Creating a Braille Number Line

Background

Braille number lines can be created with specific Nemeth code number line symbols using a braillewriter. Since number lines take up two lines of braille, a one-line refreshable braille display is not able to display them properly. These tactile number lines are also quite "visual". That is, they look very much like the print versions of number lines. Therefore, it is rather easy for a sighted math teacher to interpret them, once they are given the rules for the various symbols. So, here is what you could teach your math teacher.

The following symbols are used to create number lines:

⠪ (dots 2-4-6) left-pointing arrowhead

⠒ (dots 2-5) line (axis line)

⠳ (dots 1-2-3-5) coordinate scale mark

⠕ (dots 1-3-5) right-pointing arrowhead

Basic Rules

- A number line must be preceded and followed by a blank line.
- The units on the number line must be equally spaced.
- Scale marks are labeled below the number line using Nemeth code numbers without numeric indicators.
- The coordinate scale mark, and the first digit of its numeric label should be aligned, even if preceded by a plus or a minus sign.
- In some cases, the numeric label may be a fraction. The opening fraction indicator of a fraction (dots 1-4-5-6) should be aligned with the coordinate marker, even if it is preceded by a plus or a minus sign.

General Instructions

- When creating a number line, first space down a line.
- Then, create the number line as follows: left arrow, line, line, scale mark, line, line, scale mark, ..., line, line, right arrow.
- Add more or less "line" depending on the problem and preciseness required.
- Some say: left arrow; dots 2-5, 2-5, r, 2-5, 2-5, r, …, 2-5, 2-5, right arrow.

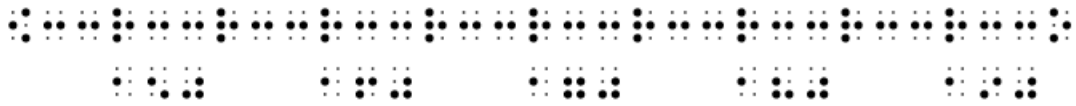
- Others say: left arrow; 3, 3, r, 3, 3, r, …, 3, 3, right arrow. Just get in a rhythm.
- Next, place the proper coordinate (for the preciseness required) under each scale mark. Remember the scale mark is where you feel the "r's." We leave off numeric indicators to allow better spacing, or you can label every other scale mark, or every fifth one – whatever is appropriate for the specific number line you need to create.

Detailed Examples

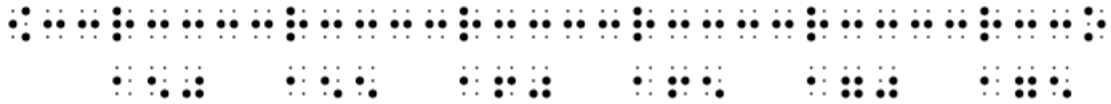
1. The integers are often shown as labels for scale marks evenly spaced on the line. Although the number line below only shows the integers from −4 to 4, the line includes all real numbers, continues forever in each direction (as indicated by the arrows), and also represents all the real numbers not marked that are between the integers.

Activity time: See if you can re-create this number line.

2. Sometimes you need to use much larger numbers and they won't all fit on the number line. You could omit alternate labels while keeping the coordinate markers.



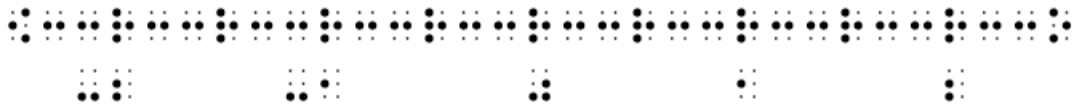
Or you could increase the length of your space between units.



Activity time: Try re-creating these two number lines.

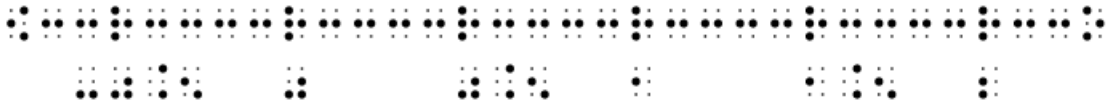
3. Occasionally, you need to use fractional values for your scale marks, and you will need to adjust your number line to accommodate these space hungry symbols.

Or you might cleverly try the following, where you align the labeled scale marks to your integers and leave the fractional scale marks unlabeled.



Activity time: Try re-creating these two number lines and see if you notice that you are improving your technique and getting faster.

4. You can even use decimal values for your scale marks.



Activity time: Okay, let's see if you can quickly re-create this last number line in the lesson before heading for the games for even more practice.