

# Enrich

## Writing Repeating Decimals as Fractions

Here is a common method of writing repeating decimals as fractions.

When writing repeating decimals as fractions, you will need to multiply by a power of 10.

- If 1 digit repeats, you will multiply by 10.
- If 2 digits repeat, you will multiply by 100.
- If 3 digits repeat, you will multiply by 1,000.

**Example** Write  $0.\overline{4}$  as a repeating decimal.

**Step 1** Set the number equal to a variable. Remove the bar notation.

$$n = 0.4444\ldots$$

**Step 2** Multiply both sides of the equation by the appropriate power of 10.

$$10n = 4.444\ldots$$

**Step 3** Subtract the first equation from the second.

$$\begin{array}{r} 10n = 4.444\ldots \\ - \quad n = 0.444\ldots \\ \hline 9n = 4 \end{array}$$

**Step 4** Solve for  $n$ .

$$n = \frac{4}{9}$$

### Exercises

Write each repeating decimal as a fraction in simplest form.

1.  $0.\overline{47}$

2.  $0.\overline{7}$

3.  $0.\overline{123}$

4.  $0.\overline{63}$

5.  $0.\overline{81}$

6.  $0.\overline{405}$

7.  $0.\overline{06}$

8.  $0.\overline{15}$

9.  $0.\overline{801}$