

Number Lines Lesson 1

Creating a Number Line

Important Note

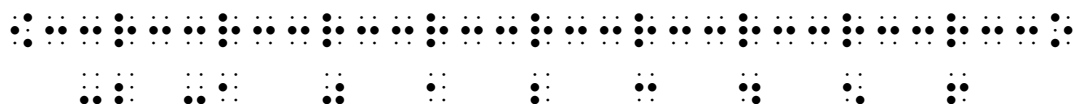
For all braille examples, emboss the "L1-NL-Problems-Only.brf" file as a supplement to this lesson.

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:

- left-pointing arrowhead (dots 2-4-6)
- line (axis line) (dots 2-5) ⠠
- scale mark (dots 1-2-3-5) ⠨
- right-pointing arrowhead (dots 1-3-5) ⠡



A braille number line is shown with arrows on both ends. The scale marks are in increments of 1 starting with negative 2 and ending with 6.

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 scale mark, and the first digit of its numeric label should be aligned, even if preceded by a plus or a minus sign.

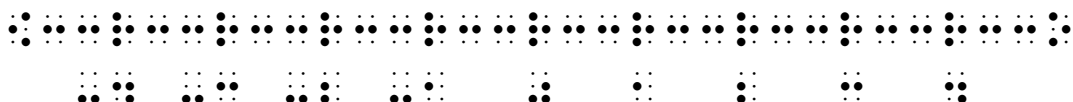
- In some cases, the numeric label may be a fraction. The opening fraction indicator of a fraction (dots 1-4-5-6) should be aligned with the coordinate marker, even if it is preceded by a plus or a minus sign.

When creating a number line:

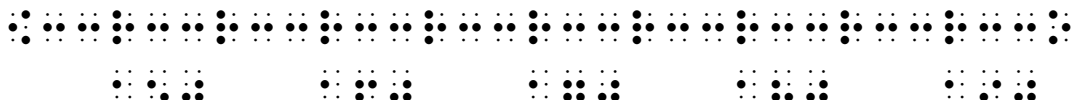
1. Number your problem.
2. Space down two lines.
3. Create the number line as follows: left arrow, line, line, scale mark, line, line, scale mark, ..., line, line, right arrow.
 - Add more or less "line" depending on the problem and preciseness required.
 - Some say: left arrow, dots 2-5, 2-5, r, 2-5, 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.
4. 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.

Examples

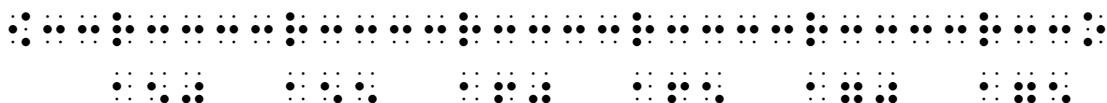
1. The integers are often shown as labels for scale marks evenly spaced on the line. Although the number line shows the integers from -4 to 4 , the line includes all real numbers, continues forever in each direction (as indicated by the arrows), and also represents all the real numbers not marked that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



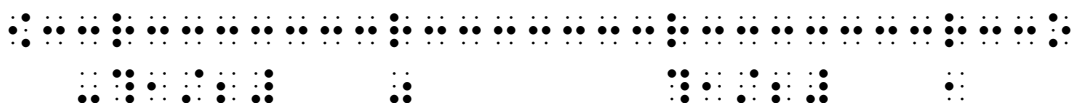
2. Sometimes you need to use much larger numbers and they won't all fit on the number line. You could omit alternate labels while keeping the scale marks. As shown on the number line, the scale marks are in increments of 5 starting with 150 and ending with 190, but only every other scale mark is labeled.



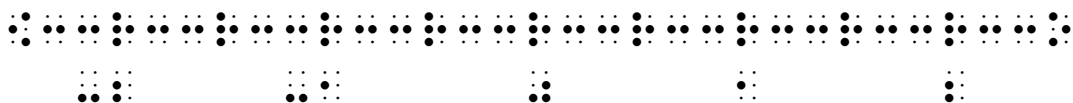
Or you could increase the length of your space between scale marks. As shown in this new number line, the scale marks are in increments of 5, with every scale mark labeled; however, there is only room for scale marks starting at 150 and ending with 175.



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. As shown in the number line, the scale marks are in increments of one-half starting with negative one-half and ending with 1. All scale marks are labeled.



Or you might cleverly try a different approach, where you align the labeled scale marks to your integers and leave the fractional scale marks unlabeled. As shown in this number line, the scale marks are in increments of one-half starting with negative 2 and ending with 2.



4. You can even use decimal values for your scale marks. As shown in this number line, the scale marks are in increments of .5 starting with negative 0.5 and ending with 2. All scale marks are labeled.

Activity Time

Okay, let's see if you can re-create all of the number lines in this lesson. You can also make up some of your own number lines for even more practice. Then head to the games to have even more fun with making number lines.