Braille
Authority of
North
America

Guidance for Transcription Using the Nemeth Code within UEB Contexts

Approved April 2018

When Nemeth Code is to be used for mathematics and science, the actual math and technical notation is presented in Nemeth Code or the Nemeth-based Chemistry Code, as applicable, while the surrounding text is presented in UEB. UEB symbols are not used within the switch indicators for Nemeth Code. *No contractions are to be used in Nemeth Code.*

Switch Indicators for Nemeth Code
  Opening Nemeth Code indicator ⠸⠩
  Nemeth Code terminator ⠸⠱
  Single-word switch indicator ⠰⠰

These indicators should be listed on the Special Symbols page in braille order. The Nemeth Code terminator and single-word switch indicator are Nemeth symbols. Following the definition of both of these symbols, insert this phrase: (Nemeth Code symbol).

Basic Guidance on When to Switch

1. Any mathematical expression or chemical formula is transcribed in Nemeth Code. This includes fragmentary expressions, (parts of formulas, incomplete equations, and the like) including isolated signs of operation or comparison. (See 3a below for exceptions.) Slash meaning per, over, or divided by is mathematical and is part of a fraction. Fractions are transcribed in Nemeth Code.

Example:

Multiplication is another commutative operation because 3(5) is the same as 5(3).

⠀⠀⠠⠍⠥⠇⠞⠊⠏⠇⠊⠉⠁⠰⠝ ⠊⠎ ⠁⠝⠕⠮⠗ ⠉⠕⠍⠍⠥⠞⠁⠞⠊⠧⠑
⠕⠏⠻⠁⠰⠝ ⠆⠉ ⠸⠩ ⠼⠒⠷⠢⠾ ⠸⠱ ⠊⠎ ⠮ ⠎⠁⠍⠑ ⠵
⠸⠩ ⠼⠢⠷⠒⠾ ⠸⠱⠲

2. All other text, including punctuation that is logically associated with surrounding sentences, should be done in UEB. (See 3b below for exceptions)
3. Exceptions: Despite the above principles, it is nevertheless desirable not to overdo switching just for the sake of a simple item that is easily read in either code. On that basis, avoid switching in the following two cases:
    a. Freestanding, unmodified numbers and/or letters can be transcribed in UEB. If a freestanding number or letter is combined with anything other than an ordinal, an internal comma, or a plural (e.g., a minus sign, a decimal point, etc.), it is transcribed according to Nemeth Code.

Examples:

52. Find the sum of the numbers between 1 and 500 that are not multiples of 2 or 3. You may use the formula $S=\frac{n(n+1)}{2}$ for the sum, *S*, of the integers 1 to *n*.

⠼⠑⠃⠲ ⠠⠋⠔⠙ ⠮ ⠎⠥⠍ ⠷ ⠮ ⠝⠥⠍⠃⠻⠎ ⠆⠞ ⠼⠁ ⠯ ⠼⠑⠚⠚
⠀⠀⠞ ⠜⠑ ⠝ ⠍⠥⠇⠞⠊⠏⠇⠑⠎ ⠷ ⠼⠃ ⠕⠗ ⠼⠉⠲ ⠠⠽ ⠍⠁⠽
⠀⠀⠥⠎⠑ ⠮ ⠿⠍⠥⠇⠁ ⠸⠩ ⠠⠎ ⠨⠅ ⠹⠝⠷⠝⠬⠂⠾⠌⠆⠼ ⠸⠱ ⠿ ⠮
⠀⠀⠎⠥⠍⠂ ⠰⠠⠎⠂ ⠷ ⠮ ⠔⠞⠑⠛⠻⠎ ⠼⠁ ⠞⠕ ⠰⠝⠲

45. How many ways can you have 50¢ using at least 1 quarter?

⠼⠙⠑⠲ ⠠⠓⠪ ⠸⠍ ⠺⠁⠽⠎ ⠉ ⠽ ⠓ ⠸⠩ ⠼⠢⠴⠈⠉ ⠸⠱ ⠥⠎⠬
⠀⠀⠁⠞ ⠇⠂⠌ ⠼⠁ ⠟⠥⠜⠞⠻⠦

b. Digital time (0:00) is transcribed in UEB unless the time is involved in computation.

Examples:

The time of the concert is 9:00-12:30.

⠠⠮ ⠐⠞ ⠷ ⠮ ⠒⠉⠻⠞ ⠊⠎ ⠼⠊⠒⠼⠚⠚⠤⠼⠁⠃⠒⠼⠉⠚⠲

What is 2:45 + 1:10?

⠠⠱⠁⠞ ⠊⠎ ⠸⠩ ⠼⠆⠸⠒⠼⠲⠢⠬⠂⠸⠒⠼⠂⠴ ⠸⠱⠦

c. When a comma or semicolon occurs between items that are to be transcribed in Nemeth Code, even if they could logically be regarded as belonging to the sentence structure, the comma or semicolon should be transcribed in Nemeth Code. Likewise, parentheses, brackets, or braces that enclose only material that is to be transcribed in Nemeth Code may be transcribed as part of that material even if they could logically be considered as belonging to the larger sentence structure.

4. To avoid use of switch indicators when a single word standing alone occurs between two math expressions, a *single-word switch indicator* (6, 3) may be used in Nemeth Code to indicate that the following word (or hyphenated word) is in UEB. Contractions may be used in the subsequent word. The single-word switch indicator should precede the word whether or not it contains contractions. The effect of the indicator is terminated by a space. Otherwise, no contractions are used in Nemeth Code. Similar to the capital indicators, the one-word switch indicator is disregarded for purposes of the UEB lower sign rule. Before a consecutive sequence of two or more words, terminate Nemeth Code. UEB typeform indicators may be used on words that are preceded by the single-word switch indicator. **Note:** The dots 6, 3, previously a transcriber's note symbol, is now the single-word switch indicator, and therefore should be listed on the Special Symbols page, even though it is a Nemeth Code symbol.

5. When following *Guidance for Transcription Using the Nemeth Code within UEB Contexts*, icons that are created using the UEB transcriber-defined shape indicator (UEB 11.7.2) may be used in either UEB or Nemeth context without the insertion of switch indicators.

6. A switch from UEB to Nemeth Code terminates the effect of a typeform indicator. No UEB typeform terminator is required. This does not apply when switching from Nemeth to UEB. (Capitalization is not a typeform attribute.)

UEB Rule for Use of Opening and Closing Nemeth Indicators

The opening Nemeth Code indicator and Nemeth Code terminator should be used to indicate the switch in and out of Nemeth Code. For convenience, the applicable section of the *Rules of Unified English Braille 2013* is inserted here. The examples provided here have been modified as per the guidelines in this document. Included changes are: keeping the open/close Nemeth indicators on the line with the equation if the entire equation and indicators will fit on the line; not leaving Nemeth Code for single words between mathematical expressions:

14.6 Nemeth Code within UEB text

14.6.1 When technical material is transcribed according to the provisions of *The Nemeth Braille Code for Mathematics and Science Notation* within UEB text, the following sections provide for switching between UEB and Nemeth Code.

14.6.2 Place the opening Nemeth Code indicator followed by a space before the sequence to which it applies. Its effect is terminated by the Nemeth Code terminator preceded by a space.

Note: The spaces required with the indicator and the terminator do not represent spaces in print.

Examples:

The result will be in the form (ax + by)(cx + dy), where
ac = 12, bd = −10, and ad + bc = 7.

⠀⠀⠠⠮⠀⠗⠑⠎⠥⠇⠞⠀⠺⠀⠆⠀⠔⠀⠮⠀⠿⠍
⠸⠩⠀⠷⠁⠭⠬⠃⠽⠾⠷⠉⠭⠬⠙⠽⠾⠠⠀⠠⠄⠐⠱⠀⠁⠉⠀⠨⠅⠀⠼⠂⠆⠠
⠃⠙⠀⠨⠅⠀⠤⠼⠂⠴⠠⠀⠠⠄⠯⠀⠁⠙⠬⠃⠉⠀⠨⠅⠀⠼⠶⠀⠸⠱⠲

He said, "4x+3y is the numerator."

⠀⠀⠠⠓⠑⠀⠎⠙⠂⠀⠦⠸⠩⠀⠼⠲⠭⠬⠒⠽⠀⠸⠱⠀⠊⠎⠀⠮⠀⠝⠥⠍⠻⠁⠞⠕⠗⠲⠴

14.6.3 When the Nemeth Code text is displayed on one or more lines separate from the UEB text, the opening Nemeth Code indicator and the Nemeth Code terminator may each be placed on a line by itself or at the end of the previous line of text.

Example:

Solution. Again we group the first two terms and the last two terms.

$$\begin{aligned}4x^3 - 12x^2 - x + 3 &= 4x^2(x - 3) - (x - 3)\\ &= (x - 3)(4x^2 - 1)\\ &= (x - 3)(2x + 1)(2x - 1)\end{aligned}$$

⠀⠀⠨⠂⠠⠎⠕⠇⠥⠰⠝⠲⠀⠠⠁⠛⠀⠺⠑⠀⠛⠗⠳⠏⠀⠮⠀⠋⠌⠀⠞⠺⠕⠀⠞⠻⠍⠎⠀⠯
⠮⠀⠇⠁⠌⠀⠞⠺⠕⠀⠞⠻⠍⠎⠲⠀⠸⠩
⠀⠀⠼⠲⠭⠘⠒⠐⠤⠂⠆⠭⠘⠆⠐⠤⠭⠬⠒
⠀⠀⠀⠀⠨⠅⠀⠼⠲⠭⠘⠆⠐⠷⠭⠤⠒⠾⠤⠷⠭⠤⠒⠾
⠀⠀⠀⠀⠨⠅⠀⠷⠭⠤⠒⠾⠷⠲⠭⠘⠆⠐⠤⠂⠾
⠀⠀⠀⠀⠨⠅⠀⠷⠭⠤⠒⠾⠷⠆⠭⠬⠂⠾⠷⠆⠭⠤⠂⠾⠀⠸⠱

The opening indicator is placed at the end of the text line preceding the math expression in preference to being on a line by itself.

Additional Guidelines

1. The title page and any supplemental title pages of a book are transcribed in UEB. Nemeth Code symbols are not listed on the Special Symbols Page. The Transcriber's Notes page should carry the following note: "Mathematical content is transcribed according to *The Nemeth Braille Code for Mathematics and Science Notation, 1972 Revision*, 2007-*(year of latest update)* Updates including the *Guidance for Transcription Using the Nemeth Code within UEB Contexts."*
2. Consistency should be maintained throughout the book. For symbols such as the percent sign, degree mark, primes, and mentions of Greek letters, whether in a math expression or freestanding, the transcriber should switch to Nemeth Code.
3. Titles for figures, tables, sections, etc. (such as "Figure 1") are transcribed in UEB. This applies to numbers related to the figure title, such as

   Section 1.3.4 ⠠⠎⠑⠉⠰⠝ ⠼⠁⠲⠉⠲⠙

4. When words are part of an equation or math expression, they are as much a part of the technical notation as are the letter variables, numbers, signs of operation, etc. The whole expression is placed inside the Nemeth switches with no contractions and is spaced as defined in the Nemeth Code.

Example:

One of the most obvious features of an object in motion is how fast it is moving. If a car travels 200 meters in 10 seconds, we say its average speed is 20 meters per second, the ***average speed*** being the distance traveled divided by the time required to cover the distance:

$$\text{Average speed} = \frac{\text{Distance}}{\text{Elapsed time}}$$

The equation indicates that the unit for average speed is the unit for distance divided by the unit for time, or meters per second (m/s) in SI units.

⠀⠀⠠⠐⠕ ⠷ ⠮ ⠍⠕⠌ ⠕⠃⠧⠊⠳⠎ ⠋⠂⠞⠥⠗⠑⠎ ⠷ ⠁⠝ ⠕⠃⠚⠑⠉⠞
⠔ ⠍⠕⠰⠝ ⠊⠎ ⠓⠪ ⠋⠁⠌ ⠭ ⠊⠎ ⠍⠕⠧⠬⠲ ⠠⠊⠋ ⠁ ⠉⠜
⠞⠗⠁⠧⠑⠇⠎ ⠼⠃⠚⠚ ⠍⠑⠞⠻⠎ ⠔ ⠼⠁⠚ ⠎⠑⠉⠕⠝⠙⠎⠂ ⠺⠑ ⠎⠁⠽
⠭⠎ ⠁⠧⠻⠁⠛⠑ ⠎⠏⠑⠫ ⠊⠎ ⠼⠃⠚ ⠍⠑⠞⠻⠎ ⠏⠻ ⠎⠑⠉⠕⠝⠙⠂ ⠮
⠘⠂⠨⠂⠁⠧⠻⠁⠛⠑ ⠘⠂⠨⠂⠎⠏⠑⠫ ⠆⠬ ⠮ ⠲⠞⠨⠑ ⠞⠗⠁⠧⠑⠇⠫
⠙⠊⠧⠊⠙⠫ ⠃⠽ ⠮ ⠐⠞ ⠗⠑⠟⠥⠊⠗⠫ ⠞⠕ ⠉⠕⠧⠻ ⠮ ⠲⠞⠨⠑⠒
⠀⠀⠸⠩ ⠠⠁⠧⠑⠗⠁⠛⠑ ⠎⠏⠑⠑⠙
⠀⠀⠀⠀⠨⠅ ⠹⠠⠙⠊⠎⠞⠁⠝⠉⠑⠌⠠⠑⠇⠁⠏⠎⠑⠙ ⠞⠊⠍⠑⠼ ⠸⠱
⠠⠮ ⠑⠟⠥⠁⠰⠝ ⠔⠙⠊⠉⠁⠞⠑⠎ ⠞ ⠮ ⠥⠝⠊⠞ ⠿ ⠁⠧⠻⠁⠛⠑
⠎⠏⠑⠫ ⠊⠎ ⠮ ⠥⠝⠊⠞ ⠿ ⠲⠞⠨⠑ ⠙⠊⠧⠊⠙⠫ ⠃⠽ ⠮ ⠥⠝⠊⠞ ⠿
⠐⠞⠂ ⠕⠗ ⠍⠑⠞⠻⠎ ⠏⠻ ⠎⠑⠉⠕⠝⠙ ⠸⠩ ⠷⠰⠍⠸⠌⠰⠎⠾ ⠸⠱ ⠔
⠠⠠⠎⠊ ⠥⠝⠊⠞⠎⠲

5. Abbreviated measurement units (e.g., ft., min) adjacent to related numbers transcribed in Nemeth Code are part of the technical expression and are transcribed within the Nemeth switch indicators.

   Examples:

   If the box is more than $\frac{1}{4}$ ounce above or below the desired weight, the box is rejected.

   ⠀⠀⠠⠊⠋ ⠮ ⠃⠕⠭ ⠊⠎ ⠍ ⠹⠁⠝ ⠸⠩ ⠹⠂⠌⠲⠼ ⠸⠱ ⠳⠝⠉⠑
   ⠁⠃⠧ ⠕⠗ ⠆⠇ ⠮ ⠙⠑⠎⠊⠗⠫ ⠺⠑⠊⠣⠞⠂ ⠮ ⠃⠕⠭ ⠊⠎
   ⠗⠑⠚⠑⠉⠞⠫⠲

   If the box is more than $\frac{1}{4}$ oz above or below the desired weight, the box is rejected.

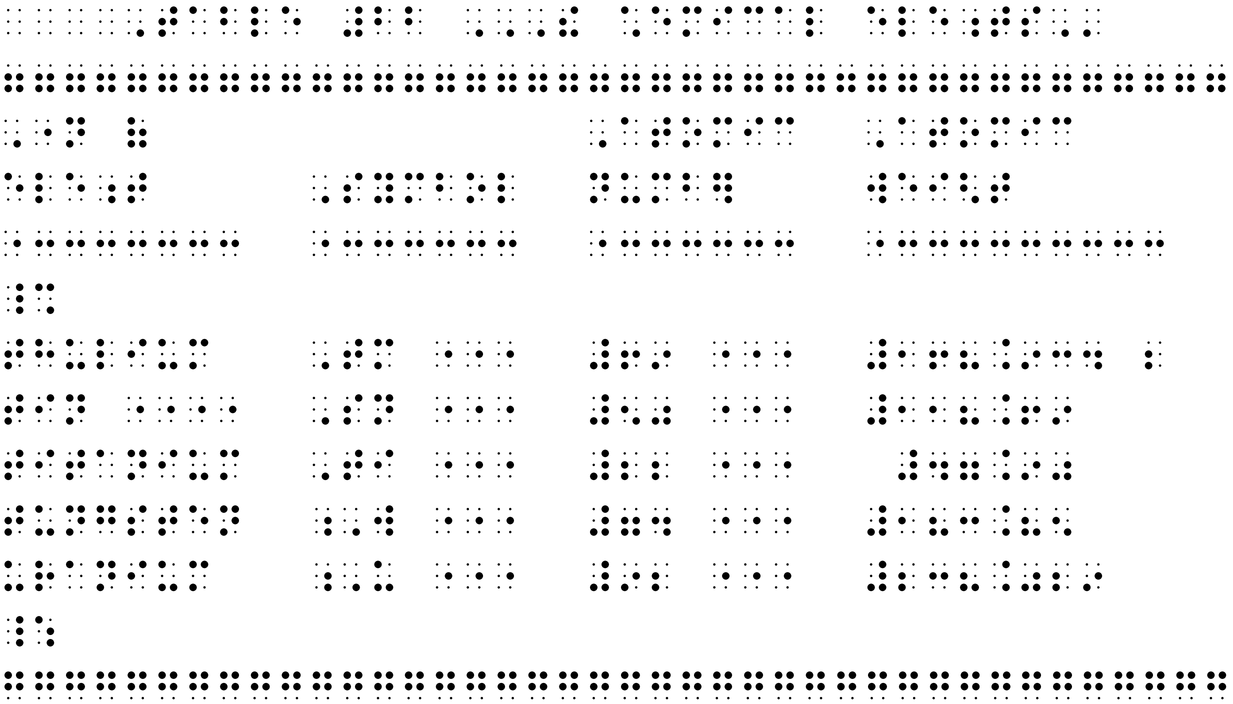
   ⠀⠀⠠⠊⠋ ⠮ ⠃⠕⠭ ⠊⠎ ⠍ ⠹⠁⠝ ⠸⠩ ⠹⠂⠌⠲⠼ ⠕⠵ ⠸⠱ ⠁⠃⠧
   ⠕⠗ ⠆⠇ ⠮ ⠙⠑⠎⠊⠗⠫ ⠺⠑⠊⠣⠞⠂ ⠮ ⠃⠕⠭ ⠊⠎ ⠗⠑⠚⠑⠉⠞⠫⠲

6. A series of two or more letters (not abbreviations) identifying geometric shapes or figures is transcribed in Nemeth Code and capitalized individually if needed. (e.g. Triangle ABC, line EF). The name of the figure is not included within the switches. A single letter identifying a shape or figure may be transcribed in UEB. (e.g. Circle O).
7. Tables consisting entirely of words are transcribed in UEB. When table entries are technical material but the row headings are words, the whole table is considered technical material, excluding the table title and column headings. The opening Nemeth Code indicator is placed at the margin of the line following the column separation line with the first row heading or first entry on the next line. The Nemeth Code terminator follows the last line of entries, placed at the margin, followed by the bottom box line, if needed, on the next braille line. The single-word switch indicator is not required on the individual words in the row headings, and contractions are not used.

Example:

Table 22 **THE CHEMICAL ELEMENTS**

Name of element	**Symbol**	**Atomic number**	**Atomic weight**
thulium	Tm	69	168.934 2
tin	Sn	50	118.69
titanium	Ti	22	47.90
tungsten	W	74	183.85
uranium	U	92	238.029



8. In a numbered or lettered series of math problems that are in Nemeth Code, keep Nemeth Code in effect for the identifiers to avoid excessive switching, even though these identifiers are not technically part of the math.

Example:

a. $\frac{2}{5}+\frac{5}{2}=$

b. $\frac{12}{5}-\frac{9}{5}=$

c. $\frac{14}{5}-\frac{8}{9}=$

d. $\frac{2}{15}+\frac{24}{15}=$

⠸⠩
⠰⠁⠸⠲ ⠹⠆⠌⠢⠼⠬⠹⠢⠌⠆⠼ ⠨⠅ ⠿
⠰⠃⠸⠲ ⠹⠂⠆⠌⠢⠼⠤⠹⠔⠌⠢⠼ ⠨⠅ ⠿
⠰⠉⠸⠲ ⠹⠂⠲⠌⠢⠼⠤⠹⠦⠌⠔⠼ ⠨⠅ ⠿
⠰⠙⠸⠲ ⠹⠆⠌⠂⠢⠼⠬⠹⠆⠲⠌⠂⠢⠼ ⠨⠅ ⠿ ⠸⠱

9. In general, keep the switch indicators on the same line as the mathematics to which they apply with the following exceptions:
   a. As shown in the example above, the opening Nemeth Code indicator at the beginning of a list of numbered or lettered identifiers could be placed by itself on the line above the first item, or at the end of the line of text that precedes the list. This ensures that all identifiers begin in the same cell. If space permits, the Nemeth Code terminator should still be placed on the same line with the text where Nemeth Code ends.
   b. If space permits, an opening Nemeth Code indicator that precedes a spatial problem may be placed on the same line with the end of the text above the problem. The required blank line follows the opening Nemeth Code indicator. If there is not room on the line with the preceding text, the opening Nemeth Code indicator is placed in cell 1 on a line by itself and followed by the requisite blank line. When Nemeth Code is closed after a spatial problem, the Nemeth Code terminator is placed in cell 1 on a line by itself and is preceded by the required blank line (the blank lines around spatial problems are required in Nemeth Code).

c. If code switching occurs within a math problem and would interfere with the alignment of the problem, an opening Nemeth Code indicator should be placed at the end of the line before the math to which it applies. If there is not room on the line, the indicator is treated as a runover to that line. (*See the example under Formatting #6*.)

10. If exercise directions end with an expression in Nemeth Code and the subsequent math problem starts with Nemeth Code, Nemeth Code may be left in effect between the end of the directions and the start of the problem.

Example:

Find and simplify each of the following expressions. Let $f(x)=\sqrt{x+2}$ and $g(x)=3x-1$.

8. $f(7)$ 9. $g(2)$ 10. $(f \circ g)(2)$

⠀⠀⠀⠀⠠⠋⠔⠙ ⠯ ⠎⠊⠍⠏⠇⠊⠋⠽ ⠑⠁⠡ ⠷ ⠮ ⠋⠕⠇⠇⠪⠬
⠀⠀⠑⠭⠏⠗⠑⠎⠨⠝⠎⠲ ⠠⠇⠑⠞ ⠸⠩ ⠋⠷⠭⠾ ⠨⠅ ⠜⠭⠬⠆⠻ ⠠⠄⠯
⠀⠀⠛⠷⠭⠾ ⠨⠅ ⠼⠒⠭⠤⠂⠸⠲
⠼⠦⠸⠲ ⠋⠷⠶⠾
⠼⠔⠸⠲ ⠛⠷⠆⠾
⠼⠂⠴⠸⠲ ⠷⠋⠨⠡⠛⠾⠷⠆⠾ ⠸⠱

11. The opening Nemeth Code indicator and the Nemeth Code terminator should be placed on the same page with part of the expression to which they apply.
12. If a tactile graphic intervenes between two items in Nemeth Code, leave Nemeth Code in effect for the graphic.
13. When short comments in words appear alternated with math problems (such as comments on equations), switch out of Nemeth Code to transcribe the comments in contracted braille.
14. In uncontracted Nemeth braille, the English Letter Indicator (ELI) is used wherever required by §24-§30 of the Nemeth Code. This would mean, for example, that multiple choice and exercise letters as well as single letter abbreviations would need the ELI.

15. UEB typeform indicators are used in the surrounding text. Nemeth emphasis indicators are used only if it is necessary to indicate emphasis inside the Nemeth Code switches. For italicized phrases of two or more words within Nemeth switches, where necessary, use the three-cell Nemeth typeform indicators for words, phrases, and mathematical statements. ⠠⠄⠨ ⠨⠠⠄ (6, 3, 46) (46, 6, 3) For a single italicized word within Nemeth switches, use the italic typeform indicator as already provided for letters and numbers (46). Boldface is indicated by the three-cell Nemeth open and close bold indicators.

Example:

Remember the rule for the probability of **A** *and* **B**? It said

P(**A** *and* **B**) = *P*(**A**) × *P*(**B**) when **A** and **B** are independent.

⠀⠀⠠⠗⠑⠍⠑⠍⠃⠻ ⠮ ⠗⠥⠇⠑ ⠿ ⠮ ⠏⠗⠕⠃⠁⠃⠊⠇⠰⠽ ⠷
⠸⠩ ⠸⠰⠠⠁ ⠨⠁⠝⠙ ⠸⠰⠠⠃ ⠸⠱⠦ ⠠⠭ ⠎⠙ ⠸⠩
⠀⠀⠠⠏⠷⠸⠰⠠⠁ ⠨⠁⠝⠙ ⠸⠰⠠⠃⠾
⠀⠀⠀⠀⠨⠅ ⠠⠏⠷⠸⠰⠠⠁⠾⠈⠡⠠⠏⠷⠸⠰⠠⠃⠾ ⠠⠄⠱⠢ ⠸⠰⠠⠁ ⠠⠄⠯
⠀⠀⠀⠀⠸⠰⠠⠃ ⠸⠱ ⠜⠑ ⠔⠙⠑⠏⠢⠙⠢⠞⠲

16. If code switching is necessary within the text of an emphasized passage as, for example, in a labeled statement, the beginning typeform indicators are repeated after each switch to show that emphasis continues. Therefore, to avoid excessive use of indicators, omit the typeform indication from an emphasized passage in which code switching occurs unless doing so would change the meaning.

Example:

Emphasis may be ignored in the following example. The boldface font has no meaning. If retained, UEB typeform terminates with the opening Nemeth Code indicator, bold is restated inside the switches with Nemeth typeform indicators, open and close, UEB typeform is restated after the Nemeth terminator, etc., requiring many indicators.

Midpoint of a Line Segment	**If a line segment has endpoints at (x_1, y_1) and (x_2, y_2) then the midpoint of the line segment has coordinates $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$.**

With boldface retained:

⠶⠶
⠀⠀⠠⠠⠠⠍⠊⠙⠏⠕⠔⠞ ⠷ ⠁ ⠇⠔⠑ ⠎⠑⠛⠰⠞⠠⠄ ⠘⠶⠠⠊⠋ ⠁ ⠇⠔⠑
⠎⠑⠛⠰⠞ ⠓⠁⠎ ⠢⠙⠏⠕⠔⠞⠎ ⠁⠞
⠸⠩ ⠠⠄⠸ ⠷⠭⠂⠠ ⠽⠂⠾ ⠸⠠⠄ ⠸⠱ ⠘⠂⠯
⠸⠩ ⠠⠄⠸ ⠷⠭⠆⠠ ⠽⠆⠾ ⠸⠠⠄ ⠸⠱ ⠘⠶⠮⠝ ⠮ ⠍⠊⠙⠏⠕⠔⠞ ⠷
⠮ ⠇⠔⠑ ⠎⠑⠛⠰⠞ ⠓⠁⠎ ⠉⠕⠕⠗⠙⠔⠁⠞⠑⠎
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With boldface not retained:

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In this second example there is meaning to the italics. The italics would be retained using UEB typeform indicators, but the boldface typeform may be ignored.

Inverse of a 2 x 2 Matrix	**Any matrix** M, $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$, **will have an inverse** M^{-1} ***if and only if*** $\begin{vmatrix} a & b \\ c & d \end{vmatrix} \neq 0$. **Then** $M^{-1} = \frac{1}{ad - bc}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$.

17. Number lines are transcribed in Nemeth Code following the provisions of the *Guidelines and Standards for Tactile Graphics*. The following symbols are used and must be listed in braille order in a separate category with the cell 5 heading “Nemeth Horizontal Number Line Symbols” on the Special Symbols page. Following is *suggested* wording.

Braille	Meaning
⠕	Right-pointing arrowhead
⠕⠕	Bold right-pointing arrowhead
⠗	Ordinary (regular) coordinate (scale) mark
⠭	Open (hollow) circle, placed above the number line
⠽	Right bracket, placed above the number line
⠯	Left bracket, placed above the number line
⠿	Solid (filled-in) circle, placed above the number line
⠷	Left parenthesis, placed above the number line
⠾	Right parenthesis, placed above the number line
⠪	Left-pointing arrowhead
⠪⠪	Bold left-pointing arrowhead
⠒	Line segment
⠶	Bold (shaded, colored) line segment

NOTE: These symbols should not be used below the Grade 4 level.

Formatting

The switch indicators signal which **symbols** are to be used, but they do not govern the **formatting**. Formatting (that is, indentions, line spacing, centering, etc.) is handled as a separate issue from the switch between **symbols sets/notation.** This means that the document that contains even one set of Nemeth Code switch indicators is formatted according to the following mix of Nemeth Code and *Braille Formats* provisions regardless of whether Nemeth Code is in effect. Note that for this context, emphasis falls in the category of symbols, not formatting.

1. Follow Nemeth Code rules about division of mathematical expressions. If there is not room on a line for the Nemeth Code terminator and any related punctuation to follow the last expression, the indicator may be separated from the math and placed on the following line.
2. For a box transcribed all in Nemeth Code, the opening Nemeth Code indicator is at the beginning of the top box line, followed by a blank space. The Nemeth Code terminator is at the end of the bottom box line, preceded by a space. The box lines themselves should be brailled as indicated in the most current edition of *Braille Formats.* If a transcriber's note occurs inside a box that is otherwise all in Nemeth Code, do not include the box lines within Nemeth Code. Preferably, the transcriber's note would be transcribed before the box. If technical material follows the box without interruption, begin the Nemeth Code before the box and terminate Nemeth Code after the technical material following the box.

Example:

Tangent table

x (rad)	x (°)	tan (x)
-π/2	-90°	-∞
-1.2490	-71.565°	-3
-1.1071	-63.435°	-2
-π/3	-60°	-√3
-π/4	-45°	-1
-π/6	-30°	-1/√3
-0.4636	-26.565°	-0.5
0	0°	0
0.4636	26.565°	0.5
π/6	30°	1/√3
π/4	45°	1
π/3	60°	√3
1.1071	63.435°	2
1.2490	71.565°	3
π/2	90°	∞

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3. All narrative paragraphs should be transcribed in 3-1 (no blocked paragraphs).
4. Runover margins for itemized material are determined individually for each question rather than by section as *Formats* states.
5. For an exercise with any number of subentry levels, use margins 1-5 for the first level, and 3-5 for all subsequent levels. (Follows *Nemeth formatting rules*).
6. It is preferred that authors' comments following mathematical equations be treated as part of the line of the equation, with runovers in the appropriate location for the expression. Alternatively, authors' comments may be blocked four cells to the right of the runover of the expression. The comments should be formatted in a consistent manner within a transcription.

Example:

You can substitute these values into the equation to find C.

$Ax + By = C$	***Standard form of a linear equation***
$4x + 5y = C$	***Substitute values for A and B.***
$4(3) + 5(1) = C$	***Substitute values for x and y.***
$12 + 5 = C$	
$17 = C$	

The standard form of the equation is $4x + 5y = 17$.

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7. Follow *Formats* for displayed literary text, with the exception of blocked paragraphs, which are not used in Nemeth. Follow Nemeth rules for displayed math expressions (displayed material begins 2 cells to the right of the material above it with runovers two cells to the right of that; no blank lines).
8. Instructions are transcribed in 5-3 (follows Nemeth formatting rules). At least one line of the instructions must be on the same braille page as the questions or itemized text that follow.
9. Instructions must be followed by lettered or numbered exercises. If there are no exercises following the instructions, the text is considered a narrative paragraph and transcribed in 3-1.
10. If the body of a table, excluding column headings, consists only of numbers, the numeric indicator **may** be omitted. The table can contain no guide dots, plus/minus signs, etc. No TN is required. The body of the table is transcribed according to Nemeth Code and must be within Nemeth Code indicators.
11. In listed table format, when transcribing within the Nemeth switches, a double dash (four cells of dots 36) is used for blank entries that are to be filled in.
12. Transcribe proportion and ratio symbols according to the rules of Nemeth Code.
13. In a technical context, use the Nemeth caret; in surrounding text, use the UEB caret. This means that the caret may be brailled two different ways within one document. The distinction is based on meaning.
14. Words enclosed in shapes are transcribed according to the methods for shapes with internal modification and must be enclosed within Nemeth switches. This includes print representations of computer or calculator keys.
15. When a matrix is embedded in text, the opening Nemeth Code indicator is placed on the top line of the matrix before the opening enlarged grouping symbol on that line; the Nemeth Code terminator is placed on the top line of the matrix after the closing enlarged grouping symbol. These indicators apply to the whole arrangement. The enlarged grouping indicators provide the boundaries on the subsequent lines of the matrix. If there is room on the top line after the matrix, surrounding text can continue on that line.

Example:

For the matrix $\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$, the determinant is found using the diagonal rule.

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16. In a unified system of equations with accompanying remarks to the right and no right grouping sign, the remarks are placed on the line following the required blank line in the displayed position for that text.