1. Each rectangle represents 1. Draw horizontal lines to decompose each rectangle into the fractional units as indicated. Use the model to give the shaded area as a sum and as a product of unit fractions. Use parentheses to show the relationship between the number sentences. The first one has been partially done for you.

   a. sixths

   \[
   \frac{2}{3} = \frac{4}{12}
   \]

   \[
   \frac{1}{3} + \frac{1}{3} + \left(\frac{1}{6} + \frac{1}{6} + \frac{1}{6}\right) = \frac{4}{12}
   \]

   \[
   \left(\frac{1}{6} + \frac{1}{6}\right) + \left(\frac{1}{6} + \frac{1}{6}\right) = 2 \times \left(\frac{1}{12}\right) = \frac{4}{12}
   \]

   \[
   \frac{2}{3} = 4 \times \frac{1}{12} = \frac{4}{12}
   \]

   b. tenths

   \[
   \frac{2}{5} = \frac{4}{10}
   \]

   \[
   \frac{1}{5} + \frac{1}{5} = \frac{1}{10} + \frac{1}{10} = \frac{2}{10} = \frac{4}{10}
   \]

   \[
   \left(\frac{1}{10} + \frac{1}{10}\right) + \left(\frac{1}{10} + \frac{1}{10}\right) = \left(\frac{2}{10} + \frac{2}{10}\right) = \frac{4}{10}
   \]

   \[
   \frac{2}{5} = 4 \times \frac{1}{10} = \frac{4}{10}
   \]

   c. twelfths

   \[
   \frac{3}{4} = \frac{9}{12}
   \]

   \[
   \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} = \frac{9}{12}
   \]

   \[
   \left(\frac{1}{12} + \frac{1}{12} + \frac{1}{12}\right) + \left(\frac{1}{12} + \frac{1}{12} + \frac{1}{12}\right) = \left(3 \times \frac{1}{12}\right) = \frac{3}{12}
   \]

   \[
   \frac{3}{4} = 9 \times \frac{1}{12} = \frac{9}{12}
   \]
2. Draw area models to show the decompositions represented by the number sentences below. Express each as a sum and product of unit fractions. Use parentheses to show the relationship between the number sentences.

a. \( \frac{3}{5} = \frac{6}{10} \)

\[
\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = (\frac{1}{10} + \frac{1}{10}) + (\frac{1}{10} + \frac{1}{10}) + (\frac{1}{10} + \frac{1}{10}) = \frac{6}{10}
\]

\[
(\frac{1}{10} + \frac{1}{10}) + (\frac{1}{10} + \frac{1}{10}) + (\frac{1}{10} + \frac{1}{10}) = (2 \times \frac{1}{10}) + (2 \times \frac{1}{10}) + (2 \times \frac{1}{10}) = \frac{6}{10}
\]

\[
\frac{3}{5} = 6 \times \frac{1}{10} = \frac{6}{10}
\]

b. \( \frac{3}{4} = \frac{6}{8} \)

\[
\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{8} + \frac{1}{8}\right) = \frac{6}{8}
\]

\[
\left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{8} + \frac{1}{8}\right) = (2 \times \frac{1}{8}) + (2 \times \frac{1}{8}) + (2 \times \frac{1}{8}) = \frac{6}{8}
\]

\[
\frac{3}{4} = 6 \times \frac{1}{8} = \frac{6}{8}
\]

3. **Step 1:** Draw an area model for a fraction with units of thirds, fourths, or fifths.

**Step 2:** Shade in more than one fractional unit.

**Step 3:** Partition the area model again to find an equivalent fraction.

**Step 4:** Write the equivalent fractions as a number sentence. (If you've written a number sentence like this one already on this Problem Set, start over.)

\[
\frac{1}{4} + \frac{1}{4} = \left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{8} + \frac{1}{8}\right) = \frac{4}{8}
\]

\[
\left(\frac{1}{8} + \frac{1}{8}\right) + \left(\frac{1}{8} + \frac{1}{8}\right) = (2 \times \frac{1}{8}) + (2 \times \frac{1}{8}) = \frac{4}{8}
\]

\[
\frac{2}{4} = \frac{4}{8}
\]