Section 7.1: Decimals

- **Decimals:** are used to represent fractions in our usual base ten place value notation.

  We can also write decimals in expanded form:

  $$327.24 = (3 \cdot 100) + (2 \cdot 10) + (7 \cdot 1) + \left(2 \cdot \frac{1}{10} \right) + \left(4 \cdot \frac{1}{100} \right)$$

- **Converting fraction to decimal**: Write the following fraction as a decimal.

  $$\frac{3}{50}$$

- **Converting decimal to fraction**: Write the following decimal as a fraction.

  .243

- **THREE TYPES OF DECIMALS**

  1. **terminating decimals**: decimals that can be represented using a finite number of nonzero digits to the right of the decimal point.

     Theorem 1 *Let $\frac{a}{b}$ be a fraction in simplest form. Then $\frac{a}{b}$ has a terminating decimal representation if and only if b contains only 2s and/or 5s in its prime factorization.*

  2. **repeating decimals**: decimal representation does not terminate, but repeats. (These will be discussed further in Section 7.2)

  3. **nonterminating, nonrepeating decimals**: decimal representation does not terminate nor does it repeat. (These are called irrational numbers and we will discuss these more in Section 9.2)

- **Exercises**: Determine if the following fractions represent a terminating decimal.

  a) $\frac{2}{5}$ b) $\frac{3}{14}$ c) $\frac{3}{200}$ d) $\frac{3}{600}$