

# Fractions Lesson 1

## Simple Fractions with Variables

### Important Note

For all braille examples, emboss the "L1-Fractions-V-Problems-Only.brf" file as a supplement to this lesson.

### Background

A **fraction** simply describes how many parts of a whole we have. If you divided one whole pizza into eight equal pieces, and you and your friends ate seven of those pieces, you would have one out of eight pieces left. This is described as the fraction 1 over 8, or one-eighth of the pizza.

When writing a fraction, you have two parts:

1. The **denominator** represents the total number of parts the whole has been divided into.
2. The **numerator** represents the number of these parts that we have.

So, in the fraction 1 over 8, 1 is the numerator and 8 is the denominator. In print, this is usually written with the numerator on the top and the denominator on the bottom with a horizontal bar between them.

$$\frac{1}{8}$$

However, in Nemeth Code, we do not have "tops" and "bottoms" for fractions. We have "lefts" and "rights" because the numerator is written to the left of the fraction line and the denominator is written to the right of the fraction line.

### Basic Rules for Writing a Simple Fraction

Fractions with a horizontal fraction line use the following Nemeth symbols:

- Opening simple fraction indicator (dots 1-4-5-6) ⠠
- Horizontal fraction line (dots 3-4) ⠬
- Closing simple fraction indicator (dots 3-4-5-6) ⠡

The following steps outline how to write the simple fraction 1 over 8 in Nemeth Code:

1. Opening simple fraction indicator (dots 1-4-5-6) ⠠
2. One (dot 2) ⠠
3. Horizontal fraction line (dots 3-4) ⠬
4. Eight (dots 2-3-6) ⠠
5. Closing simple fraction indicator (dots 3-4-5-6) ⠡

⠠⠠⠬⠠⠡

Notice that the numerator of 1 is to the left of the fraction line, and the denominator of 8 is to the right.

## Examples for Writing a Simple Fraction

1. three over four or three-fourths

$$\frac{3}{4}$$

⠠⠠⠬⠠⠡

2. five over eight or five-eighths

$$\frac{5}{8}$$

⠠⠠⠬⠠⠡

3. thirty-three over one hundred or thirty-three hundredths

$$\frac{33}{100}$$

⠠⠠⠬⠠⠡

## Activity Time for Writing a Simple Fraction

Write the fractions from Examples 1 to 3:

1. three over four or three-fourths
2. five over eight or five-eighths
3. thirty-three over one hundred or thirty-three hundredths

## Examples for Writing a Simple Fraction with Variables

The numerator and denominator don't always have to be a specific number. We could have an unknown number in either the numerator or the denominator or both. These unknown numbers are written as letters, called **variables**, and could even have **subscripts** – symbols that appear below the baseline in print.

1. three over y or open fraction three over y close fraction

$$\frac{3}{y}$$

2.  $\frac{x}{y}$  or open fraction  $x$  over  $y$  close fraction

$$\frac{x}{y}$$

3. open fraction  $y$  sub two minus  $y$  sub one over  $x$  sub two minus  $x$  sub one close fraction

$$\frac{y_2 - y_1}{x_2 - x_1}$$

## Activity Time for Writing a Simple Fraction with Variables

Write the fractions with variables from Examples 1 to 3:

1. three over y or open fraction three over y close fraction
2. x over y or open fraction x over y close fraction
3. open fraction y sub two minus y sub one over x sub two minus x sub one close fraction

## Basic Rules for Reading a Simple Fraction

When you read simple fractions with numbers in the numerator and denominator, you read the numerator as a regular number, but you often read the denominator as an **ordinal number** – the numbers you use when you are putting things in order. There are a few exceptions though.

## Examples for Reading a Simple Fraction

$$1. \quad \frac{1}{2}$$

Example 1 would be read one over two or one-half.

Notice that you use the word "half" and not "second" for the denominator.

2.  $\frac{1}{3}$

Example 2 would be read one over three or one-third.

3.  $\frac{1}{4}$

Example 3 would be read one over four or one-fourth or sometimes one quarter.

4.  $\frac{2}{3}$

Example 4 would be read two over three or two-thirds.

Notice that when the numerator is more than one, then the denominator is read as a plural.

5.  $\frac{3}{2}$

Example 5 would be read three over two or three-halves.

Notice that you use the word "halves" and not "seconds" for the denominator.

This is an example of an **improper fraction**. An improper fraction is one where the numerator is greater than or equal to the denominator.

6.  $\frac{3}{4}$

The figure consists of two 3x3 grids of dots. The left grid contains four 2x2 clusters of dots, one in each quadrant. The right grid contains four 3x3 clusters of dots, one in each quadrant.

Example 6 would be read three over four or three-fourths.

## Examples for Reading a Simple Fraction with Variables

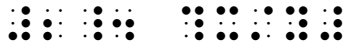
When you have variables in either the numerator or the denominator, you would read them using the rules your math teacher applies. Here are some possibilities.

$$1. \quad \frac{3}{y}$$

Example 1 would be read as one of the following:

- three over y
- open fraction three over y close fraction
- the fraction with numerator three and denominator y

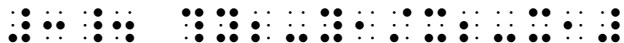
$$2. \frac{x}{y}$$



Example 2 would be read as one of the following:

- $x$  over  $y$
- open fraction  $x$  over  $y$  close fraction
- the fraction with numerator  $x$  and denominator  $y$

$$3. \frac{y_2 - y_1}{x_2 - x_1}$$



Example 3 would be read as one of the following:

- open fraction  $y$  sub two minus  $y$  sub one over  $x$  sub two minus  $x$  sub one close fraction
- the fraction with numerator  $y$  sub two minus  $y$  sub one and denominator  $x$  sub two minus  $x$  sub one