How do Fractions Relate to Decimals?

Fractions and decimals are TWO ways to describe parts of a whole.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/100</td>
<td>0.18</td>
<td><img src="image" alt="Fraction 18/100" /></td>
</tr>
<tr>
<td>9/10</td>
<td>0.9</td>
<td><img src="image" alt="Fraction 9/10" /></td>
</tr>
<tr>
<td>5/10</td>
<td>0.5</td>
<td><img src="image" alt="Fraction 5/10" /></td>
</tr>
<tr>
<td>46/100</td>
<td>0.46</td>
<td><img src="image" alt="Fraction 46/100" /></td>
</tr>
</tbody>
</table>

= 1 and 14/100
What is a Unit Fraction?

Unit Fractions

A unit fraction is a fraction that has a numerator of 1. It is one equal part of a whole.

6/8 =

7/9 =

Write the following as a sum of unit fractions:

6/8 =

7/9 =
Decomposing Fractions

- We decompose fractions when we break fractions into smaller pieces.

Examples

\[
\frac{5}{6} = \frac{1}{6} + \frac{1}{6} \text{ or } \frac{2}{6} + \frac{3}{6} \text{ or } \frac{4}{6} + \frac{1}{6} + \frac{1}{6}
\]

\[
2\frac{1}{4} = \frac{2}{4} + \frac{1}{4} \text{ or } \frac{5}{4} + \frac{1}{4}
\]

\[
\frac{6}{8} = \frac{2}{8} + \frac{3}{8} + \frac{1}{8} \text{ or } \frac{5}{8} + \frac{1}{8}
\]

Try It: Decompose the following fractions

\[
\frac{4}{5} = \frac{10}{3} = 
\]
Equivalent Fractions

Equivalent fractions have the same value even though they have different numerators and denominators.

Golden Rule of Equivalent Fractions: Do unto the numerator as you do unto the denominator (That means, you do the SAME thing to both.)

Practice generating equivalent fractions.

⅔ =

⅓ =

⅓ =

⅓ =
Simplifying Fractions

- **Simplifying fractions** means writing the fraction in **lowest terms**.
- **We want the smallest numerator and denominator**, without changing the value of the fraction.

Simplify the following fractions:

\[
\frac{12}{36} \quad \frac{25}{60}
\]
Comparing Fractions

Vocabulary:
benchmark: a known size or amount that helps you understand a different size or amount

When we compare fractions, we look for similarities and differences. Which one is larger, smaller or are they equal?

5 Strategies for Comparing Fractions

1. Common Denominator ⇒ compare numerators
   \[
   \frac{2}{4} < \frac{3}{4} \quad \text{more pieces}
   \]

2. Common Numerator ⇒ compare denominators
   \[
   \frac{2}{10} > \frac{2}{8}
   \]

3. Use \( \frac{1}{2} \) as a benchmark
   \[
   \frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2} \quad \frac{2}{6} < \frac{6}{8}
   \]

4. Change one denominator to match
   \[
   \frac{2}{5} > \frac{3}{10} \quad \frac{2 \times 2}{5 \times 2} = \frac{4}{10} \quad \frac{4}{10} > \frac{3}{10}
   \]

5. Find a common denominator
   \[
   \frac{1}{6} < \frac{3}{18} \quad \frac{1 \times 3}{6 \times 3} = \frac{3}{18} \quad \frac{6}{18} < \frac{18}{24}
   \]

Practice comparing the fractions:
\[
\frac{3}{4} \quad \frac{16}{24} \quad \frac{3}{5} \quad \frac{2}{7} \quad \frac{5}{7} \quad \frac{12}{14}
\]
Finding Common Denominators

1. List multiples of both denominators.

2. Circle the first multiple that both numbers have in common. ☆This number is the **Least Common Multiple** 
   LCM=Common Denominator

Example: 3/9 and ⅚

9: 9, 18, 27, 36
6: 6, 12, 18, 24, 30

18 is the least common multiple

3/9 = 6/18 (Multiply both numerator and denominator by 2)
⅚ = 15/18 (Multiply both numerator and denominator by 3)

Finding Common Denominators

3. List multiples of both denominators.

4. Circle the first multiple that both numbers have in common. ☆This number is the **Least Common Multiple** 
   LCM=Common Denominator

Example: 3/9 and ⅚

9: 9, 18, 27, 36
6: 6, 12, 18, 24, 30

18 is the least common multiple

3/9 = 6/18 (Multiply both numerator and denominator by 2)
⅚ = 15/18 (Multiply both numerator and denominator by 3)

Finding Common Denominators

5. List multiples of both denominators.

6. Circle the first multiple that both numbers have in common. ☆This number is the **Least Common Multiple** 
   LCM=Common Denominator

Example: 3/9 and ⅚

9: 9, 18, 27, 36
6: 6, 12, 18, 24, 30

18 is the least common multiple

3/9 = 6/18 (Multiply both numerator and denominator by 2)
⅚ = 15/18 (Multiply both numerator and denominator by 3)

Finding Common Denominators

7. List multiples of both denominators.

8. Circle the first multiple that both numbers have in common. ☆This number is the **Least Common Multiple** 
   LCM=Common Denominator

Example: 3/9 and ⅚

9: 9, 18, 27, 36
6: 6, 12, 18, 24, 30

18 is the least common multiple

3/9 = 6/18 (Multiply both numerator and denominator by 2)
⅚ = 15/18 (Multiply both numerator and denominator by 3)
<table>
<thead>
<tr>
<th>Fraction</th>
<th>Equivalent Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{3} )</td>
<td>8/12</td>
</tr>
<tr>
<td>( \frac{3}{4} )</td>
<td>9/12</td>
</tr>
<tr>
<td>( \frac{1}{2} )</td>
<td>6/12</td>
</tr>
</tbody>
</table>

Try ordering the following fractions:

3/9; 2/6; \( \frac{1}{3} \)

4/6; \( \frac{1}{3} \); \( \frac{1}{4} \); \( \frac{1}{3} \)
Adding and Subtracting Fractions

Try the following:

\[ \frac{3}{6} + \frac{2}{6} = \frac{5}{6} - \frac{4}{8} = \]

1. Add or subtract the numerators.
   \[ 2 + 1 = 3 \quad 6 - 5 = 1 \]

2. Keep the denominator the same.
   \[ \frac{3}{5}, \frac{1}{8} \]

3. Simplify or reduce if necessary.
   \[ \frac{2}{5} + \frac{1}{5} = \frac{3}{5}, \quad \frac{6}{8} - \frac{5}{8} = \frac{1}{8} \]

Try the following:

\[ \frac{3}{6} + \frac{2}{6} = \frac{5}{8} - \frac{4}{8} = \]
Adding and Subtracting Mixed Numbers

1. Step 1: Add/subtract whole numbers
   \[3 \frac{1}{4} + 2 \frac{3}{4} = 5 \quad 6 \frac{1}{8} - 2 \frac{1}{8} = 3\]

2. Step 2: Add/subtract numerators
   \[3 \frac{1}{4} + 2 \frac{3}{4} = 5 \frac{1}{2} \quad 5 \frac{1}{8} - 2 \frac{1}{8} = 3 \frac{1}{8}\]

3. Denominators stay the same.
   \[3 \frac{1}{4} + 2 \frac{3}{4} = 5 \frac{3}{4} \quad 5 \frac{1}{8} - 2 \frac{1}{8} = 3 \frac{1}{8}\]

4. Simplify if needed
   \[3 \frac{1}{4} + 2 \frac{3}{4} = 3 \frac{1}{4} \quad 5 \frac{1}{8} - 2 \frac{1}{8} = 3 \frac{1}{4}\]

Try the following:

5 \frac{3}{4} + 9 \frac{3}{4} =

2 \frac{5}{8} - 1 \frac{4}{8} =
Borrowing Method for Subtracting Mixed Numbers

Practice It:
3 $\frac{5}{8} - 1 \frac{7}{8} =$

$6 \frac{2}{8} - 4 \frac{5}{8} =$

Use when the numerator is greater in the second mixed number.

1. Borrow a 1 from the whole number.
2. Add the 1 in fraction form to the fraction.
3. Subtract the mixed numbers.

$5 \frac{10}{8} - 4 \frac{5}{8} = 1 \frac{5}{8}$

Practice It:
4 $\frac{1}{2} - 2 \frac{3}{8} =$

$3 \frac{5}{8} - 1 \frac{7}{8} =$

$4 \frac{1}{2} - 2 \frac{3}{8} =$
### Mixed Numbers to Improper Fractions

Make mixed numbers \textit{MAD} by changing them to improper fractions.

**Example:**

7 \(\frac{1}{4}\)

- **Multiply** the whole number by the numerator.
  \[7 \times 4 = 28\]
- **Add** the product and the numerator.
  \[28 + 1 = 29\]
- **Denominator** stays the same.

\[7 \frac{1}{4} = \frac{29}{4}\]

### Improper Fractions to Mixed Numbers

**Example:**

\[\frac{29}{4}\]

- **Go divide** the numerator by the denominator.
  \[29 \div 4 = 7 \text{ remainder } 1\]
- **Leave** the quotient whole number as the whole number in the mixed number.
- **Always** put the remainder as the numerator.
- **Always** put the denominator as the denominator.

\[\frac{29}{4} = 7 \frac{1}{4}\]

Try it:

27/8 = \[3 \frac{3}{4}\]
$\frac{27}{8} =$

$3 \% =$