of the following fractions with related denominators. Use >, <, or = to compare.

a. \( \frac{2}{3} \quad \frac{5}{6} \)

b. \( \frac{3}{4} \quad \frac{7}{8} \)

c. \( 1\frac{3}{4} \quad 1\frac{7}{12} \)
4. Draw one number line to model each pair of fractions with related denominators. Use $>$, $<$, or $=$ to compare.
   
   a. \[ \frac{2}{3} \quad \frac{5}{6} \]
   
   b. \[ \frac{3}{8} \quad \frac{1}{4} \]
   
   c. \[ \frac{2}{6} \quad \frac{5}{12} \]
   
   d. \[ \frac{8}{9} \quad \frac{2}{3} \]

5. Compare each pair of fractions using $>$, $<$, or $\equiv$. Draw a model if you choose to.
   
   a. \[ \frac{3}{4} \quad \frac{3}{7} \]
   
   b. \[ \frac{4}{5} \quad \frac{8}{12} \]
   
   c. \[ \frac{7}{10} \quad \frac{3}{5} \]
   
   d. \[ \frac{2}{3} \quad \frac{11}{15} \]
   
   e. \[ \frac{3}{4} \quad \frac{11}{12} \]
   
   f. \[ \frac{7}{3} \quad \frac{7}{4} \]
   
   g. \[ 1\frac{1}{3} \quad 1\frac{2}{9} \]
   
   h. \[ 1\frac{2}{3} \quad 1\frac{4}{7} \]
6. Timmy drew the picture to the right and claimed that $\frac{2}{3}$ is less than $\frac{7}{12}$. Evan says he thinks $\frac{2}{3}$ is greater than $\frac{7}{12}$. Who is correct? Support your answer with a picture.
1. Draw tape diagrams to compare the following fractions:

\[
\frac{2}{5} \quad \frac{3}{10}
\]

2. Use a number line to compare the following fractions:

\[
\frac{4}{3} \quad \frac{7}{6}
\]
1. Compare the pairs of fractions by reasoning about the size of the units. Use >, <, or =.
   a. 1 third ____ 1 sixth
   b. 2 halves ____ 2 thirds
   c. 2 fourths ____ 2 sixths
   d. 5 eighths ____ 5 tenths

2. Compare by reasoning about the following pairs of fractions with the same or related numerators.
   Use >, <, or =. Explain your thinking using words, pictures, or numbers. Problem 2(b) has been done for you.
   a. \( \frac{3}{6} \) ____ \( \frac{3}{7} \)
   b. \( \frac{2}{5} \) ____ \( \frac{4}{9} \)
      because \( \frac{2}{5} = \frac{4}{10} \)
      4 tenths is less
      than 4 ninths because
tenths are smaller than ninths.
   c. \( \frac{3}{11} \) ____ \( \frac{3}{13} \)
   d. \( \frac{5}{7} \) ____ \( \frac{10}{13} \)

EUREKA MATH
Lesson 14: Find common units or number of units to compare two fractions.

engage\text{\textsuperscript{ny}}
3. Draw two tape diagrams to model each pair of the following fractions with related denominators. Use >, <, or = to compare.

a. \( \frac{3}{4} \quad \frac{7}{12} \)

b. \( \frac{2}{4} \quad \frac{1}{8} \)

c. \( \frac{4}{10} \quad \frac{3}{5} \)
4. Draw one number line to model each pair of fractions with related denominators. Use >, <, or = to compare.

a. \( \frac{3}{4} \) \( \frac{5}{8} \)  

b. \( \frac{11}{12} \) \( \frac{3}{4} \)  

c. \( \frac{4}{5} \) \( \frac{7}{10} \)  

d. \( \frac{8}{9} \) \( \frac{2}{3} \)  

5. Compare each pair of fractions using >, <, or =. Draw a model if you choose to.

a. \( \frac{1}{7} \) \( \frac{2}{7} \)  

b. \( \frac{5}{7} \) \( \frac{11}{14} \)  

c. \( \frac{7}{10} \) \( \frac{3}{5} \)  

d. \( \frac{2}{3} \) \( \frac{9}{15} \)  

e. \( \frac{3}{4} \) \( \frac{9}{12} \)  

f. \( \frac{5}{3} \) \( \frac{5}{2} \)  

6. Simon claims \( \frac{4}{9} \) is greater than \( \frac{1}{3} \). Ted thinks \( \frac{4}{9} \) is less than \( \frac{1}{3} \). Who is correct? Support your answer with a picture.
1. Draw an area model for each pair of fractions, and use it to compare the two fractions by writing $>$, $<$, or $=$ on the line. The first two have been partially done for you. Each rectangle represents 1.

- a. $\frac{1}{2} \quad \quad \frac{2}{3}$
  
  $1 \times 3 = 3$
  
  $2 \times 3 = 6$

- b. $\frac{4}{5} \quad \frac{3}{4}$
  
- c. $\frac{3}{5} \quad \frac{4}{7}$
  
- d. $\frac{2}{7} \quad \frac{2}{6}$

- e. $\frac{5}{8} \quad \frac{6}{9}$

- f. $\frac{2}{3} \quad \frac{3}{4}$
2. Rename the fractions, as needed, using multiplication in order to compare each pair of fractions by writing $>$, $<$, or $\leq$.
   a. $\frac{3}{5}$ $\underline{\text{________}}$ $\frac{5}{6}$
   b. $\frac{2}{6}$ $\underline{\text{________}}$ $\frac{3}{8}$
   c. $\frac{7}{5}$ $\underline{\text{________}}$ $\frac{10}{8}$
   d. $\frac{4}{3}$ $\underline{\text{________}}$ $\frac{6}{5}$

3. Use any method to compare the fractions. Record your answer using $>$, $<$, or $\leq$.
   a. $\frac{3}{4}$ $\underline{\text{________}}$ $\frac{7}{8}$
   b. $\frac{6}{8}$ $\underline{\text{________}}$ $\frac{3}{5}$
   c. $\frac{6}{4}$ $\underline{\text{________}}$ $\frac{8}{6}$
   d. $\frac{8}{5}$ $\underline{\text{________}}$ $\frac{9}{6}$
4. Explain two ways you have learned to compare fractions. Provide evidence using words, pictures, or numbers.
Name ____________________________ Date ______________

Draw an area model for each pair of fractions, and use it to compare the two fractions by writing >, <, or = on the line.

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

2. \( \frac{2}{6} \) ______\( \frac{3}{5} \)
1. Draw an area model for each pair of fractions, and use it to compare the two fractions by writing >, <, or = on the line. The first two have been partially done for you. Each rectangle represents 1.

a. \( \frac{1}{2} \ < \ \frac{3}{5} \)

\[
\begin{align*}
\frac{1 \times 5}{2 \times 5} & = \frac{5}{10} \\
\frac{3 \times 2}{5 \times 2} & = \frac{6}{10} \\
\frac{5}{10} & < \frac{6}{10} \quad \text{So} \ \frac{1}{2} & < \frac{3}{5}
\end{align*}
\]

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

d. \( \frac{2}{7} \ < \ \frac{3}{5} \)

e. \( \frac{4}{6} \ < \ \frac{6}{9} \)

f. \( \frac{4}{5} \ < \ \frac{5}{6} \)
2. Rename the fractions, as needed, using multiplication in order to compare each pair of fractions by writing $>$, $<$, or $=$.

   a. $\frac{2}{3} \underline{\phantom{0}} \frac{2}{4}$

   b. $\frac{4}{7} \underline{\phantom{0}} \frac{1}{2}$

   c. $\frac{5}{4} \underline{\phantom{0}} \frac{9}{8}$

   d. $\frac{8}{12} \underline{\phantom{0}} \frac{5}{8}$

3. Use any method to compare the fractions. Record your answer using $>$, $<$, or $=$.

   a. $\frac{8}{9} \underline{\phantom{0}} \frac{2}{3}$

   b. $\frac{4}{7} \underline{\phantom{0}} \frac{4}{5}$

   c. $\frac{3}{2} \underline{\phantom{0}} \frac{9}{6}$

   d. $\frac{11}{7} \underline{\phantom{0}} \frac{5}{3}$
4. Explain which method you prefer using to compare fractions. Provide an example using words, pictures, or numbers.
1. Solve.
   a. \( \frac{3}{5} - \frac{1}{5} = \) ________
   b. \( \frac{5}{5} - \frac{3}{5} = \) ________
   c. \( \frac{3}{2} - \frac{2}{2} = \) ________
   d. \( \frac{6}{4} - \frac{3}{4} = \) ________

2. Solve.
   a. \( \frac{5}{6} - \frac{3}{6} = \) ________
   b. \( \frac{6}{8} - \frac{4}{8} = \) ________
   c. \( \frac{3}{10} - \frac{3}{10} = \) ________
   d. \( \frac{5}{5} - \frac{4}{5} = \) ________
   e. \( \frac{5}{4} - \frac{4}{4} = \) ________
   f. \( \frac{5}{4} - \frac{3}{4} = \) ________

3. Solve. Use a number bond to show how to convert the difference to a mixed number. Problem (a) has been completed for you.
   a. \( \frac{12}{8} - \frac{3}{8} = \frac{9}{8} = \frac{9}{8} \)
   b. \( \frac{12}{6} - \frac{5}{6} = \frac{1}{6} \)
   c. \( \frac{9}{5} - \frac{3}{5} = \frac{6}{5} \)
   d. \( \frac{14}{8} - \frac{3}{8} = \frac{11}{8} \)
   e. \( \frac{8}{4} - \frac{2}{4} = \frac{6}{4} \)
   f. \( \frac{15}{10} - \frac{3}{10} = \frac{12}{10} \)
4. Solve. Write the sum in unit form.
   
   a. 2 fourths + 1 fourth = ______________
   
   b. 4 fifths + 3 fifths = ______________

5. Solve.
   
   a. \( \frac{2}{8} + \frac{5}{8} \)
   
   b. \( \frac{4}{12} + \frac{5}{12} \)

6. Solve. Use a number bond to decompose the sum. Record your final answer as a mixed number.
   Problem (a) has been completed for you.
   
   a. \( \frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1 \frac{2}{5} \)
   
   b. \( \frac{4}{4} + \frac{3}{4} \)

   c. \( \frac{6}{9} + \frac{6}{9} \)
   
   d. \( \frac{7}{10} + \frac{6}{10} \)

   e. \( \frac{5}{6} + \frac{7}{6} \)
   
   f. \( \frac{9}{8} + \frac{5}{8} \)

7. Solve. Use a number line to model your answer.

   a. \( \frac{7}{4} - \frac{5}{4} \)

   b. \( \frac{5}{4} + \frac{2}{4} \)
Name ________________________________      Date __________________

1. Solve. Use a number bond to decompose the difference. Record your final answer as a mixed number.

\[ \frac{16}{9} - \frac{5}{9} \]

2. Solve. Use a number bond to decompose the sum. Record your final answer as a mixed number.

\[ \frac{5}{12} + \frac{10}{12} \]
Name ____________________________________ Date ______________________

1. Solve.
   a. \( \frac{3}{6} - \frac{2}{6} = \) _____________
   b. \( \frac{5}{10} - \frac{3}{10} = \) _____________
   c. \( \frac{3}{4} - \frac{2}{4} = \) _____________
   d. \( \frac{5}{3} - \frac{2}{3} = \) _____________

2. Solve.
   a. \( \frac{3}{5} - \frac{2}{5} = \) _____________
   b. \( \frac{7}{9} - \frac{3}{9} = \) _____________
   c. \( \frac{7}{12} - \frac{3}{12} = \) _____________
   d. \( \frac{6}{6} - \frac{4}{6} = \) _____________
   e. \( \frac{5}{3} - \frac{2}{3} = \) _____________
   f. \( \frac{7}{4} - \frac{5}{4} = \) _____________

3. Solve. Use a number bond to decompose the difference. Record your final answer as a mixed number. Problem (a) has been completed for you.
   a. \( \frac{12}{6} - \frac{3}{6} = \frac{9}{6} = \frac{3}{6} \) = \( 1 \frac{3}{6} \)
   b. \( \frac{17}{8} - \frac{6}{8} = \frac{11}{8} \)
   c. \( \frac{9}{5} - \frac{3}{5} = \frac{6}{5} \)
   d. \( \frac{11}{4} - \frac{6}{4} = \frac{5}{4} \)
   e. \( \frac{10}{7} - \frac{2}{7} = \frac{8}{7} \)
   f. \( \frac{21}{10} - \frac{9}{10} = \frac{12}{10} \)
4. Solve. Write the sum in unit form.
   a. 4 fifths + 2 fifths = ____________
   b. 5 eighths + 2 eighths = ____________

5. Solve.
   a. \( \frac{3}{11} + \frac{6}{11} \)
   b. \( \frac{3}{10} + \frac{6}{10} \)

6. Solve. Use a number bond to decompose the sum. Record your final answer as a mixed number.
   a. \( \frac{3}{4} + \frac{3}{4} \)
   b. \( \frac{8}{12} + \frac{6}{12} \)
   c. \( \frac{5}{8} + \frac{7}{8} \)
   d. \( \frac{8}{10} + \frac{5}{10} \)
   e. \( \frac{3}{5} + \frac{6}{5} \)
   f. \( \frac{4}{3} + \frac{2}{3} \)

7. Solve. Use a number line to model your answer.
   a. \( \frac{11}{9} - \frac{5}{9} \)
   b. \( \frac{13}{12} + \frac{4}{12} \)
Lesson 17: Use visual models to add and subtract two fractions with the same units.

blank number lines
Name ________________________________ Date ____________________

1. Use the following three fractions to write two subtraction and two addition number sentences.

   a. \( \frac{8}{5}, \frac{2}{5}, \frac{10}{5} \)   
   b. \( \frac{15}{8}, \frac{7}{8}, \frac{5}{8} \)   

2. Solve. Model each subtraction problem with a number line, and solve by both counting up and subtracting. Part (a) has been completed for you.

   a. \( 1 - \frac{3}{4} \)  
   b. \( 1 - \frac{8}{10} \)  
   \[ \frac{4}{4} - \frac{3}{4} = \frac{1}{4} \]  
   \[ \frac{6}{4} \quad \frac{1}{4} \quad \frac{2}{4} \quad \frac{3}{4} \quad \frac{4}{4} \]  

   c. \( 1 - \frac{3}{5} \)  
   d. \( 1 - \frac{5}{8} \)  

   e. \( 1\frac{2}{10} - \frac{7}{10} \)  
   f. \( 1\frac{1}{5} - \frac{3}{5} \)
3. Find the difference in two ways. Use number bonds to decompose the total. Part (a) has been completed for you.

a. \[ \begin{align*}
\frac{2}{5} - \frac{4}{5} &= \frac{5}{5} + \frac{2}{5} - \frac{4}{5} = \frac{3}{5} \\
\frac{5}{5} &= \frac{5}{5} = \frac{1}{5}
\end{align*} \]

b. \[ \begin{align*}
1\frac{3}{6} - \frac{4}{6}
\end{align*} \]

c. \[ \begin{align*}
1\frac{6}{6} - \frac{7}{8}
\end{align*} \]

d. \[ \begin{align*}
1\frac{1}{10} - \frac{7}{10}
\end{align*} \]

e. \[ \begin{align*}
1\frac{3}{12} - \frac{6}{12}
\end{align*} \]
1. Solve. Model the problem with a number line, and solve by both counting up and subtracting.
   \[ 1 - \frac{2}{5} \]

2. Find the difference in two ways. Use a number bond to show the decomposition.
   \[ 1 \frac{2}{7} - \frac{5}{7} \]
1. Use the following three fractions to write two subtraction and two addition number sentences.

   a. \( \frac{5}{6}, \frac{4}{6}, \frac{9}{6} \)  
   b. \( \frac{5}{9}, \frac{13}{9}, \frac{8}{9} \)

2. Solve. Model each subtraction problem with a number line, and solve by both counting up and subtracting.

   a. \( 1 - \frac{5}{8} \)  
   b. \( 1 - \frac{2}{5} \)

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

   e. \( 1\frac{1}{3} - \frac{2}{3} \)  
   f. \( 1\frac{4}{5} - \frac{2}{5} \)
3. Find the difference in two ways. Use number bonds to decompose the total. Part (a) has been completed for you.

a. \( \frac{12}{5} - \frac{4}{5} \)

\[
\begin{array}{c}
5 \\
5 \\
\hline
5 \\
\end{array}
\]

\[
\begin{array}{c}
2 \\
5 \\
\hline
2 \\
\end{array}
\]

\[
\begin{array}{c}
5 + 2 = 7 \\
\hline
5 \\
\end{array}
\]

\[
\begin{array}{c}
7 - 4 = 3 \\
\hline
5 \\
\end{array}
\]

\[
\begin{array}{c}
5 - 5 = 0 \\
\hline
5 \\
\end{array}
\]

\[
\begin{array}{c}
1 + 2 = 3 \\
\hline
5 \\
\end{array}
\]

\[
\begin{array}{c}
1 - 0 = 1 \\
\hline
5 \\
\end{array}
\]

b. \( 1 \frac{3}{6} - \frac{7}{8} \)

c. \( 1 \frac{1}{4} - \frac{3}{4} \)

d. \( 1 \frac{2}{7} - \frac{5}{7} \)

e. \( 1 \frac{3}{10} - \frac{7}{10} \)
<table>
<thead>
<tr>
<th>Problem A:</th>
<th>( \frac{1}{8} + \frac{3}{8} + \frac{4}{8} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem B:</td>
<td>( \frac{1}{6} + \frac{4}{6} + \frac{2}{6} )</td>
</tr>
<tr>
<td>Problem C:</td>
<td>( \frac{11}{10} - \frac{4}{10} - \frac{1}{10} )</td>
</tr>
</tbody>
</table>

**Adding and Subtracting Fractions**

**Lesson 19:** Given more than two fractions, the student will correctly add and subtract using a preferred strategy.
Adding and subtracting fractions

Lesson 19: Given more than two fractions, the student will correctly add and subtract using a preferred strategy.

Problem D: \[ 1 - \frac{3}{12} - \frac{5}{12} \]

Problem E: \[ \frac{5}{8} + \frac{4}{9} + \frac{1}{8} \]

Problem F: \[ 1\frac{1}{5} - \frac{2}{5} - \frac{3}{5} \]
1. Show one way to solve each problem. Express sums and differences as a mixed number when possible. Use number bonds when it helps you. Part (a) is partially completed.

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>a. (\frac{2}{5} + \frac{3}{5} + \frac{1}{5}) &amp; b. (\frac{3}{6} + \frac{1}{6} + \frac{3}{6}) &amp; c. (\frac{5}{7} + \frac{7}{7} + \frac{2}{7})</td>
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<tr>
<td>(\frac{5}{5} + \frac{1}{5} = 1 + \frac{1}{5}) &amp;  &amp;</td>
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<td>&amp;  &amp;</td>
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<tr>
<td>d. (\frac{7}{8} - \frac{3}{8} - \frac{1}{8}) &amp; e. (\frac{7}{9} + \frac{1}{9} + \frac{4}{9}) &amp; f. (\frac{4}{10} + \frac{11}{10} + \frac{5}{10})</td>
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<td>&amp;  &amp;</td>
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<tr>
<td>g. (1 - \frac{3}{12} - \frac{4}{12}) &amp; h. (1 \frac{2}{3} - \frac{1}{3} - \frac{1}{3}) &amp; i. (\frac{10}{12} + \frac{5}{12} + \frac{2}{12} + \frac{7}{12})</td>
<td></td>
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</tbody>
</table>
2. Monica and Stuart used different strategies to solve $\frac{5}{8} + \frac{2}{8} + \frac{5}{8}$.

- Monica's Way

\[
\frac{5}{8} + \frac{2}{8} + \frac{5}{8} = \frac{5}{8} + \frac{5}{8} + \frac{8}{8} = 1 + \frac{4}{8} = 1 + \frac{1}{2} = \frac{3}{2}
\]

- Stuart's Way

\[
\frac{5}{8} + \frac{2}{8} + \frac{5}{8} = \frac{12}{8} = \frac{3}{2}
\]

Whose strategy do you like best? Why?

3. You gave one solution for each part of Problem 1. Now, for each problem indicated below, give a different solution method.

1(c) \[\frac{5}{7} + \frac{7}{7} + \frac{2}{7}\]

1(f) \[\frac{4}{10} + \frac{11}{10} + \frac{5}{10}\]

1(g) \[1 - \frac{3}{12} - \frac{4}{12}\]
Solve the following problems. Use number bonds to help you.

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

2. \( 1 - \frac{5}{8} - \frac{1}{8} \)
1. Show one way to solve each problem. Express sums and differences as a mixed number when possible. Use number bonds when it helps you. Part (a) is partially completed.

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>a. (\frac{1}{3} + \frac{2}{3} + \frac{1}{3})</td>
<td>b. (\frac{5}{8} + \frac{5}{8} + \frac{3}{8})</td>
<td>c. (\frac{4}{6} + \frac{6}{6} + \frac{1}{6})</td>
</tr>
<tr>
<td>(= \frac{3}{3} + \frac{1}{3} = 1 + \frac{1}{3})</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>d. (1\frac{2}{12} - \frac{2}{12} - \frac{1}{12})</td>
<td>e. (\frac{5}{7} + \frac{1}{7} + \frac{4}{7})</td>
<td>f. (\frac{4}{10} + \frac{7}{10} + \frac{9}{10})</td>
</tr>
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<tr>
<td>g. (1 - \frac{3}{10} - \frac{1}{10})</td>
<td>h. (1\frac{3}{5} - \frac{4}{5} - \frac{1}{5})</td>
<td>i. (\frac{16}{15} + \frac{7}{15} + \frac{12}{15} + \frac{1}{15})</td>
</tr>
</tbody>
</table>
2. Bonnie used two different strategies to solve $\frac{5}{10} + \frac{4}{10} + \frac{3}{10}$.

   **Bonnie's First Strategy**

   \[
   \frac{5}{10} + \frac{4}{10} + \frac{3}{10} = \frac{9}{10} + \frac{3}{10} = \frac{10}{10} + \frac{2}{10} = 1 \frac{2}{10}
   \]

   \[
   \frac{1}{10} \quad \frac{2}{10}
   \]

   **Bonnie's Second Strategy**

   \[
   \frac{5}{10} + \frac{4}{10} + \frac{3}{10} = \frac{12}{10} = 1 \frac{2}{10}
   \]

   \[
   \frac{10}{10} \quad \frac{2}{10}
   \]

Which strategy do you like best? Why?

3. You gave one solution for each part of Problem 1. Now, for each problem indicated below, give a different solution method.

1(b) \( \frac{5}{8} + \frac{5}{8} + \frac{3}{8} \)

1(e) \( \frac{5}{7} + \frac{1}{7} + \frac{4}{7} \)

1(h) \( \frac{3}{5} - \frac{4}{5} - \frac{1}{5} \)
Use the RDW process to solve.

1. Sue ran \( \frac{9}{10} \) mile on Monday and \( \frac{7}{10} \) mile on Tuesday. How many miles did Sue run in the 2 days?

2. Mr. Salazar cut his son's birthday cake into 8 equal pieces. Mr. Salazar, Mrs. Salazar, and the birthday boy each ate 1 piece of cake. What fraction of the cake was left?

3. Maria spent \( \frac{4}{7} \) of her money on a book and saved the rest. What fraction of her money did Maria save?
4. Mrs. Jones had $1\frac{4}{8}$ pizzas left after a party. After giving some to Gary, she had $\frac{2}{8}$ pizza left. What fraction of a pizza did she give Gary?

5. A baker had 2 pans of corn bread. He served $1\frac{1}{4}$ pans. What fraction of a pan was left?

6. Marius combined $\frac{4}{8}$ gallon of lemonade, $\frac{3}{8}$ gallon of cranberry juice, and $\frac{6}{8}$ gallon of soda water to make punch for a party. How many gallons of punch did he make in all?
Name ____________________________ Date ______________

Use the RDW process to solve.

1. Mrs. Smith took her bird to the vet. Tweety weighed $1 \frac{3}{10}$ pounds. The vet said that Tweety weighed $\frac{4}{10}$ pound more last year. How much did Tweety weigh last year?

2. Hudson picked $1 \frac{1}{4}$ baskets of apples. Suzy picked 2 baskets of apples. How many more baskets of apples did Suzy pick than Hudson?
Use the RDW process to solve.

1. Isla walked $\frac{3}{4}$ mile each way to and from school on Wednesday. How many miles did Isla walk that day?

2. Zach spent $\frac{1}{3}$ hour reading on Friday and $1 \frac{2}{3}$ hours reading on Saturday. How much more time did he read on Saturday than on Friday?

3. Mrs. Cashmore bought a large melon. She cut a piece that weighed $1 \frac{1}{8}$ pounds and gave it to her neighbor. The remaining piece of melon weighed $\frac{6}{8}$ pound. How much did the whole melon weigh?
4. Ally's little sister wanted to help her make some oatmeal cookies. First, she put $\frac{5}{6}$ cup of oatmeal in the bowl. Next, she added another $\frac{5}{8}$ cup of oatmeal. Finally, she added another $\frac{5}{8}$ cup of oatmeal. How much oatmeal did she put in the bowl?

5. Marcia baked 2 pans of brownies. Her family ate $1 \frac{5}{6}$ pans. What fraction of a pan of brownies was left?

6. Joanie wrote a letter that was $1 \frac{3}{4}$ pages long. Katie wrote a letter that was $\frac{1}{4}$ page shorter than Joanie's letter. How long was Katie's letter?
1. Use a tape diagram to represent each addend. Decompose one of the tape diagrams to make like units. Then, write the complete number sentence. Part (a) is partially completed.

   a. \[ \frac{1}{4} + \frac{1}{8} \]

   b. \[ \frac{1}{4} + \frac{1}{12} \]

   \[
   \frac{1}{4} \quad \frac{1}{8}
   \]

   \[
   \frac{1}{4} \quad \frac{1}{12}
   \]

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

   c. \[ \frac{2}{6} + \frac{1}{3} \]

   d. \[ \frac{1}{2} + \frac{3}{8} \]

   e. \[ \frac{3}{10} + \frac{3}{5} \]

   f. \[ \frac{2}{3} + \frac{2}{9} \]
2. Estimate to determine if the sum is between 0 and 1 or 1 and 2. Draw a number line to model the addition. Then, write a complete number sentence. Part (a) has been completed for you.

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

b. \( \frac{1}{2} + \frac{4}{10} \)

c. \( \frac{6}{10} + \frac{1}{2} \)

d. \( \frac{2}{3} + \frac{3}{6} \)

e. \( \frac{3}{4} + \frac{6}{8} \)

f. \( \frac{4}{10} + \frac{6}{5} \)

3. Solve the following addition problem without drawing a model. Show your work.

\[ \frac{2}{3} + \frac{4}{6} \]
1. Draw a number line to model the addition. Solve, and then write a complete number sentence.

\[
\frac{5}{8} + \frac{2}{4}
\]

2. Solve without drawing a model.

\[
\frac{3}{4} + \frac{1}{2}
\]
1. Use a tape diagram to represent each addend. Decompose one of the tape diagrams to make like units. Then, write the complete number sentence.

   a. \( \frac{1}{3} + \frac{1}{6} \)

   b. \( \frac{1}{2} + \frac{1}{4} \)

   c. \( \frac{3}{4} + \frac{1}{8} \)

   d. \( \frac{1}{4} + \frac{5}{12} \)

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

   f. \( \frac{3}{5} + \frac{3}{10} \)
2. Estimate to determine if the sum is between 0 and 1 or 1 and 2. Draw a number line to model the addition. Then, write a complete number sentence. The first one has been completed for you.

   a. \[\frac{1}{3} + \frac{1}{6} = \frac{2}{6} + \frac{1}{6} = \frac{3}{6}\]

   b. \[\frac{3}{5} + \frac{7}{10}\]

   c. \[\frac{5}{12} + \frac{1}{4}\]

   d. \[\frac{3}{4} + \frac{5}{8}\]

   e. \[\frac{7}{8} + \frac{3}{4}\]

   f. \[\frac{1}{6} + \frac{5}{3}\]

3. Solve the following addition problem without drawing a model. Show your work.

   \[\frac{5}{6} + \frac{1}{3}\]
1. Draw a tape diagram to represent each addend. Decompose one of the tape diagrams to make like units. Then, write a complete number sentence. Use a number bond to write each sum as a mixed number.

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

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

   c. $\frac{5}{6} - \frac{1}{3}

   d. $\frac{4}{5} - \frac{7}{10}

2. Draw a number line to model the addition. Then, write a complete number sentence. Use a number bond to write each sum as a mixed number.

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

   b. $\frac{1}{2} + \frac{6}{8}$
3. Solve. Write the sum as a mixed number. Draw a model if needed.

a. \( \frac{3}{4} - \frac{2}{8} \)

b. \( \frac{4}{6} - \frac{1}{2} \)

c. \( \frac{4}{6} + \frac{2}{3} \)

d. \( \frac{8}{10} + \frac{3}{5} \)

e. \( \frac{5}{8} + \frac{3}{4} \)

f. \( \frac{5}{8} - \frac{2}{4} \)

g. \( \frac{1}{2} + \frac{5}{8} \)

h. \( \frac{3}{10} + \frac{4}{5} \)
Solve. Write a complete number sentence. Use a number bond to write each sum as a mixed number. Use a model if needed.

1. \( \frac{1}{4} + \frac{7}{9} \)

2. \( \frac{2}{3} - \frac{7}{12} \)
1. Draw a tape diagram to represent each addend. Decompose one of the tape diagrams to make like units. Then, write a complete number sentence. Use a number bond to write each sum as a mixed number.

   a. \( \frac{7}{8} - \frac{1}{4} \)
   b. \( \frac{4}{8} + \frac{2}{4} \)
   c. \( \frac{4}{6} - \frac{1}{2} \)
   d. \( \frac{3}{5} + \frac{8}{10} \)

2. Draw a number line to model the addition. Then, write a complete number sentence. Use a number bond to write each sum as a mixed number.

   a. \( \frac{1}{2} + \frac{5}{8} \)
   b. \( \frac{3}{4} - \frac{3}{8} \)
3. Solve. Write the sum as a mixed number. Draw a model if needed.

a. \( \frac{1}{2} + \frac{6}{8} \)

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

c. \( \frac{5}{6} + \frac{1}{3} \)

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

e. \( \frac{4}{12} + \frac{3}{4} \)

f. \( \frac{1}{2} + \frac{5}{6} \)

g. \( \frac{3}{12} + \frac{5}{6} \)

h. \( \frac{7}{10} + \frac{4}{5} \)
1. Draw a tape diagram to match each number sentence. Then, complete the number sentence.
   
   a. $3 + \frac{1}{3} = \underline{\phantom{1}}$
   
   b. $4 + \frac{3}{4} = \underline{\phantom{1}}$

   c. $3 - \frac{1}{4} = \underline{\phantom{1}}$
   
   d. $5 - \frac{2}{5} = \underline{\phantom{1}}$

2. Use the following three numbers to write two subtraction and two addition number sentences.
   
   a. $6, 6\frac{3}{8}, \frac{3}{8}$
   
   b. $\frac{4}{7}, 9, 8\frac{3}{7}$

3. Solve using a number bond. Draw a number line to represent each number sentence. The first one has been done for you.
   
   a. $4 - \frac{1}{3} = \underline{3\frac{2}{3}}$
   
   b. $5 - \frac{2}{3} = \underline{\phantom{1}}$

   \[\text{Number bond:} \quad 4 - \frac{1}{3} = 3\frac{2}{3}\]

   \[\text{Number line:} \quad 3 \quad 3\frac{1}{3} \quad 3\frac{2}{3} \quad 4\]
c. \(7 - \frac{3}{8} = \) 

d. \(10 - \frac{4}{10} = \) 

4. Complete the subtraction sentences using number bonds.

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

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

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

d. \(7 - \frac{3}{9} = \) 

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

f. \(29 - \frac{9}{12} = \)
Complete the addition and subtraction sentences using number bonds. Draw a model if needed.

1. \(6 + \frac{1}{5} = \) ______

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

3. \(7 - \frac{5}{8} = \) ______
1. Draw a tape diagram to match each number sentence. Then, complete the number sentence.

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

   b. \(3 + \frac{2}{3} = \) ______

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

   d. \(3 - \frac{3}{4} = \) ______

2. Use the following three numbers to write two subtraction and two addition number sentences.

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

   b. \(\frac{2}{7}, \frac{5}{7}, 6\)

3. Solve using a number bond. Draw a number line to represent each number sentence. The first one has been done for you.

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

   b. \(8 - \frac{5}{6} = \) ______

   \[\text{Number bond:} \quad \frac{4}{3} - \frac{1}{3} = \frac{2}{3}\]

   \[\text{Number line:} \quad 3 \quad \frac{2}{3} \quad \frac{3}{2} \quad 4\]
c. \( 7 - \frac{4}{5} = \) 

\[ \frac{31}{5} \]

d. \( 3 - \frac{3}{10} = \) 

\[ \frac{27}{10} \]

4. Complete the subtraction sentences using number bonds.

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

\[ \frac{11}{4} \]

b. \( 7 - \frac{2}{10} = \) 

\[ \frac{47}{10} \]

c. \( 5 - \frac{5}{6} = \) 

\[ \frac{19}{6} \]

d. \( 6 - \frac{6}{8} = \) 

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

e. \( 3 - \frac{7}{8} = \) 

\[ \frac{17}{8} \]

f. \( 26 - \frac{7}{10} = \) 

\[ \frac{253}{10} \]
1. Convert each mixed number to a fraction greater than 1. Draw a number line to model your work.

   a. \( 3 \frac{1}{4} \)
      \[
      3 \frac{1}{4} = 3 + \frac{1}{4} = \frac{12}{4} + \frac{1}{4} = \frac{13}{4}
      \]

   b. \( 2 \frac{4}{5} \)

   c. \( 3 \frac{5}{8} \)

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

   e. \( 4 \frac{7}{9} \)
2. Convert each mixed number to a fraction greater than 1. Show your work as in the example.
   
   (Note: $3 \times \frac{4}{4} = \frac{3 \times 4}{4}$)

   a. $3 \frac{3}{4}$
      
      $3\frac{3}{4} = 3 + \frac{3}{4} = \left(3 \times \frac{4}{4}\right) + \frac{3}{4} = \frac{12}{4} + \frac{3}{4} = \frac{15}{4}$

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

   c. $4 \frac{3}{5}$

   d. $4 \frac{6}{8}$
3. Convert each mixed number to a fraction greater than 1.

<table>
<thead>
<tr>
<th>a. $2 \frac{3}{4}$</th>
<th>b. $2 \frac{2}{5}$</th>
<th>c. $3 \frac{3}{6}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. $3 \frac{3}{8}$</td>
<td>e. $3 \frac{1}{10}$</td>
<td>f. $4 \frac{3}{8}$</td>
</tr>
<tr>
<td>g. $5 \frac{2}{3}$</td>
<td>h. $6 \frac{1}{2}$</td>
<td>i. $7 \frac{3}{10}$</td>
</tr>
</tbody>
</table>
Convert each mixed number to a fraction greater than 1.

1. \(3\frac{1}{5}\)

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

3. \(4\frac{2}{8}\)
1. Convert each mixed number to a fraction greater than 1. Draw a number line to model your work.

a. \(3 \frac{1}{4}\)

\[\frac{12}{4} + \frac{1}{4} = \frac{13}{4}\]

b. \(4 \frac{2}{5}\)

c. \(5 \frac{3}{8}\)

d. \(3 \frac{7}{16}\)

e. \(6 \frac{2}{3}\)
2. Convert each mixed number to a fraction greater than 1. Show your work as in the example.

(Note: \(3 \times \frac{4}{4} = \frac{3 \times 4}{4}\))

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

\[
3\frac{3}{4} = 3 + \frac{3}{4} = \left(3 \times \frac{4}{4}\right) + \frac{3}{4} = \frac{12}{4} + \frac{3}{4} = \frac{15}{4}
\]

b. \(5\frac{2}{3}\)

c. \(4\frac{1}{5}\)

d. \(3\frac{7}{8}\)

3. Convert each mixed number to a fraction greater than 1.

<table>
<thead>
<tr>
<th>a. (2\frac{1}{3})</th>
<th>b. (2\frac{3}{4})</th>
<th>c. (3\frac{2}{6})</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. (3\frac{1}{6})</td>
<td>e. (4\frac{5}{12})</td>
<td>f. (4\frac{2}{8})</td>
</tr>
<tr>
<td>g. (4\frac{1}{10})</td>
<td>h. (5\frac{1}{3})</td>
<td>i. (5\frac{5}{6})</td>
</tr>
<tr>
<td>j. (6\frac{1}{4})</td>
<td>k. (7\frac{1}{2})</td>
<td>l. (7\frac{11}{12})</td>
</tr>
</tbody>
</table>
Name ___________________________ Date ______________

1. a. Plot the following points on the number line without measuring. List the fractions in order from least to greatest.
   
   i. \( \frac{7}{8} \)
   
   ii. \( 3 \frac{1}{6} \)
   
   iii. \( \frac{29}{12} \)

   
   [Number line with points plotted]

   2. b. Use the number line in Problem 1(a) to compare the fractions by writing \( >, <, \) or \( = \).

   i. \( \frac{29}{12} \) \( > \) \( \frac{7}{8} \)

   ii. \( \frac{29}{12} \) \( < \) \( 3 \frac{1}{6} \)

2. a. Plot the following points on the number line without measuring. List the fractions in order from greatest to least.

   i. \( \frac{70}{9} \)

   ii. \( 8 \frac{2}{3} \)

   iii. \( \frac{25}{3} \)

   
   [Number line with points plotted]

   b. Compare the following by writing \( >, <, \) or \( = \).

   i. \( 8 \frac{2}{3} \) \( = \) \( \frac{25}{3} \)

   ii. \( \frac{70}{9} \) \( > \) \( 8 \frac{2}{3} \)

   c. Explain how you plotted the points in Problem 2(a).
3. Compare the fractions given below by writing $>$, $<$, or $=$. Give a brief explanation for each answer, referring to benchmark fractions.

a. $\frac{5}{3}$ ______ $\frac{3}{4}$

b. $\frac{12}{6}$ ______ $\frac{25}{12}$

c. $\frac{18}{7}$ ______ $\frac{17}{5}$

d. $\frac{5}{2}$ ______ $\frac{5}{8}$

e. $\frac{6}{3}$ ______ $\frac{6}{7}$

f. $\frac{31}{7}$ ______ $\frac{32}{8}$

g. $\frac{31}{10}$ ______ $\frac{25}{8}$

h. $\frac{39}{12}$ ______ $\frac{19}{6}$

i. $\frac{49}{50}$ ______ $\frac{90}{100}$

j. $\frac{5}{12}$ ______ $\frac{51}{100}$
Compare the fractions given below by writing $>$, $<$, or $=$.

Give a brief explanation for each answer, referring to benchmark fractions.

1. $\frac{3}{3} \underline{\hspace{1cm}} \frac{4}{6}$

2. $\frac{12}{3} \underline{\hspace{1cm}} \frac{27}{7}$

3. $\frac{10}{6} \underline{\hspace{1cm}} \frac{5}{4}$

4. $\frac{3}{5} \underline{\hspace{1cm}} \frac{3}{10}$
Lesson 27 Homework

Name ___________________________________________ Date ____________________

1. a. Plot the following points on the number line without measuring. List the fractions in order from least to greatest.
   i. \( \frac{5}{6} \)  
   ii. \( \frac{3}{4} \)  
   iii. \( \frac{33}{9} \)

   \[ \begin{array}{ccc}
   & 2 & \quad 3 & \quad 4 \\
   \end{array} \]

   b. Use the number line in Problem 1(a) to compare the fractions by writing >, <, or =.
   i. \( \frac{33}{9} \) ___________ \( 2 \frac{1}{6} \)  
   ii. \( \frac{33}{9} \) ___________ \( 3 \frac{3}{4} \)

2. a. Plot the following points on the number line without measuring. List the fractions in order from greatest to least.
   i. \( \frac{65}{8} \)  
   ii. \( \frac{8}{6} \)  
   iii. \( \frac{29}{4} \)

   \[ \begin{array}{ccc}
   & 7 & \quad 8 & \quad 9 \\
   \end{array} \]

   b. Compare the following by writing >, <, or =.
   i. \( \frac{8}{6} \) ___________ \( \frac{65}{8} \)  
   ii. \( \frac{29}{4} \) ___________ \( \frac{65}{8} \)

   c. Explain how you plotted the points in Problem 2(a).
3. Compare the fractions given below by writing $>$, $<$, or $=$. Give a brief explanation for each answer, referring to benchmark fractions.

a. $\frac{5 \frac{1}{3}}{3} \underline{} \frac{3}{4}$

b. $\frac{12}{4} \underline{} \frac{25}{8}$

c. $\frac{18}{6} \underline{} \frac{17}{4}$

d. $\frac{5 \frac{3}{5}}{5} \underline{} \frac{5}{10}$

e. $\frac{6 \frac{3}{4}}{4} \underline{} \frac{6 \frac{3}{5}}{5}$

f. $\frac{33}{6} \underline{} \frac{34}{7}$

g. $\frac{23}{10} \underline{} \frac{20}{8}$

h. $\frac{27}{12} \underline{} \frac{15}{6}$

i. $\frac{2 \frac{49}{50}}{50} \underline{} \frac{2 \frac{99}{100}}{100}$

j. $\frac{6 \frac{5}{9}}{9} \underline{} \frac{6 \frac{49}{100}}{100}$
Lesson 28 Practice Set

Name ___________________________ Date ____________________

1. Draw a tape diagram to model each comparison. Use >, <, or = to compare.
   a. $\frac{3}{2}$ ______ $\frac{5}{6}$
   b. $\frac{3}{5}$ ______ $\frac{6}{10}$

Order the 4 fractions from 1a and 1b from least to greatest.
   c. $\frac{3}{6}$ ______ $\frac{4}{3}$
   d. $\frac{5}{8}$ ______ $\frac{19}{4}$

Order the 4 fractions from 1c and 1d from greatest to least.

2. Use an area model to make like units. Then, use >, <, or = to compare.
   a. $\frac{2}{5}$ ______ $\frac{18}{7}$
   b. $\frac{3}{8}$ ______ $\frac{1}{3}$

Order the 4 fractions from 2a and 2b from least to greatest.

3. Compare each pair of fractions using >, <, or = using any strategy.
   a. $\frac{3}{4}$ ______ $\frac{3}{8}$
   b. $\frac{2}{5}$ ______ $\frac{8}{10}$

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EUREKA MATH™ Lesson 28: The student will compare and order fractions greater than 1 by creating common numerators or denominators.
c. \[\frac{56}{10} \quad \frac{27}{5}\]
d. \[\frac{52}{3} \quad \frac{7}{9}\]
e. \[\frac{7}{2} \quad \frac{7}{3}\]
f. \[\frac{12}{3} \quad \frac{15}{4}\]
g. \[\frac{22}{5} \quad \frac{42}{7}\]
h. \[\frac{21}{4} \quad \frac{52}{5}\]
i. \[\frac{29}{8} \quad \frac{11}{3}\]
j. \[\frac{33}{4} \quad \frac{34}{7}\]
Name ___________________________ Date ______________

Compare each pair of fractions using >, <, or = using any strategy.

1. $\frac{43}{8} _____ \frac{4}{14}$

2. $\frac{34}{5} _____ \frac{39}{10}$

Order the 4 fractions from 1 and 2 from least to greatest.

3. $\frac{21}{3} _____ \frac{22}{5}$

4. $\frac{102}{5} _____ \frac{103}{4}$

Order the 4 fractions from 3 and 4 from greatest to least.
1. Draw a tape diagram to model each comparison. Use >, <, or = to compare.
   
   a. \( \frac{3}{4} \) \( \underline{\quad} \) \( \frac{7}{8} \)  
   b. \( \frac{2}{6} \) \( \underline{\quad} \) \( \frac{1}{3} \)

Order the 4 fractions from 1a and 1b from least to greatest.

   c. \( \frac{3}{8} \) \( \underline{\quad} \) \( \frac{1}{4} \)  
   d. \( \frac{5}{9} \) \( \underline{\quad} \) \( \frac{21}{3} \)

Order the 4 fractions from 1c and 1d from greatest to least.

2. Use an area model to make like units. Then, use >, <, or = to compare.

   a. \( \frac{4}{5} \) \( \underline{\quad} \) \( \frac{11}{4} \)  
   b. \( \frac{3}{5} \) \( \underline{\quad} \) \( \frac{2}{3} \)

Order the 4 fractions from 2a and 2b from greatest to least.
3. Compare each pair of fractions using >, <, or = using any strategy.

   a. $\frac{6}{2}$ _______ $\frac{3}{8}$
   b. $\frac{7}{6}$ _______ $\frac{11}{12}$

   c. $\frac{3}{10}$ _______ $\frac{2}{5}$
   d. $\frac{2}{3}$ _______ $\frac{8}{12}$

   e. $\frac{10}{3}$ _______ $\frac{10}{4}$
   f. $\frac{12}{4}$ _______ $\frac{10}{3}$

   g. $\frac{38}{9}$ _______ $\frac{4}{12}$
   h. $\frac{23}{4}$ _______ $\frac{5}{3}$

   i. $\frac{30}{8}$ _______ $\frac{7}{12}$
   j. $\frac{3}{4}$ _______ $\frac{10}{6}$
1. Solve.
   a. \( \frac{3}{4} + \frac{1}{4} \)  
   b. \( \frac{3}{4} + \frac{1}{4} \)  
   c. \( \frac{3}{8} + \frac{5}{8} \)  
   d. \( \frac{1}{8} + \frac{6}{8} \)  

2. Complete the number sentences.
   a. \( 4\frac{7}{8} + \_ = 5 \)  
   b. \( 7\frac{2}{5} + \_ = 8 \)  
   c. \( 3 = 2\frac{1}{6} + \_ \)  
   d. \( 12 = 11\frac{1}{12} + \_ \)  

3. Use a number bond and the arrow way to show how to make one. Solve.
   a. \( 2\frac{3}{4} + \frac{2}{4} \)  
   b. \( 3\frac{3}{5} + \frac{3}{5} \)  

The students will add a mixed number and a fraction.
4. Solve.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>(4 \frac{2}{3} + \frac{2}{3})</td>
<td>b.</td>
<td>(3 \frac{3}{5} + \frac{4}{5})</td>
</tr>
<tr>
<td>c.</td>
<td>(5 \frac{4}{6} + \frac{5}{6})</td>
<td>d.</td>
<td>(\frac{7}{8} + 6 \frac{4}{8})</td>
</tr>
<tr>
<td>e.</td>
<td>(\frac{7}{10} + 7 \frac{9}{10})</td>
<td>f.</td>
<td>(9 \frac{7}{12} + \frac{11}{12})</td>
</tr>
<tr>
<td>g.</td>
<td>(2 \frac{70}{100} + \frac{87}{100})</td>
<td>h.</td>
<td>(\frac{50}{100} + 16 \frac{78}{100})</td>
</tr>
</tbody>
</table>
5. To solve $\frac{9}{10} + \frac{5}{10}$, Maria thought, "$\frac{9}{10} + \frac{1}{10} = 8 + \frac{4}{10} = 8\frac{4}{10}$".

Paul thought, "$\frac{9}{10} + \frac{5}{10} = \frac{14}{10} = 7 + \frac{4}{10} = 7\frac{4}{10}$." Explain why Maria and Paul are both right.
Name ___________________________  Date ___________________

Solve.

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

2. $2\frac{3}{8} + \frac{7}{8}$
Name ________________________________  Date __________________

1. Solve.
   a. $4\frac{1}{3} + \frac{1}{3}$  b. $5\frac{1}{2} + \frac{2}{4}$
   c. $\frac{2}{6} + 3\frac{4}{6}$  d. $\frac{5}{8} + 7\frac{3}{8}$

2. Complete the number sentences.
   a. $3\frac{5}{9} + \_ = 4$
   b. $5\frac{3}{7} + \_ = 6$
   c. $5 = 4\frac{1}{8} + \_$
   d. $15 = 14\frac{4}{12} + \_ $

3. Draw a number bond and the arrow way to show how to make one. Solve.
   a. $\frac{24}{5} + \frac{2}{5}$
   b. $3\frac{2}{3} + \frac{2}{3}$
   c. $4\frac{4}{6} + \frac{5}{6}$

\[2\frac{4}{5} \rightarrow \frac{4}{5} \rightarrow 3\frac{1}{5}\]
4. Solve.

<table>
<thead>
<tr>
<th>a. [\dfrac{2\frac{3}{5}}{5} + \dfrac{3}{5}]</th>
<th>b. [\dfrac{3\frac{6}{8}}{8} + \dfrac{4}{8}]</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. [\dfrac{5\frac{4}{6}}{6} + \dfrac{3}{6}]</td>
<td>d. [\dfrac{7\frac{6}{10}}{10} + \dfrac{6}{10}]</td>
</tr>
<tr>
<td>e. [\dfrac{5}{10} + \dfrac{8\frac{9}{10}}{10}]</td>
<td>f. [\dfrac{7\frac{8}{12}}{12} + \dfrac{11}{12}]</td>
</tr>
<tr>
<td>g. [\dfrac{3\frac{90}{100}}{100} + \dfrac{58}{100}]</td>
<td>h. [\dfrac{60}{100} + \dfrac{14\frac{79}{100}}{100}]</td>
</tr>
</tbody>
</table>
5. To solve $4 \frac{8}{10} + \frac{3}{10}$, Carmen thought, "$4 \frac{8}{10} + \frac{2}{10} = 5$, and $\frac{1}{10}$ = $5 \frac{1}{10}$.”

Benny thought, "$4 \frac{8}{10} + \frac{3}{10} = 4 \frac{11}{10} = 4 + \frac{1}{10} + \frac{1}{10} = 5 \frac{1}{10}$.” Explain why Carmen and Benny are both right.
1. Estimate each sum or difference to the nearest half or whole number by rounding. Explain your estimate using words or a number line.
   a. \(2 \frac{1}{12} + 1 \frac{7}{8} \approx \) ______
   b. \(1 \frac{11}{12} + 5 \frac{3}{4} \approx \) ______
   c. \(8 \frac{7}{8} - 2 \frac{1}{5} \approx \) ______
   d. \(6 \frac{1}{8} - 2 \frac{1}{12} \approx \) ______
   e. \(3 \frac{3}{8} + 5 \frac{1}{6} \approx \) ______
2. Estimate each sum or difference to the nearest half or whole number by rounding. Explain your estimate using words or a number line.

a. \( \frac{16}{5} + \frac{11}{4} = \) ________

b. \( \frac{17}{3} - \frac{15}{8} \approx \) ________

c. \( \frac{59}{10} + \frac{26}{10} = \) ________

3. Montoya's estimate for \( 8\frac{5}{8} - 2\frac{1}{3} \) was 7. Julio's estimate was \( 6\frac{1}{2} \). Whose estimate do you think is closer to the actual difference? Explain.

4. Use benchmark numbers or mental math to estimate the sum or difference.

<table>
<thead>
<tr>
<th>a. ( 14\frac{3}{4} + 29\frac{11}{12} )</th>
<th>b. ( 3\frac{5}{12} + 54\frac{5}{8} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. ( 17\frac{4}{6} - 8\frac{7}{12} )</td>
<td>d. ( \frac{65}{8} - \frac{37}{6} )</td>
</tr>
</tbody>
</table>
Name ____________________________ Date _________________

Estimate each sum or difference to the nearest half or whole number by rounding. Explain your estimate using words or a number line.

1. \(2 \frac{9}{10} + 2 \frac{1}{4} = \) ________

2. \(11 \frac{8}{10} - 3 \frac{3}{8} = \) ________
Name __________________________________________ Date ________________

1. Estimate each sum or difference to the nearest half or whole number by rounding. Explain your estimate using words or a number line.
   a. \( \frac{3}{10} + \frac{1}{4} \approx \) ________

   b. \( \frac{2}{10} + \frac{4}{5} \approx \) ________

   c. \( \frac{9}{10} - \frac{1}{5} \approx \) ________

   d. \( \frac{4}{8} - \frac{1}{10} \approx \) ________

   e. \( \frac{3}{12} + \frac{5}{8} \approx \) ________
2. Estimate each sum or difference to the nearest half or whole number by rounding. Explain your estimate using words or a number line.
   a. \( \frac{16}{3} + \frac{17}{8} = \) 
   b. \( \frac{17}{3} - \frac{15}{4} = \) 
   c. \( \frac{57}{8} + \frac{26}{8} = \)

3. Gina's estimate for \( 7\frac{5}{6} - 2\frac{1}{2} \) was 5. Dominick's estimate was 5 \( \frac{1}{2} \). Whose estimate do you think is closer to the actual difference? Explain.

4. Use benchmark numbers or mental math to estimate the sum or difference.

<table>
<thead>
<tr>
<th>a. ( 10\frac{3}{4} + 12\frac{11}{12} )</th>
<th>b. ( 2\frac{7}{10} + 23\frac{3}{8} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. ( 15\frac{9}{12} - 8\frac{11}{12} )</td>
<td>d. ( \frac{56}{6} - \frac{31}{8} )</td>
</tr>
</tbody>
</table>
1. Solve.
   a. \[ 3 \frac{1}{3} + 2 \frac{2}{3} = 5 + \frac{3}{3} = \]
      \[ \begin{array}{ccc} \frac{1}{3} & \frac{2}{3} \end{array} \]
   b. \[ 4 \frac{1}{4} + 3 \frac{2}{4} = \]
   c. \[ 2 \frac{2}{6} + 6 \frac{4}{6} = \]

2. Solve. Use a number line to show your work.
   a. \[ 2 \frac{4}{5} + 1 \frac{2}{5} = 3 + \frac{6}{5} = \]
      \[ \begin{array}{c} \frac{5}{5} \end{array} \]
   b. \[ 1 \frac{3}{4} + 3 \frac{3}{4} = \]
   c. \[ 3 \frac{7}{8} + 2 \frac{6}{8} = \]
3. Solve. Use the arrow way to show how to make one.
   a. \[ \frac{4}{6} + \frac{5}{6} = \frac{4}{6} + \frac{5}{6} = \]
      \[ \frac{2}{6} \quad \frac{3}{6} \]
   b. \[ 1\frac{3}{4} + 3\frac{3}{4} \]
   c. \[ 3\frac{3}{8} + 2\frac{6}{8} \]

   a. \[ 1\frac{3}{5} + 3\frac{4}{5} \]
   b. \[ 2\frac{6}{8} + 3\frac{7}{8} \]
   c. \[ 3\frac{8}{12} - 2\frac{7}{12} \]
Name ___________________________________________  Date ________________

Solve.

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

2. $3\frac{4}{5} - 2\frac{3}{5}$
Name ____________________________ Date ______________

1. Solve.
   a. \[2 \frac{1}{3} + 1 \frac{2}{3} = 3 + \frac{3}{3} = \]

   \[\begin{array}{c}
   2 \\
   \frac{1}{3} \\
   1 \\
   \frac{2}{3}
   \end{array}\]

   b. \[2 \frac{2}{5} + 2 \frac{2}{5}\]

   c. \[3 \frac{3}{8} + 1 \frac{5}{8}\]

2. Solve. Use a number line to show your work.
   a. \[2 \frac{2}{4} + 1 \frac{3}{4} = 3 + \frac{5}{4} = \]

   \[\begin{array}{c}
   4 \\
   4 \\
   1 \\
   \frac{4}{4}
   \end{array}\]

   b. \[3 \frac{4}{6} + 2 \frac{3}{6}\]

   c. \[1 \frac{9}{12} - 1 \frac{7}{12}\]
3. Solve. Use the arrow way to show how to make one.

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

\[\frac{1}{4} \quad \frac{2}{4} \quad 3\frac{3}{4} \quad + \frac{1}{4} \quad 4 \quad \rightarrow\]

b. \[5\frac{7}{8} - 3\frac{4}{8}\]

c. \[1\frac{7}{9} + 4\frac{5}{9}\]


a. \[1\frac{4}{5} + 1\frac{3}{5}\]

b. \[3\frac{8}{10} - 1\frac{5}{10}\]

c. \[2\frac{5}{7} + 3\frac{6}{7}\]
Name _________________________________ Date ________________

1. Find the sums.
   a. \( \frac{0}{3} + \frac{1}{3} + \frac{2}{3} + \frac{3}{3} \)
   b. \( \frac{0}{4} + \frac{1}{4} + \frac{2}{4} + \frac{3}{4} + \frac{4}{4} \)
   c. \( \frac{0}{5} + \frac{1}{5} + \frac{2}{5} + \frac{3}{5} + \frac{4}{5} + \frac{5}{5} \)
   d. \( \frac{0}{6} + \frac{1}{6} + \frac{2}{6} + \frac{3}{6} + \frac{4}{6} + \frac{5}{6} + \frac{6}{6} \)
   e. \( \frac{0}{7} + \frac{1}{7} + \frac{2}{7} + \frac{3}{7} + \frac{4}{7} + \frac{5}{7} + \frac{6}{7} + \frac{7}{7} \)
   f. \( \frac{0}{8} + \frac{1}{8} + \frac{2}{8} + \frac{3}{8} + \frac{4}{8} + \frac{5}{8} + \frac{6}{8} + \frac{7}{8} + \frac{8}{8} \)

2. Describe a pattern you notice when adding the sums of fractions with even denominators as opposed to those with odd denominators.

3. How would the sums change if the addition started with the unit fraction rather than with 0?
4. Find the sums.

   a. \( \frac{0}{10} + \frac{1}{10} + \frac{2}{10} + \cdots + \frac{10}{10} \)

   b. \( \frac{0}{12} + \frac{1}{12} + \frac{2}{12} + \cdots + \frac{12}{12} \)

   c. \( \frac{0}{15} + \frac{1}{15} + \frac{2}{15} + \cdots + \frac{15}{15} \)

   d. \( \frac{0}{25} + \frac{1}{25} + \frac{2}{25} + \cdots + \frac{25}{25} \)

   e. \( \frac{0}{50} + \frac{1}{50} + \frac{2}{50} + \cdots + \frac{50}{50} \)

   f. \( \frac{0}{100} + \frac{1}{100} + \frac{2}{100} + \cdots + \frac{100}{100} \)

5. Compare your strategy for finding the sums in Problems 4(d), 4(e), and 4(f) with a partner.

6. How can you apply this strategy to find the sum of all the whole numbers from 0 to 100?
Find the sums.

1. \( \frac{0}{20} + \frac{1}{20} + \frac{2}{20} + \cdots + \frac{20}{20} \)

2. \( \frac{0}{200} + \frac{1}{200} + \frac{2}{200} + \cdots + \frac{200}{200} \)
1. Find the sums.

   a. \( \frac{0}{5} + \frac{1}{5} + \frac{2}{5} + \frac{3}{5} + \frac{4}{5} + \frac{5}{5} \)

   b. \( \frac{0}{6} + \frac{1}{6} + \frac{2}{6} + \frac{3}{6} + \frac{4}{6} + \frac{5}{6} + \frac{6}{6} \)

   c. \( \frac{0}{7} + \frac{1}{7} + \frac{2}{7} + \frac{3}{7} + \frac{4}{7} + \frac{5}{7} + \frac{6}{7} + \frac{7}{7} \)

   d. \( \frac{0}{8} + \frac{1}{8} + \frac{2}{8} + \frac{3}{8} + \frac{4}{8} + \frac{5}{8} + \frac{6}{8} + \frac{7}{8} + \frac{8}{8} \)

   e. \( \frac{0}{9} + \frac{1}{9} + \frac{2}{9} + \frac{3}{9} + \frac{4}{9} + \frac{5}{9} + \frac{6}{9} + \frac{7}{9} + \frac{8}{9} + \frac{9}{9} \)

   f. \( \frac{0}{10} + \frac{1}{10} + \frac{2}{10} + \frac{3}{10} + \frac{4}{10} + \frac{5}{10} + \frac{6}{10} + \frac{7}{10} + \frac{8}{10} + \frac{9}{10} + \frac{10}{10} \)

2. Describe a pattern you notice when adding the sums of fractions with even denominators as opposed to those with odd denominators.

3. How would the sums change if the addition started with the unit fraction rather than with 0?
4. Find the sums.

\[ \begin{align*}
\text{a. } & \frac{0}{20} + \frac{1}{20} + \frac{2}{20} + \cdots + \frac{20}{20} \\
\text{b. } & \frac{0}{35} + \frac{1}{35} + \frac{2}{35} + \cdots + \frac{35}{35} \\
\text{c. } & \frac{0}{36} + \frac{1}{36} + \frac{2}{36} + \cdots + \frac{36}{36} \\
\text{d. } & \frac{0}{75} + \frac{1}{75} + \frac{2}{75} + \cdots + \frac{75}{75} \\
\text{e. } & \frac{0}{100} + \frac{1}{100} + \frac{2}{100} + \cdots + \frac{100}{100} \\
\text{f. } & \frac{0}{99} + \frac{1}{99} + \frac{2}{99} + \cdots + \frac{99}{99}
\end{align*} \]

5. How can you apply this strategy to find the sum of all the whole numbers from 0 to 50? To 99?