

## Fractions Lesson 4

### Mixed Numbers

#### Important Note

For all braille examples, emboss the “L4-Fractions-Problems-Only.brf” file as a supplement to this lesson.

#### Background

A **mixed number** is composed of a **whole number** and a **fraction**. If you ordered three pizzas for three of your friends, and each person only ate half a pizza, you would have one whole pizza and a half of a pizza left. You could think of this as one plus one-half, but it’s easier to write this as a mixed number, which reads as one and one-half.

$$1\frac{1}{2}$$

In Nemeth Code, mixed numbers begin with the numeric indicator and the whole number. The fractional part of the mixed number is then enclosed within the **mixed number indicators**. Either the horizontal fraction line or the diagonal fraction line is used within the fractional part.






#### Basic Rules

Mixed numbers use the following Nemeth symbols:

- Numeric indicator to write the whole number (dots 3-4-5-6) ⠼
- Opening mixed number indicator (dots 4-5-6, dots 1-4-5-6) ⠠⠠
- Horizontal fraction line (dots 3-4) ⠬
- Diagonal fraction line (dots 4-5-6, dots 3-4) ⠬⠠
- Closing mixed number indicator (dots 4-5-6, dots 3-4-5-6) ⠠⠠

The following steps outline how to write the mixed number one and one-half (which has a horizontal fraction line) in Nemeth Code:

1. Numeric indicator (dots 3-4-5-6) ⠼
2. One (dot 2) ⠠

3. Opening mixed number indicator (dots 4-5-6, dots 1-4-5-6) 
4. One (dot 2) 
5. Horizontal fraction line (dots 3-4) 
6. Two (dots 2-3) 
7. Closing mixed number indicator (dots 4-5-6, dots 3-4-5-6) 

Now let's write the mixed number one and one-half (which has a diagonal fraction line).

$1\frac{1}{2}$

The following steps (very similar to the ones above) outline how to write this in Nemeth Code:

numeric indicator, one, opening mixed number indicator, one, diagonal fraction line, two, closing mixed number indicator.

## Examples

In the following examples, if the fraction line is horizontal in print, then a horizontal fraction line is used in braille. If the fraction line is diagonal in print, then a diagonal fraction line is used in braille.

1. two and three-fourths with a horizontal fraction line

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

2. thirty-seven and five-eighths with a horizontal fraction line

$$37\frac{5}{8}$$

3. four and nine-tenths with a diagonal fraction line

$$4\frac{9}{10}$$

4. fifty-six and three-sevenths with a diagonal fraction line

$56\frac{3}{7}$

5. forty-two and fifty-three eightieths with a horizontal fraction line

$$42\frac{53}{80}$$

The figure consists of 10 diagrams arranged in two rows of five. Each diagram is a 3x3 grid of dots. The sequence of diagrams is as follows:

- Diagram 1: A single dot in the center (2,2).
- Diagram 2: A horizontal line of three dots (1,2), (2,2), (3,2).
- Diagram 3: A vertical line of three dots (2,1), (2,2), (2,3).
- Diagram 4: A 2x2 square of dots in the top-left corner (1,1), (1,2), (2,1), (2,2).
- Diagram 5: A 2x2 square of dots in the bottom-right corner (2,2), (2,3), (3,2), (3,3).
- Diagram 6: A horizontal line of five dots (1,1), (1,2), (1,3), (2,2), (3,3).
- Diagram 7: A vertical line of five dots (1,2), (2,1), (2,2), (2,3), (3,2).
- Diagram 8: A 2x2 square of dots in the top-left corner (1,1), (1,2), (2,1), (2,2).
- Diagram 9: A 2x2 square of dots in the bottom-right corner (2,2), (2,3), (3,2), (3,3).
- Diagram 10: A 3x3 grid of dots (all positions filled).

6. nineteen and thirty-three hundredths with a diagonal fraction line

$$19 \frac{33}{100}$$

Figure 1 shows a sequence of 10 diagrams illustrating the evolution of a pattern of black dots on a 3x10 grid. The pattern starts as a small cluster of dots in the first few columns and grows into a larger, more complex shape over 10 steps. The dots are arranged in a way that suggests a branching or spreading process.

## Activity Time

Write the mixed numbers from Examples 1 to 6:

1. two and three-fourths with a horizontal fraction line
2. thirty-seven and five-eighths with a horizontal fraction line
3. four and nine-tenths with a diagonal fraction line
4. fifty-six and three-sevenths with a diagonal fraction line
5. forty-two and fifty-three eightieths with a horizontal fraction line
6. nineteen and thirty-three hundredths with a diagonal fraction line