APPENDIX C
NEMETH CODE FORMAT SUMMARIES

- General Principles
- "Keep Together"
- Margins
- Itemized Material
- Displayed Mathematical Material
- Mathematical Statements
- Formal Proofs
- Division of Mathematical Expressions Between Braille Lines
- Placement of Code Switch Indicators
- Spatial Arrangements

"Formatting" refers to layout on the page, such as indentations (margins), line spacing (blank lines), centering, and pagination. The Nemeth Code specifies certain formats which are summarized in this appendix. For illustrative examples, go to the sections in this lesson material which are cited as bold numbers in brackets.

General Principles

When an item in a UEB transcription requires the use of Nemeth Code symbols, format rules of *The Nemeth Braille Code for Mathematics and Science Notation* are to be applied to the entire transcription including those portions transcribed in UEB. When a format is not specifically addressed in the Nemeth Code, the principles provided in *Braille Formats Principles of Print-to-Braille Transcription* should be followed. [**Preliminary Lesson, Section P7**]

"Keep Together"

A mathematical expression that will fit on one braille line within the current margins must not be divided between lines. The entire expression is brought down to the next line. [**1.5**] If a page number on line 25 or line 1 does not allow the entire expression to fit on the line, the expression is brought down to the next line that has enough usable cells. [**3.7**]

Within a paragraph, a code switch indicator and/or terminator should appear on the same line as the expression to which it applies, if there is room on the line. [**1.5.1**]

A hyphenated expression containing one or more mathematical components must not be divided between braille lines. [**2.19**]

An abbreviation and a preceding or following numeral or letter to which it applies must not be divided between braille lines. [**3.4.1, 4.1.1**]

Items in an enclosed list must not be divided between braille lines if the entire list will fit on a single braille line. If the enclosed list will not fit on a single braille line, use as much of the current line as possible and begin a runover line after a comma. [**4.17.3**]

The components of the following symbols must not be divided between braille lines: a symbol of operation using plus and minus (**Lesson 5**); a symbol of comparison compounded vertically or horizontally (**Lesson 5**); a shape symbol with structural or interior modification (**Lesson 11**); the the components of an expression modified according to the five-step rule. (**Lesson 12**); superposed symbols (**Lesson 13**); a two-part function name (**Lesson 14**).

A fraction must not be divided unless the entire fraction will not fit on the line. [**8.3.b**]

A mixed number must not be divided from its fractional part. [**8.5.1.b**]

A single keystroke construction must not be divided between braille lines. [**11.25**]

A sign of shape and the letter, sequence of letters, or numeral which follows it is regarded as a single mathematical item and therefore should not be divided between braille lines. [**11.31.1**]

Tally marks belonging to the same group must not be divided between braille lines. [**13.4.a**]

A function name or an abbreviated function name and the sign which follows it must not be divided between braille lines. [**14.5**]

Unless unavoidable, items enclosed within grouping signs should not be divided between lines. [**15.2**]

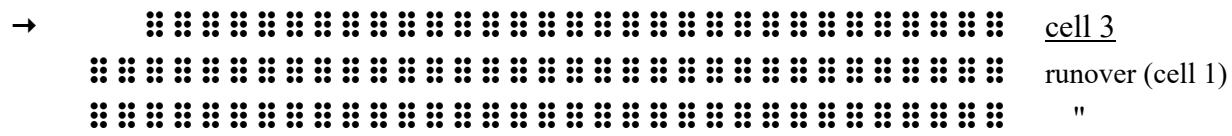
Margins

For margins with spatial material, see the section on Spatial Arrangements at the end of this Appendix.

Nemeth formatting can be broken down into two major styles: indented and hanging. In the indented styles, the first line is indented two cells to the right of the runover margin. In the hanging styles, the first line begins two cells or four cells to the left of the runover margin.

Narrative

3-to-1 Narrative paragraphs in a document governed by Nemeth formatting begin in cell 3 with runovers in cell 1 (indented style). Blocked paragraphing is not used in a Nemeth transcription. [**1.14**]



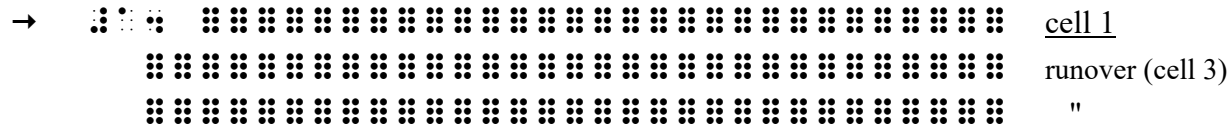
Directions

3-to-1 If instructional text is not followed by lettered or numbered exercise material, the text is considered to be a narrative paragraph and begins in cell 3 with runovers beginning in cell 1 (indented style). The (5-5) style of "directions" given in *Braille Formats* does not apply in a transcription that contains Nemeth. [**5.12.1**]

Margins: Itemized Material

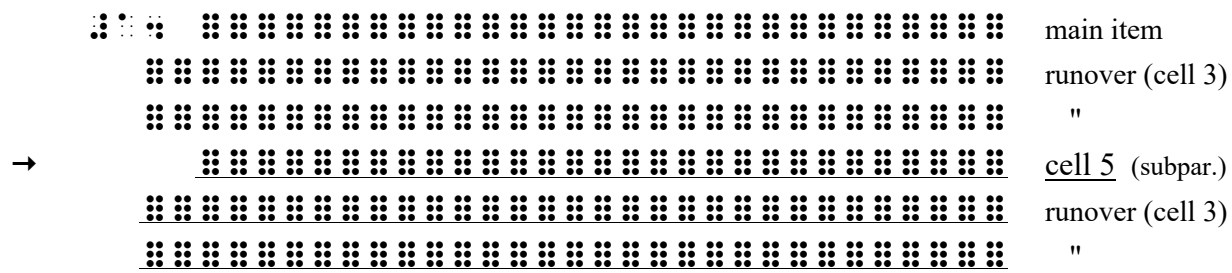
Main Item (no subdivisions)

1-to-3 The identifier begins in cell 1; runovers begin in cell 3 (hanging style). [**1.16**]



Subparagraph of a Main Item (no subdivisions)

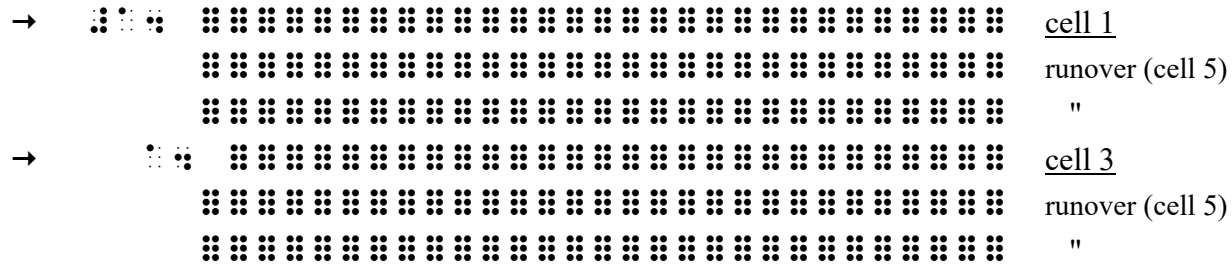
5-to-3 If a main item contains more than one paragraph, each subparagraph begins in cell 5 with runovers in cell 3 (indented style). [**1.16**]



When the print copy arranges nonspatial itemized material side by side across the page, the braille format is changed so that all identifiers start in the same cell. [**2.20, 6.1.2**]

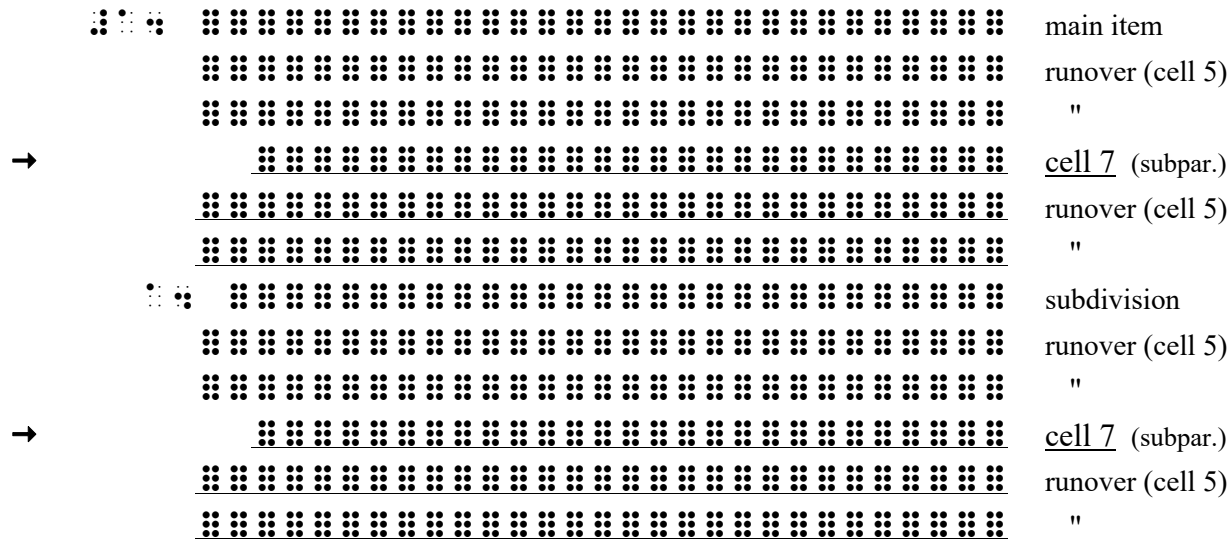
Main Item with Subdivision

1-to-5, 3-to-5 The main item designation begins in cell 1, and its runovers begin in cell 5. Each lettered or numbered subdivision—regardless of print indentation—begin in cell 3, with any runovers in cell 5 (hanging styles). [**6.1**]



Subparagraph of Items with Subdivision

7-to-5 If a main item or a subdivision has more than one paragraph, each new paragraph begins in cell 7, and its runovers begin in cell 5 (indented style). [**6.1.1**]



When itemized material is arranged in tabular form so that items are numbered at the margin and subdivisions are aligned beneath lettered column headings, the material is transcribed in one of the following ways: [**6.1.3**]

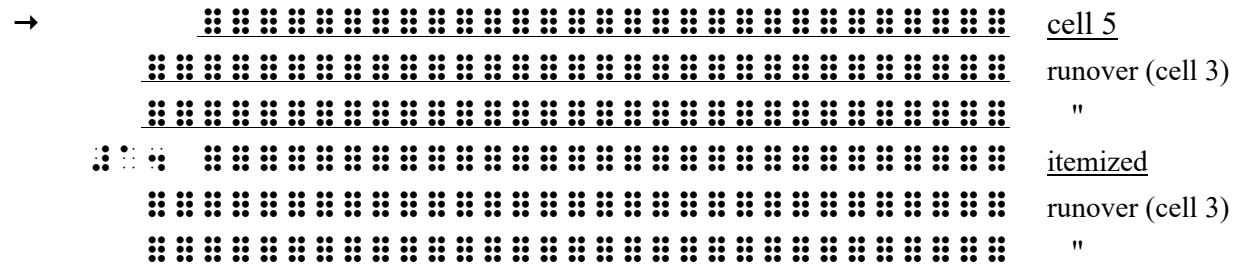
- If all the columns can be accommodated across the braille page, the print columnar arrangement is followed. Each problem number begins in cell 1. The letter identifying each column is aligned with the first cell of the related column. A blank line is left above and below the lettered column headings. Two blank cells separate the columns.
- If all the columns cannot be accommodated across the braille page, each subdivision in each problem must be lettered individually, and the (1-5; 3-5) format is followed.

Exercise Set

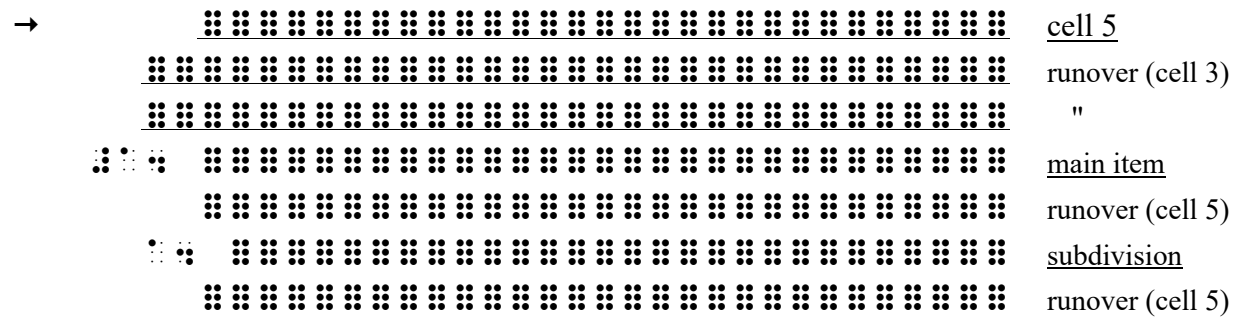
Runover margins for itemized material are determined individually for each question. A numbered or lettered problem with no subdivisions will be (1-3); the next numbered or lettered problem may have subdivisions and so will be (1-5; 3-5), etc. [**6.1.4**]

Instructions

5-to-3 When a group of numbered or lettered problems is preceded by instructions, the instructions begin in cell 5, with runovers in cell 3 (indented style). One line is left blank above instructions unless the instructions follow a cell-5 or a cell-7 heading. Instructions may begin on line 1 of the braille page if no running head is in use. The related itemized material follows on the next line unless the material itself requires a blank line before it. It is preferable to keep instructions on the same braille page with the exercise. To accomplish this, instructions may need to be moved to the next braille page. However, when there is not sufficient space on that page for the instructions and part of the exercise, instructions may be placed on the preceding page. [**5.11**]



OR



Margins: Displayed Mathematical Material

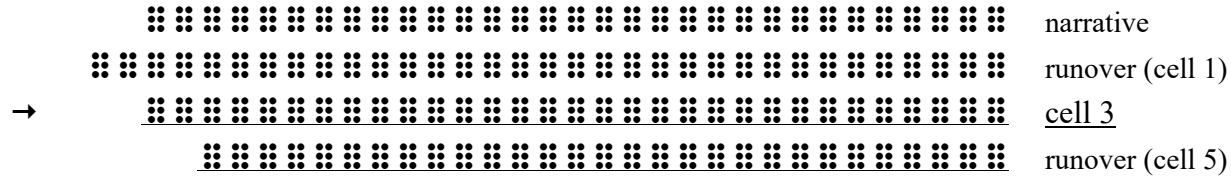
When mathematical material is set apart from the body of the text in the print copy, it is referred to as a displayed expression. Displayed math uses a hanging style. The margins depend upon the layout of the surrounding text. The first cell of the displayed material is indented two cells to the right of the runover cell of the preceding material, whether or not a runover is actually present. Runovers of the displayed math are usually indented two cells further. [**7.1**]

A line is not skipped above or below displayed mathematical material unless the preceding or following material requires a blank line. [**7.1**]

When a number or letter is used to label a displayed mathematical expression it is placed at the left of the expression in braille regardless of the location of the label in the print copy. The label begins in the appropriate cell for displayed material. [**7.2.1**]

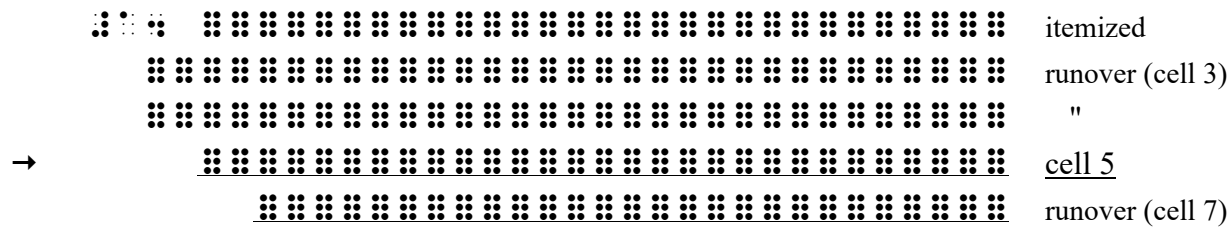
Math Displayed to Narrative

3-to-5 In unitemized explanatory portions of the text, displayed mathematical material begins in cell 3. Runovers begin in cell 5 (hanging style). [Text (3-1); displayed material (3-5)]



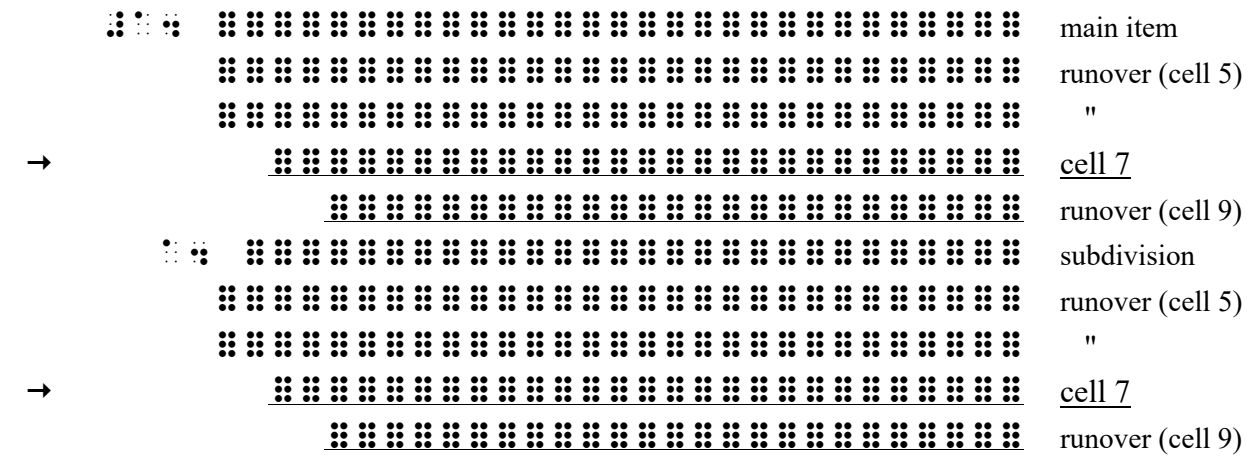
Math Displayed to Itemized Text

5-to-7 In itemized text without subdivisions, displayed mathematical material begins in cell 5. Runovers begin in cell 7 (hanging style). [Text (1-3); displayed material (5-7)]



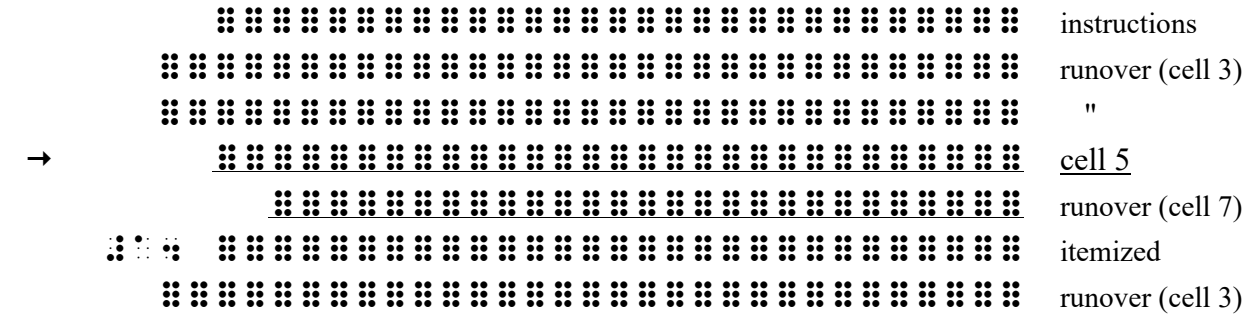
Math Displayed to Itemized Text with Subdivisions

7-to-9 In itemized text with subdivisions, displayed mathematical material begins in cell 7. Runovers begin in cell 9 (hanging style). [Main division text (1-5); displayed material (7-9). Subdivision text (3-5); displayed material (7-9)]



Math Displayed to Instructions

5-to-7 Within or following instructions, displayed mathematical material begins in cell 5. Runovers begin in cell 7 (hanging style). [Instructions (5-3); displayed material (5-7)] [**7.1.5**]



Nested Linked Expressions

A nested linked expression, defined in **8.22**, can occur in one of the following displayed layouts. Note that the first cell of the anchor is indented two cells to the right of the runover cell of the preceding material.

- **In Narrative.** When a nested linked expression is displayed to (3-1) unitemized explanatory portions of text, the anchor begins in cell 3. If the anchor has runovers, they begin in cell 7. Each link begins in cell 5. If a link has runovers, they also begin in cell 7. [**8.22.2**]
- **In Itemized Text Without Subdivisions.** When a nested linked expression is displayed to (1-3) itemized text containing no subdivisions, the anchor begins in cell 5. If the anchor has runovers, they begin in cell 9. Each link begins in cell 7. If a link has runovers, they also begin in cell 9. [**8.22.3.a**]

- **In Itemized Text With Subdivisions.** When a nested linked expression is displayed to itemized text containing subdivisions (1-5; 3-5), the anchor begins in cell 7. If the anchor has runovers, they begin in cell 11. Each link begins in cell 9. If a link has runovers, they also begin in cell 11. [**8.22.3.b**]
- **In Itemized Text With No Narrative.** When a nested linked expression follows an identifier with no intervening narrative, the anchor is placed on the same line as the identifier. Each link begins a new line, two cells to the right of the cell in which the identifier begins. Runovers are indented two cells further—that is, four cells to the right of the cell in which the identifier begins. [**8.22.4**]

Mathematical Statements and Proofs

A line is left blank before the beginning and after the end of a mathematical statement or a proof. Normal paragraphing (3-1) is applied. The label is treated as a paragraph heading. [**11.38**]

If a mathematical statement or a proof contains auxiliary captions such as *Given*, *Prove*, or *Conclusion*, etc., such captions begin a new paragraph in cell 3 with runovers in cell 1. A line is not skipped above a caption. Capitalization and typeform follows print, but if fully capitalized and also in a nonregular typeform, capitalization is retained and typeform is disregarded. [**12.16.d**]

Formal Proof in Two Columns

When a formal proof is printed in step-number form and divided into two columns, follow the format described in **12.16.1**.

Division of Mathematical Expressions Between Braille Lines

When a mathematical expression is too long to fit on one braille line within the current margins the expression is divided between braille lines according to the rules of the Nemeth Code. A new line need not be forced if there is room on the line to begin the expression, provided the division is made in accordance with the principles defined below. Runovers conform to the margin requirements currently in effect – be it itemized, instructional, explanatory, labeled, subdivided, or displayed material.

Long Numeral

A long numeral is divided after a comma if a comma is present, and a hyphen is inserted. If the numeral does not contain a comma, the hyphen may be inserted after any digit. When a numeral is divided between braille lines, the numeric indicator is used before the first digit of the numeral on the next line. [**1.7.1**]

Enclosed List

If an enclosed list will not fit on a single braille line, use as much of the current line as possible and begin a runover line after a comma. [**4.17.3.a**]

Linked Expressions

If a linked expression is too long to fit on one line, the expression continues on the next line, beginning with a sign of comparison. If the expression contains more than one link and the anchor with all links will fit on one line, do not divide it. If all links will not fit, use as much as the line as possible before dividing the expression. The new line begins with a link, placed in the runover cell of the current format. [**8.21**]

The comparison sign at which the new line begins must be on the baseline. An expression should not be divided before a comparison sign that is part of an item enclosed in grouping symbols, between fraction indicators, or within radical signs. [**8.21.1**]

A transition to a new braille line made before a sign of comparison terminates the effect of any level indicator used on the line above. [**8.21.2**]

Mathematical Expressions

Mathematical expressions which will not fit on one braille line within the boundaries of the current margins can be organized into a series of mathematical units in order to choose runover sites. The strategies are studied in Lesson 15, roughly outlined as follows. (i) Divide before a comparison sign on the baseline [**15.3**]; (ii) divide before an operation sign on the baseline [**15.4**]; (iii) divide before a mathematical unit [**15.5**]; (iv) divide after a termination indicator [**15.6**].

Placement of Code Switch Indicators

When mathematical content occurs anywhere in a UEB transcription, the nontechnical notation follows the rules of *Unified English Braille* and the technical notation follows the rules of the *Nemeth Braille Code*. Readers will assume they are reading UEB unless signaled otherwise by the use of a UEB code switch indicator, in this case, the opening Nemeth Code indicator. Between the opening Nemeth Code indicator and the Nemeth Code terminator are Nemeth symbols, following Nemeth rules. UEB symbols are not used within the Nemeth Code switch indicators. [**1.1**] The objective within a paragraph is to keep the switch indicators on the same line as the mathematics to which they apply. Displayed material, spatial arrangements, and tables have other considerations. There are guidelines to follow when the switch indicators do not fall neatly on a line or on a page.

General Principle in Narrative Context

The opening Nemeth Code indicator is followed by a space (unless it ends a line). The Nemeth Code terminator is preceded by a space (unless it begins a line). These spaces do not represent spaces in print. [**1.1**] Within a paragraph, a switch indicator should not stand alone on a line if there is room for it to fall on the line with the math expression to which it applies. [**1.5.1.b**] If two or more math expressions are transcribed between the same code switch indicators, the line may wrap at the space between the expressions even if the entire Nemeth portion could fit on one line. [**1.5.1.a**]

Switch Indicators with Itemized Material

Identifiers are transcribed according to the rules for the code in use at the time. All identifiers in a section do not need to be transcribed in the same code. [**2.18.2**] When at least the first two items require Nemeth, the opening Nemeth Code indicator is placed at the end of the line of text that precedes the itemized material. If there is no room on that line, the opening Nemeth Code indicator is placed in the runover position of the narrative. [**2.18.1**] This placement may be applied to a heading that precedes the identified Nemeth material, centered heading excepted. [**4.25**] A code switch indicator does not take the place of the blank line that may be required preceding the itemized material. For further details regarding placement of switch indicators in a list of mixed items, see **2.18.2**.

Switch Indicators with Displayed Mathematical Material

When displayed mathematical material is both preceded and followed by UEB text, the expression and its two switch indicators may be placed all together on one line if they will fit within current margins. If more than one line is required for the expression, the opening Nemeth Code indicator is placed at the end of the text line preceding the displayed material and the Nemeth Code terminator is placed at the completion of the displayed expression. If either indicator will not fit on the current line, it is placed on the following line in the runover position. [**7.1.1**]

Switch Indicators with Spatial Arrangements

Code switch indicators are placed outside of the spatial material in order not to interfere with alignment. The blank line required before and after the arrangement are part of the spatial problem and so must be inside the Nemeth switches. The opening Nemeth Code indicator and the Nemeth Code terminator do not take the place of that required blank line. If there is not room for the opening Nemeth Code indicator at the end of the line with the preceding text, it is placed on the next line in cell 1. The required blank line is on the line following the opening switch. To close Nemeth after a spatial problem, first insert the required blank line, then place the Nemeth Code terminator in cell 1 by itself on the following line. [**9.29, 9.30**]

Switch Indicators May Stand Alone on a Line

If a math expression will fit on one line but there is not room for one or both of the switch indicators, one or both switch indicators may stand alone on a line. Keeping the mathematical expression intact on one line is the priority. [**1.5.2**]

Switch Indicators and Punctuation

Punctuation that relates to the main text is placed outside of the switch indicators when the surrounding text is in UEB. There is no space between the terminator and the following punctuation. [**1.4]** To avoid excessive code switching between mathematical items, punctuation which belongs to the sentence structure may be transcribed inside the switches. **[2.3**] Paired punctuation (parentheses, brackets, braces, quotation marks) are transcribed inside the code switches when they enclose technical material. **[2.13**]

Switch Indicators after a Heading

An opening Nemeth Code indicator may be placed at the end of a cell-5 or cell-7 heading. [**4.25.2**] An opening Nemeth Code indicator cannot be placed at the end of a centered heading. [**4.25.1**]

Switch Indicators and Transcriber's Notes

Transcriber's note indicators are UEB symbols and therefore must be transcribed outside of the Nemeth switches. When the note itself contains mathematical material, code switching occurs within the note. Nemeth Code must be terminated before the closing transcriber's note indicator is transcribed. When itemized or spatial mathematical material follows the transcriber's note, the opening Nemeth Code indicator may be placed following the closing transcriber's note indicator only if it fits on the same line. [**4.26**]

Switch Indicators at Page Turns

When Nemeth is in effect, Nemeth Code is not terminated by transition to a new braille page or across a page turn line. When code switching occurs at a braille page turn, the opening Nemeth Code indicator and the Nemeth Code terminator should appear on the same braille page as the expression to which they apply. The opening Nemeth Code indicator should not stand alone at the bottom of a braille page, nor should the Nemeth Code terminator stand alone at the top of a braille page. [**1.5.3, 3.7, 3.8**]

Switch Indicators with Boxed Material

Box lines may be transcribed in either code. When literary content is followed by boxed mathematical material, if all of the material in the box is in Nemeth, the opening Nemeth Code indicator may be placed at the beginning of the top box line, followed by a blank space and the Nemeth Code terminator may be placed at the end of the bottom box line, preceded by a space. [**18.6**]

Switch Indicators with Instructional Commentary

When instructional commentary alternates with math problems, switch indicators are used in order to transcribe the comments in contracted braille. When switching into or out of Nemeth before a change of margins, the switch indicators are placed after the last item of the line rather than at the beginning of the next line to maintain clarity in the indented margin pattern. [**16.11**] When comments or conditions occur outside of enlarged grouping symbols, code switching within the comment or condition is independent of the grouped spatial arrangement. [**17.10.1.b**]

Switch Indicators with Instructions

If instructions end with an expression in Nemeth and the subsequent math problem starts with Nemeth, Nemeth Code remains in effect between the end of the instructions and the start of the problem. [**5.11.1**]

Switch Indicators with Tables

When mathematical data occur in the table, code switching decisions depend upon the content of the entire table and the spacing restrictions encountered on the braille page. Each table must be individually assessed in order to determine the clearest representation in braille. [**Lesson 18**]

Column headings which contain words are transcribed in UEB. There may be items within the column headings that require switching to Nemeth. [**18.3**]

It is best if a minimum of code switching is encountered within the body of the table. When a mixture of narrative entries and mathematical data occur in a table, a switch to Nemeth may be applied only where needed. However, a table may be more clearly presented by transcribing it entirely in Nemeth, even when some entries do not require a switch. For example, when only one column requires Nemeth, the opening switch and the Nemeth terminator must be applied to each entry, however, spacing restrictions may make that option unmanageable. Instead, it may be better to transcribe the entire body of the table in Nemeth, including any words.

When the entire body of the table is transcribed in Nemeth, the opening switch indicator is placed in cell 1 of the line following the column separation line (if present), and the entries begin on the next line. The Nemeth Code terminator follows the last line of entries, placed in cell 1. [**18.4.2**] Words within the table, including row headings, are transcribed without contractions. If a row heading consists of one word, the single-word switch indicator is not used. **[18.5]**

Switch Indicators with Tactile Graphics

Nemeth remains in effect for a tactile graphic if the graphic intervenes between two items in Nemeth. If the preceding text is in UEB and if a switch to Nemeth must be made for the tactile graphic, the opening switch indicator is placed at the end of the preceding text or in cell 1 on the line before the required blank line. [**18.9**]

Spatial Arrangements

Details regarding various spatial arrangements are in the following lesson sections.