Terminating and Non-Terminating (Repeating)

 Decimals of Rational Numbers

Classwork

Exercises 1–5

1. Use long division to determine the decimal expansion of $\frac{54}{20}$.
2. Use long division to determine the decimal expansion of $\frac{7}{8}$.
3. Use long division to determine the decimal expansion of $\frac{8}{9}$.
4. Use long division to determine the decimal expansion of $\frac{22}{7}$.
5. What do you notice about the decimal expansions of Exercises 1 and 2 compared to the decimal expansions of Exercises 3 and 4?

**Example 1**

Consider the fraction $\frac{5}{8}$. Is it a Terminating or Non-Terminating (Repeating) decimal? How do you know?

**Example 2**

Consider the fraction $\frac{17}{125}$ Is it a Terminating or Non-Terminating (Repeating) decimal? How do you know?

**Example 3**

Convert the fraction $\frac{7}{8}$ to a decimal. Is it a Terminating or Non-Terminating (Repeating) decimal? How do you know?

 Identify the type of decimal expansion for each of the numbers in Exercises 6–8 as Terminating or Non-Terminating (Repeating). Explain why their decimal expansion is such.

Example 6

Write $\frac{15}{17}$ as a decimal. Is it a Terminating or Non-Terminating (Repeating) decimal? How do you know?

Example 7

Write $\frac{3}{160}$ as a decimal. Is it a Terminating or Non-Terminating (Repeating) decimal? How do you know?

Example 8

Write $\frac{2}{3}$ as a decimal. Is it a Terminating or Non-Terminating (Repeating) decimal? How do you know?