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 Braille Code for Mathematics and Science Notation* 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

In a "UEB with Nemeth" transcription, the format rules stated in *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* are 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**] An identifier can be placed alone on the line if, by doing so, the math will fit undivided on the next line. [**15.1**] An identifier cannot stand alone at the bottom of a braille page. [**2.17**]

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 that line. [**1.5.1**]

The following items must not be divided between braille lines.

- A hyphenated expression containing one or more mathematical components. [**2.19**]
- An abbreviation and a preceding or following numeral or letter to which it applies. [**3.4.1, 4.1.1**]
- Items in an enclosed list, 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, ending with a comma. Begin the runover line with the next item in the list. [**4.17.3**]
- The components of the following symbols: a symbol of operation using plus and minus [**5.2]**; a symbol of comparison compounded vertically or horizontally [**5.8-5.9]**; a shape symbol with structural or interior modification [**11.7-11.18]**; the the components of an expression modified according to the five-step rule. [**12.2]**; superposed signs [**13.5-13.6]**; a two-part function name [**14.5**].
- A fraction, unless the entire fraction will not fit on the line. [**8.3.b**]
- In a mixed number, the whole number must not be divided from its fractional part. [**8.5.1**]
- A single keystroke construction. [**11.34**]
- A sign of shape and the letter, sequence of letters, or numeral which follows it. [**11.23.1**]
- Tally marks belonging to the same group. [**13.4.a**]
- A function name or an abbreviated function name and the sign which follows it. [**14.5**]
- Items enclosed within grouping signs. [**15.2.1**]

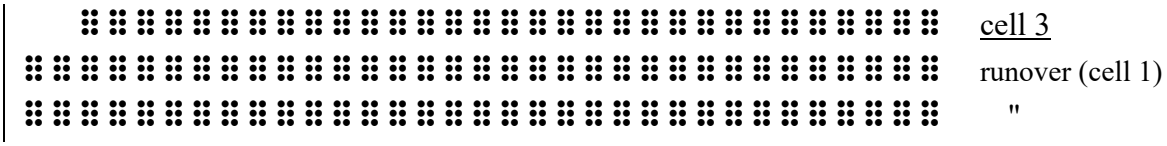
Margins

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 "UEB with Nemeth" transcription. [**1.14**]



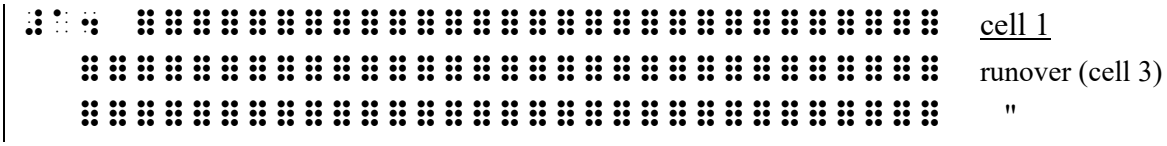
Directions

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 "UEB with Nemeth" transcription. [**5.12.1**]

Margins: Itemized Material

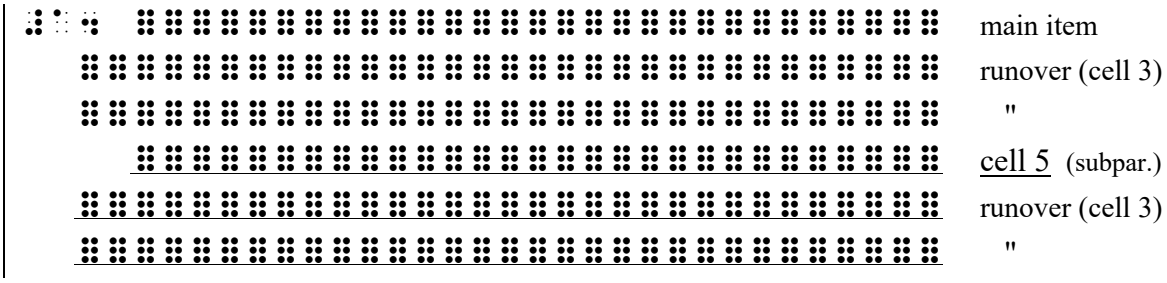
Main Item (no subdivisions)

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)

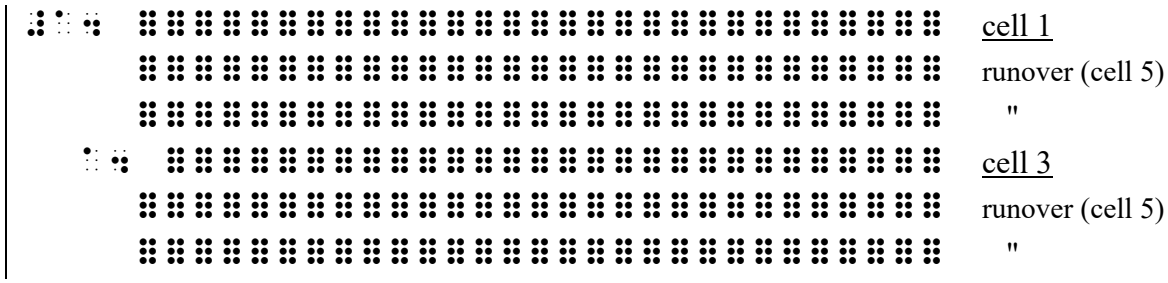
5-to-3 If a main item contains more than one paragraph, each subparagraph begins in cell 5 with runovers in cell 3 (indented style). [**1.16**]



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**]

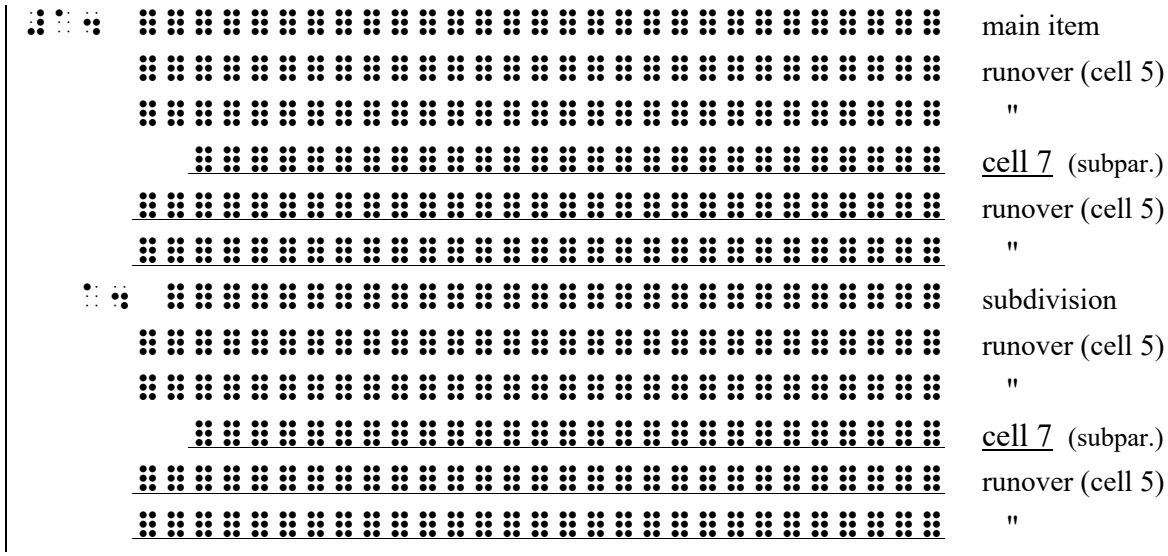
Main Item with Subdivision

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

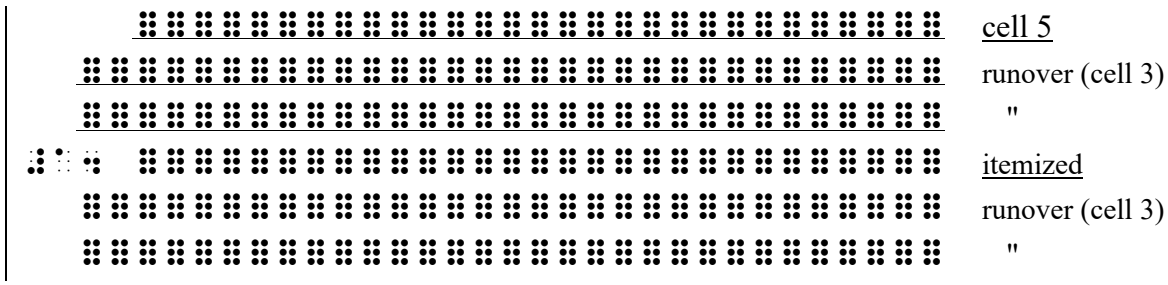
Runover margins for itemized material are determined individually for each question. A numbered or lettered problem with no subdivisions will be (1-3); the next numbered or lettered problem may have subdivisions and so will be (1-5; 3-5), etc. [**6.1.4**]

If an exercise set and its instructions will fit all together on one braille page, do so. If not, there must be room for at least the instructions and the first itemized exercise problem on the preceding page. [**5.11.1**]

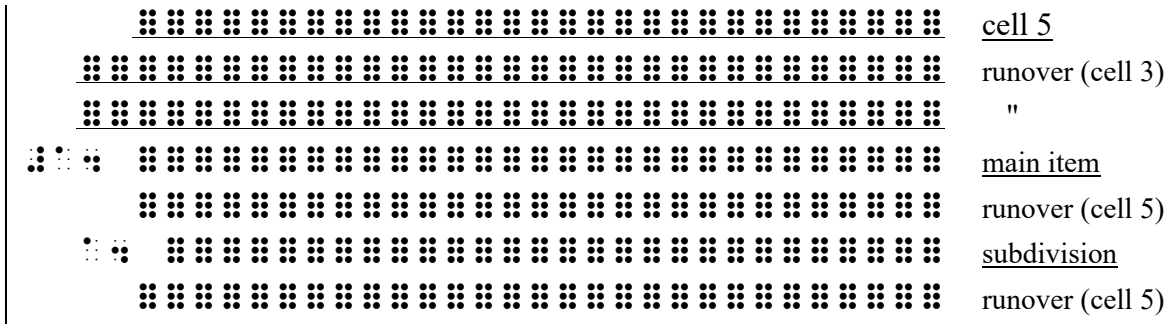
Instructions

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.

See the previous section, *Exercise Set*, regarding pagination considerations.



OR



Margins: Displayed Mathematical Material

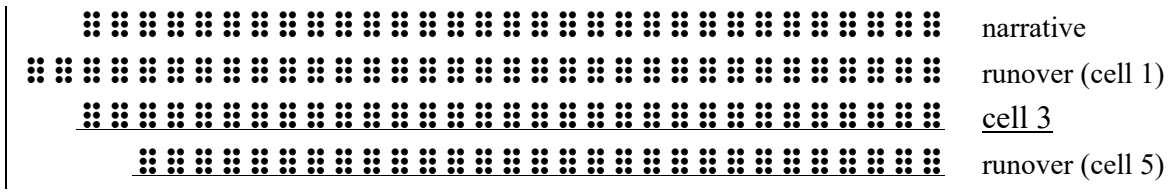
When mathematical material is set apart from the body of the text in the print copy, it is referred to as a displayed expression. Displayed math uses a hanging style. The margins depend upon the layout of the preceding text. The first cell of the displayed material is indented two cells to the right 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**] or unless the displayed material is spatial. [**9.14.2**]

When a number or letter is used to identify 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**]

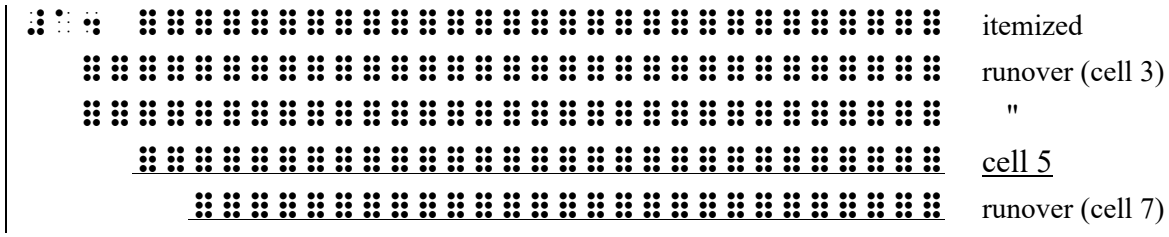
Math Displayed to Narrative

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)]



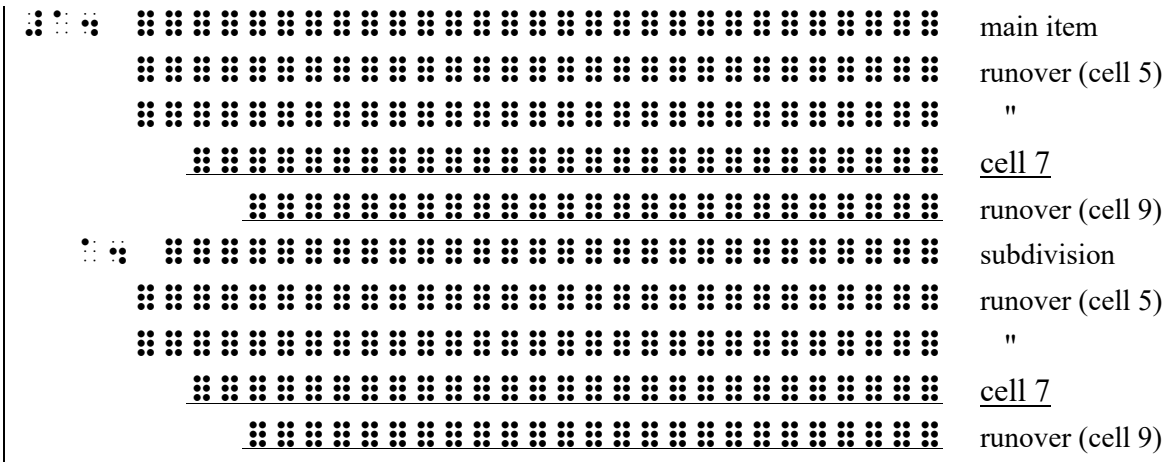
Math Displayed to Itemized Text

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)]



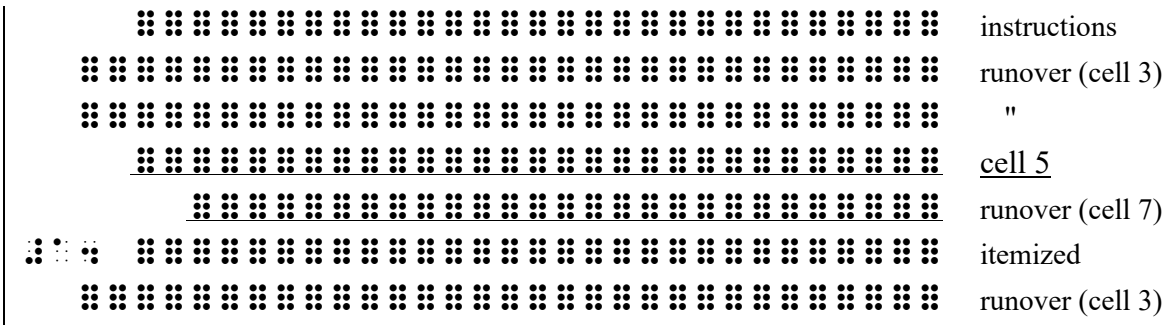
Math Displayed to Itemized Text with Subdivisions

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 can be formatted as a paragraph heading or as a cell-5 or cell-7 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. See also the summary at the end of **Lesson 15**.

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, ending with a comma. Begin the runover line with the next item in the list. [**4.17.3.a**]

Linked Expressions

Anchor with one link: If a linked expression is too long to fit on one line, the expression continues on the next line, beginning with the sign of comparison that starts the link, placed in the runover cell of the current format. [**8.21**]

Anchor with more than one link: If the anchor with all links will not fit on one line, use as much as the line as possible before dividing the expression. Begin the new line with the sign of comparison that starts 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 given 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 with Nemeth" 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. Nemeth symbols are not used outside of the code switch indicators; UEB symbols are not used within the code switch indicators. [**1.1**] The following symbols may appear in either UEB or Nemeth context: box lines [**5.5, 18.6**], column separation lines [**5.5**], guide dots [**5.5**], icons [**11.35**], note separation lines [**13.10.4**], and page change indicators [**3.8**].

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, the switch indicators should be placed on the same line as the math expression. [**1.5.1.b**] However, a switch indicator may stand alone on a line if there is not room for the math expression and one, or both, of the switch indicators. Keeping the mathematical expression intact on one line is the priority. [**1.5.2**] If two or more independent 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 Unitemized Listed Material

These guidelines apply to a simple vertical list as well as to a simple list in columns. [**2.21.1**] The following layout is recommended by the authors, as this topic is not addressed in the code book.

- Within a list of UEB and Nemeth items, code switch indicators are placed before and after Nemeth material according to the general code switching guidelines.
- When an unitemized list begins and ends with a Nemeth item, and is composed predominantly or entirely of Nemeth items, place the opening Nemeth Code indicator in cell 1 on the line above the first item in the list. Place the Nemeth Code terminator in cell 1 on the line after the completed list.
- A code switch indicator does not take the place of the blank line that may be required preceding or following the list.

Switch Indicators with Itemized Material (Spatial and Nonspatial)

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**] A code switch indicator does not take the place of the blank line that may be required preceding or following the itemized material. [**2.18.1**] A code switch indicator does not take the place of the blank line that may be required preceding or following spatial material. [**9.29**]

- The opening Nemeth Code indicator is placed at the end of the text that precedes the itemized mathematical material. If there is not room at the end of the braille line, the opening indicator is placed in the runover position of the text. [**2.18.1**]
- When itemized mathematical material follows a cell-5 or cell-7 heading, the same rules apply. [**4.25.2**]
- Embedded identifiers follow similar code-switching guidelines. An embedded identifier may fall at the end of a line; it does not need to be placed on the same line as the material with which it is associated. [**4.27**]
- When itemized material is not preceded by text, or if it is preceded by a centered heading [**4.25.1**], the opening Nemeth Code indicator is placed in cell 1 on the line before the first item.

- The Nemeth Code terminator (if needed) is placed at the end of the last Nemeth item. If there is no room on that line, the terminator is placed in the runover cell. *Exception:* This does not apply to spatial material. See "Switch Indicators with Spatial Arrangements" regarding placement of the Nemeth Code terminator following a spatial arrangement.

Further details regarding placement of switch indicators in a list of both UEB and Nemeth items are given in **2.18.2**.

Switch Indicators with Displayed Mathematical Material (Nonspatial)

When displayed nonspatial mathematical material is preceded and followed by UEB text, the expression and its two switch indicators are placed all together on one line if they will fit within current margins.

If the displayed math and its two switch indicators will not fit on one braille line, the opening Nemeth Code indicator is placed at the end of the previous text and the Nemeth Code terminator is placed at the end of the displayed math. When either indicator will not fit on its current line, it is placed on the following line in the runover position. [**7.1.1.a**]

If Nemeth continues after the displayed expression, it is preferable to place the opening Nemeth Code indicator at the end of the line of text preceding the displayed material. [**7.1.1.b**]

Switch Indicators with Spatial Arrangements

General Considerations: Code switch indicators are placed outside of the spatial material. 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.

Unitemized Spatial Arrangements: The opening Nemeth Code indicator is placed at the end of the preceding text. If there is not room for the opening switch indicator on the same line as the text, it is placed on the next line in cell 1, regardless of the current margins. The required blank line comes next. When Nemeth ends after the spatial material, the required blank line comes first. On the next line, the Nemeth Code terminator is placed in cell 1, regardless of the current margins. The transcription resumes on the next line. [**9.29**]

Itemized Spatial Arrangements: The opening Nemeth Code indicator is placed at the end of the preceding text. If there is not room for the opening switch indicator on the same line as the text, it is placed in the runover position of that text. The required blank line comes next. When Nemeth ends after the spatial material, the required blank line comes first. On the next line, the Nemeth Code terminator is placed in cell 1, regardless of the current margins. The transcription resumes on the next line. [**9.30**]

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

The option of placing an opening Nemeth Code indicator at the end of a cell-5 or cell-7 heading is most useful when itemized material follows the heading. 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 transcribed outside of the Nemeth switches. Within the note, code switching may occur as needed. When mathematical material follows a 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. If it does not fit, follow established directives regarding placement of the opening switch. [**4.26**]

Switch Indicators at Page Turns

When Nemeth is in effect, Nemeth 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]** Placement of code switch indicators is not affected by the presence of a page change indicator. **[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. **[18.6.2]** When a transcriber's note refers to material within box lines and all of the material within the box is in Nemeth Code, the note may be transcribed above the top box line in order to allow the insertion of switch indicators in the box lines. **[18.6.4]**

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 a comment or condition applies to a spatial arrangement, the comment begins on the top line of the arrangement, to the right of the enlarged grouping symbol (if present) or a transcriber-inserted grouping symbol. [**17.10.4**] When the comment contains narrative, code switching is not applied even though the words may not be part of a mathematical expression. The comment is considered to be part of the math expression. The words are uncontracted; the single-word switch

indicator is not used. [**17.10.2**] If there is little room beside the math for the comment, it may be placed before or after the math arrangement. A transcriber's note explains that the comment applies to the spatial arrangement. [**17.10.3.a**]

Switch Indicators with Instructions

If instructions end with an expression in Nemeth and the subsequent 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. [**18.1**]

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. See **18.4** for various strategies.

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. 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.