Terminating and Repeating Decimals

Students will write fractions as terminating or repeating decimals and write decimals as fractions.

Vocabulary

*repeating decimal - a decimal in which a <u>pattern</u> of one or more digits is repeated forever

Example: 0.363636....   0.14444....

*bar notation - the line or bar placed over the digits that <u>repeat</u> in a repeating decimal

Example: $0.\overline{36}$ $0.1\overline{4}$

*terminating decimal - a decimal in which the digits do not go on forever (or in which <u>zero</u> is the number that repeats forever)

Example: 0.75   0.6785

Writing Fractions as Decimals

Our decimal system is based on powers of 10, such as 10, 100, 1000, etc. If the denominator of a fraction is a power of 10, you can use place value to write the fraction as a decimal.

Example 1: Write $\dfrac{74}{100}$ as a decimal.

0.74

Example 2: Write $\dfrac{9}{10}$ as a decimal.   *0.9*

Any fraction can be expressed as a decimal by <u>dividing</u> the numerator by the denominator (the <u>top</u> by the <u>bottom</u>).

Example 3: Write $\dfrac{7}{20}$ as a decimal.

$$\frac{7}{20} \times \frac{5}{5} = \frac{35}{100}$$

0.35

$$
\begin{array}{r}
0.35 \\
20\overline{)7.00} \\
-60\downarrow \\
\hline
100 \\
-100 \\
\hline
0
\end{array}
$$

Example 4: Write $5\dfrac{3}{4}$ as a decimal.

0.35   *5.75*

$$
\begin{array}{r}
0.75 \\
4\overline{)3.00} \\
-28\downarrow \\
\hline
20 \\
-20 \\
\hline
0
\end{array}
$$

Writing Fractions as Decimals

Example 5: Write $-\dfrac{1}{40}$ as a decimal.

-0.025

$$40\overline{)1.000}$$
$$\begin{array}{r} 0.025 \\ -80\downarrow \\ \hline 200 \\ -200 \\ \hline 0 \end{array}$$

Example 6: Write $\dfrac{7}{9}$ as a decimal.

$0.\overline{7}$

$$9\overline{)7.00}$$
$$\begin{array}{r} 0.77 \\ -63\downarrow \\ \hline 70 \\ -63 \\ \hline 7 \end{array}$$

Example 7: Write $\dfrac{1}{11}$ as a decimal.

$0.\overline{09}$

$$11\overline{)1.0000}$$
$$\begin{array}{r} 0.0909 \\ -99\downarrow\downarrow \\ \hline 100 \end{array}$$

Writing Decimals as Fractions

Every terminating decimal can be written as a fraction with a denominator of 10, 100, 1000, or greater power of ten. Use the place value of the final digit as the denominator!!!

Example 8: Write 0.6 as a fraction.

$$\frac{0.6}{1} = \frac{6}{10} \begin{array}{c} \div 2 \\ \div 2 \end{array} = \frac{3}{5}$$

Example 9: Write 0.25 as a fraction.

$$\frac{25}{100} \begin{array}{c} \div 25 \\ \div 25 \end{array} = \frac{1}{4}$$

Example 10: Write -3.75 as a fraction.

$$-3\frac{3}{4} \qquad \frac{75}{100} \begin{array}{c} \div 25 \\ \div 25 \end{array} = \frac{3}{4}$$

Homework:

Practice WS 2.2

Cross off 1-9

Complete 10-15 and 22-27

$$-\frac{9}{21}$$

$$-0.429$$

$$
\begin{array}{r}
0.4285 \\
21\overline{)9.0000} \\
-84 \\
\overline{60} \\
-42 \\
\overline{180} \\
-168 \\
\overline{120}
\end{array}
$$

$$-4.8$$