Unlock the Problem

Jody has equal-size bins for the recycling center. She filled \( \frac{3}{5} \) of a bin with plastics, \( \frac{1}{12} \) of a bin with paper, and \( \frac{9}{10} \) of a bin with glass. Which bin is the most full?

**Example 1** Locate and label \( \frac{3}{5}, \frac{1}{12}, \) and \( \frac{9}{10} \) on the number line.

### STEP 1
Compare each fraction to \( \frac{1}{2} \).

\[
\frac{3}{5} \quad \frac{1}{12} \quad \frac{9}{10}
\]

and _____ are both greater than \( \frac{1}{2} \).

_____ is less than \( \frac{1}{2} \).

Label \( \frac{1}{12} \) on the number line above.

### STEP 2
Think: Use 10 as a common denominator.

\[
\frac{3}{5} = \frac{6}{10} \quad \text{and} \quad \frac{9}{10}
\]

Since \( \frac{6}{10} \), you know that \( \frac{3}{5} \) \( \text{and} \) \( \frac{9}{10} \).

Label \( \frac{3}{5} \) and \( \frac{9}{10} \) on the number line above.

The fraction the greatest distance from 0 has the greatest value.

The fraction with the greatest value is _____.

So, the bin with _______ is the most full.

- Compare the distance between \( \frac{3}{5} \) and 0 and the distance between \( \frac{9}{10} \) and 0. What can you conclude about the relationship between \( \frac{3}{5} \) and \( \frac{9}{10} \)? Explain.
Example 2 Write $\frac{7}{10}$, $\frac{1}{3}$, $\frac{7}{12}$, and $\frac{8}{10}$ in order from least to greatest.

**STEP 1** Compare each fraction to $\frac{1}{2}$.

List fractions that are less than $\frac{1}{2}$: _______________________.

List fractions that are greater than $\frac{1}{2}$: _______________________.

The fraction with the least value is ________.

Locate and label $\frac{1}{3}$ on the number line above.

**STEP 2** Compare $\frac{7}{10}$ to $\frac{7}{12}$ and $\frac{8}{10}$.

Think: $\frac{7}{10}$ and $\frac{7}{12}$ have a common numerator.

Think: $\frac{7}{10}$ and $\frac{8}{10}$ have a common denominator.

Locate and label $\frac{7}{10}$, $\frac{7}{12}$, and $\frac{8}{10}$ on the number line above.

The fractions in order from least to greatest are _______________________.

So, _______ < _______ < _______ < _______.

Try This! Write $\frac{3}{4}$, $\frac{3}{6}$, $\frac{1}{3}$, and $\frac{2}{12}$ in order from least to greatest.

______ < _______ < _______ < _______
1. Locate and label points on the number line to help you write \(\frac{3}{10}, \frac{11}{12},\) and \(\frac{5}{8}\) in order from least to greatest.

\[
\begin{array}{cc}
\text{0} & \frac{1}{2} & 1 \\
\end{array}
\]

Write the fraction with the greatest value.

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

Write the fractions in order from least to greatest.

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

**On Your Own**

Write the fractions in order from least to greatest.

8. \(\frac{2}{5}, \frac{1}{3}, \frac{5}{6}\)
9. \(\frac{4}{8}, \frac{5}{12}, \frac{1}{6}\)
10. \(\frac{7}{100}, \frac{9}{12}, \frac{4}{5}\)

**Math Talk**

**Use Reasoning** How can benchmarks help you order fractions?

**Reason Quantitatively** **Algebra** Write a numerator that makes the statement true.

11. \(\frac{1}{2} < \frac{4}{5}\)
12. \(\frac{1}{4} < \frac{5}{12} < \frac{6}{6}\)
13. \(\frac{3}{4} < \frac{7}{8}\)
14. THINK SMARTER Nancy, Lionel, and Mavis ran in a 5-kilometer race. The table shows their finish times. In what order did Nancy, Lionel, and Mavis finish the race?

a. What do you need to find?

b. What information do you need to solve the problem?

c. What information is not necessary?

d. How will you solve the problem?

e. Show the steps to solve the problem.

f. Complete the sentences.
   The runner who finished first is _____.
   The runner who finished second is _____.
   The runner who finished third is _____.

15. GO DEEPER Alma used 3 beads to make a necklace. The lengths of the beads are \( \frac{5}{6} \) inch, \( \frac{5}{12} \) inch, and \( \frac{1}{3} \) inch. What are the lengths in order from shortest to longest?

16. THINK SMARTER Victor has his grandmother’s recipe for making mixed nuts.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>pecans</td>
<td>( \frac{3}{4} ) cup</td>
</tr>
<tr>
<td>peanuts</td>
<td>( \frac{2}{12} ) cup</td>
</tr>
<tr>
<td>almonds</td>
<td>( \frac{1}{2} ) cup</td>
</tr>
<tr>
<td>walnuts</td>
<td>( \frac{7}{8} ) cup</td>
</tr>
</tbody>
</table>

Order the ingredients used in the recipe from least to greatest.
Compare and Order Fractions

Write the fractions in order from least to greatest.

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

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

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

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

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

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

Problem Solving

6. 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?

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

8. **WRITE Math** How is ordering fractions on a number line similar to and different from ordering whole numbers on a number line?
Lesson Check (4.NF.A.2)

1. Juan’s three math quizzes this week took him $\frac{1}{3}$ hour, $\frac{4}{6}$ hour, and $\frac{1}{5}$ hour to complete. List the lengths of time in order from least to greatest.

2. On three days last week, Maria ran $\frac{3}{4}$ mile, $\frac{7}{8}$ mile, and $\frac{3}{5}$ mile. List the distances in order from least to greatest.

Spiral Review (4.OA.B.4, 4.NBT.B.5, 4.NBT.B.6, 4.NF.A.1)

3. Santiago collects 435 cents in nickels. How many nickels does he collect?

4. Lisa has three classes that each last 50 minutes. What is the total number of minutes of the three classes?

5. Alicia wrote these numbers: 2, 9, 15, 21. Which of Alicia’s numbers is NOT a composite number?

6. Mrs. Carmel serves $\frac{6}{8}$ of a loaf of bread with dinner. Write a fraction with a denominator of 4 that is equivalent to $\frac{6}{8}$.