Terminating and Repeating Decimals
Objective:

* Write fractions as terminating or repeating decimals

* Write decimals as fractions
Vocabulary:

* **Repeating Decimal:** The decimal form of a rational number.
  
  \( \text{ex: } 0.454545\ldots \)

* **Bar Notation:** In a repeating decimal, the bar or line that is placed over the digits that repeat.
  
  \( \text{ex: } 0.33333\ldots = 0.\overline{3} \)

* **Terminating Decimal:** A repeating decimal that has the repeating digit zero. The decimal terminates or stops.
  
  \( \text{ex: } 0.125 \)
Convert Fractions to Decimals:

* Method #1: If the denominator is a multiple of 10 (10, 100, 1000, etc.) then use the place value to write the decimal.

Examples:

\[
\frac{9}{10} = 0.9
\]

\[
\frac{9}{100} = 0.09
\]

\[
\frac{9}{1000} = 0.009
\]
Complete the table below. Write fractions in simplest form.

<table>
<thead>
<tr>
<th>Words</th>
<th>Fraction</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>seven tenths</td>
<td>( \frac{7}{10} )</td>
<td>0.7</td>
</tr>
<tr>
<td>nineteen hundredths</td>
<td>( \frac{19}{100} )</td>
<td>0.19</td>
</tr>
<tr>
<td>one-hundred five thousandths</td>
<td>( \frac{105}{1000} = \frac{21}{200} )</td>
<td>0.105</td>
</tr>
</tbody>
</table>
**Method #2:** Write an equivalent fraction with a denominator that is a multiple of 10. Then use the place value like Method #1.

Examples:

\[
\frac{9}{50} = \frac{9}{50} \times 2 = \frac{18}{100} = 0.18
\]

\[
\frac{7}{20} = \frac{7}{20} \times 5 = \frac{35}{100} = 0.35
\]
*Method #3: Divide the numerator by the denominator.

Examples:

\[ \frac{8}{15} = 8 \div 15 \quad \text{or} \quad 15 \sqrt{8.0} = 0.533333... \]

\[ 5 \frac{3}{8} = 3 \div 8 \quad \text{or} \quad 8 \sqrt{3.0} = 0.375 \]

\[ 5.375 \]
Write each fraction as a decimal:

a) \( \frac{11}{25} = 0.44 \)

b) \( \frac{7}{11} = 0.636363\ldots = 0.\bar{63} \)

c) \( -9 \frac{3}{10} = -9.3 \)
**Convert Decimals to Fractions:**

*Every terminating decimal can be written as a fraction with a denominator to the power of 10. Use the place value of the final digit as the denominator.*

**Examples:**

\[
0.08 = \frac{8}{100} \div 4 = \frac{2}{25}
\]

\[
1.025 = 1 \frac{25}{1000} \div 25 = \frac{1}{40} = 1 \frac{1}{40}
\]
Write each decimal as a fraction in simplest form:

d) \(0.4\)  
\[
\frac{4}{10} \div \frac{2}{2} = \frac{2}{5}
\]

e) \(-5.16\)  
\[
-5 \frac{16}{100} \div \frac{4}{4} \frac{4}{25} = -5 \frac{4}{25}
\]
Homework:

* Homework:  Pg. 267 - 268 #1 - 22 (all)

         Pg. 270 #36-44 (evens)