

Spatial Arrangements with Simple Fractions and Mixed Numbers

Background

Although you have already learned how to write simple fractions and mixed number problems in a linear format, you will now learn how to write them in a vertically aligned format. Vertically aligned problems are called **spatial arrangements** in the Nemeth Code. The lesson is limited to addition and subtraction problems, as it is very rare to multiply or divide fractions or mixed numbers using a spatial arrangement. As a quick review, the following Nemeth symbols will be used:

- ⠠⠨⠠⠨⠠⠨⠠⠨ (dots 1-4-5-6) opening simple fraction indicator
- ⠠⠨⠠⠨ (dots 3-4) horizontal fraction line
- ⠠⠨⠠⠨⠠⠨⠠⠨ (dots 3-4-5-6) closing simple fraction indicator
- ⠠⠨⠠⠨⠠⠨⠠⠨ (dots 3-4-5-6) numeric indicator to write the whole number
- ⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨ (dots 4-5-6, dots 1-4-5-6) opening mixed number indicator
- ⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨ (dots 4-5-6, dots 3-4-5-6) closing mixed number indicator
- ⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨ (dots 3-4-6) plus sign (+)
- ⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨⠠⠨ (dots 3-6) minus sign (–)

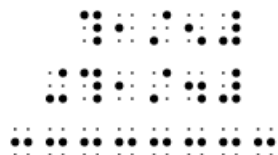
Basic Rules for When a Spatially Aligned Problem Contains Simple Fractions

When a spatially aligned problem contains fractions, the fraction indicators and fraction line must be vertically aligned. The plus or minus sign is placed one cell to the left of the opening simple fraction indicator, and the separation line extends one cell to the left and one cell to the right of the widest line in each arrangement. Notice how the numerator and denominator snuggle the fraction line in each example. We have chosen to show only horizontal fraction lines to reduce the number of examples, but you could also use diagonal fraction lines.

Examples

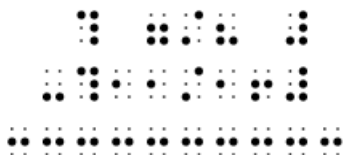
1. $\frac{1}{5}$ one-fifth plus one-fourth

$$\begin{array}{r} \frac{1}{5} \\ + \frac{1}{4} \\ \hline \end{array}$$



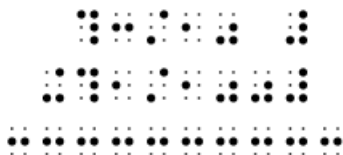
2. $\frac{7}{8}$ seven-eighths minus eleven-sixteenths

$$\begin{array}{r} \frac{7}{8} \\ - \frac{11}{16} \\ \hline \end{array}$$

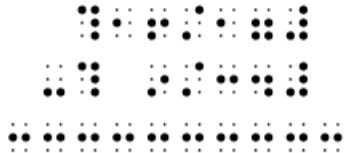


3. $\frac{3}{10}$ three-tenths plus one-hundredth

$$\begin{array}{r} \frac{3}{10} \\ + \frac{1}{100} \\ \hline \end{array}$$



4.
$$\begin{array}{r} 16 \\ 17 \\ - \frac{9}{34} \\ \hline \end{array}$$
 sixteen-seventeenths minus nine thirty-fourths



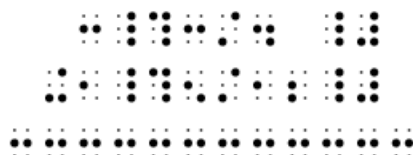
Activity time: See if you can re-create the problems in example 1 to 4.

Basic Rules for When a Spatially Aligned Problem Contains Mixed Numbers

When a spatially aligned problem contains mixed numbers, the whole numbers must also be vertically aligned based on place value, and the numeric indicator must not be used with the whole number. All other rules for spatially aligned problems with fractions apply. Notice how the whole numbers, fraction indicators, and horizontal fraction lines are aligned vertically in each example. We have chosen to show only horizontal fraction lines to reduce the number of examples, but you could also use diagonal fraction lines.

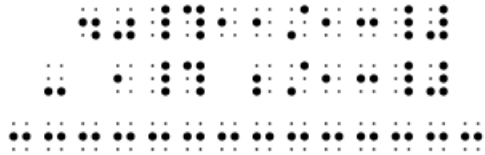
Examples

5.
$$\begin{array}{r} 3 \frac{3}{4} \\ + 1 \frac{5}{12} \\ \hline \end{array}$$
 three and three-fourths plus one and five-twelfths



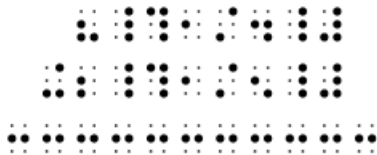
6. $40\frac{11}{13}$ forty and eleven-thirteenths minus one and two-thirteenths

$$\begin{array}{r} 40\frac{11}{13} \\ - 1\frac{2}{13} \\ \hline \end{array}$$



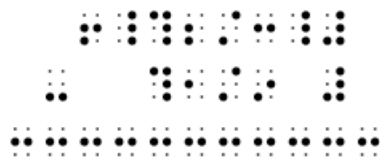
7. $8\frac{1}{4}$ eight and one-fourth plus two and one-fifth

$$\begin{array}{r} 8\frac{1}{4} \\ + 2\frac{1}{5} \\ \hline \end{array}$$



8. $6\frac{2}{3}$ six and two-thirds minus one-ninth

$$\begin{array}{r} 6\frac{2}{3} \\ - \frac{1}{9} \\ \hline \end{array}$$



Activity time: See if you can re-create the problems in examples 5 to 8.