APPENDIX C

NEMETH CODE FORMAT SUMMARIES

Read about this PROVISIONAL EDITION in the front matter to this book.
Check the NFB website periodically for updates to this appendix.

"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

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. [**1.7**]

Example: A ditto mark is centered beneath the material to which it applies and is separated from any expression which precedes or follows it by at least one space. In UEB context, the UEB ditto mark symbol is used but Nemeth Code format is applied: center the ditto under the word or item to which it applies. **[13.2.3]**

"Keep Together"

Abbreviations: An abbreviation and a preceding or following numeral or letter to which it applies must not be divided between braille lines. [**4.4.1**]

Enclosed List: 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. [**5.15.3**]

Function Names: A function name or its abbreviation and the sign which follows it must not be divided between braille lines. [**14.7**]

Hyphenated Expressions: A hyphenated expression containing one or more mathematical components must not be divided between braille lines. [**3.19**]

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

Mathematical Expressions: 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. [**2.5**] 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. [**4.7**]

Signs of Shape: 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**]

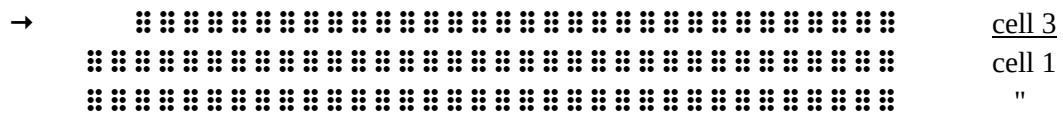
Symbols: The components of the following signs must not be divided between braille lines: plus or minus; minus or plus; plus followed by minus; minus followed by plus; minus followed by minus; signs of comparison compounded vertically or horizontally; superposed signs; tally marks belonging to the same group; signs of shape with structural or interior modification. [**6.2, 6.8, 6.9, 11.7-11.18, 13.4, 13.5-13.6**]

Margins

For margins with spatial material, see the section on Spatial Arrangements.

Nemeth Code 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 to the left of the runover margin, or four cells to the left of the runover margin.

Narrative Portions of Text (3-1): Narrative paragraphs in a document governed by Nemeth Code formatting begin in cell 3 with runovers in cell 1. Blocked paragraphing is not used in a technical transcription. [**2.14**]

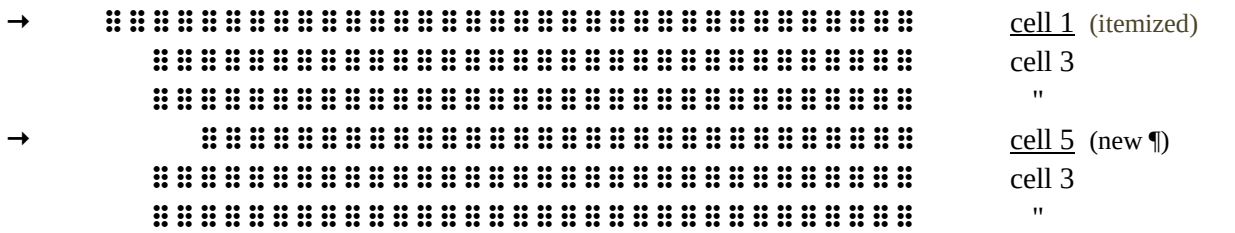


Instructions Preceding Unitemized Material (3-1): If instructional text is not followed by lettered or numbered exercise material, the text is considered to be a narrative paragraph and begins in cell 3 with runovers beginning in cell 1. The (5-5) style of "directions" given in *Braille Formats* does not apply in a transcription that contains Nemeth Code. [**6.12.1**]

Continuation of Narrative Following Displayed Material: Look for context clues in the print copy to determine if the narrative following a displayed mathematical expression is a new paragraph or if it is a continuation of the interrupted paragraph. Apply proper margins to the text accordingly. [**8.25.2**]

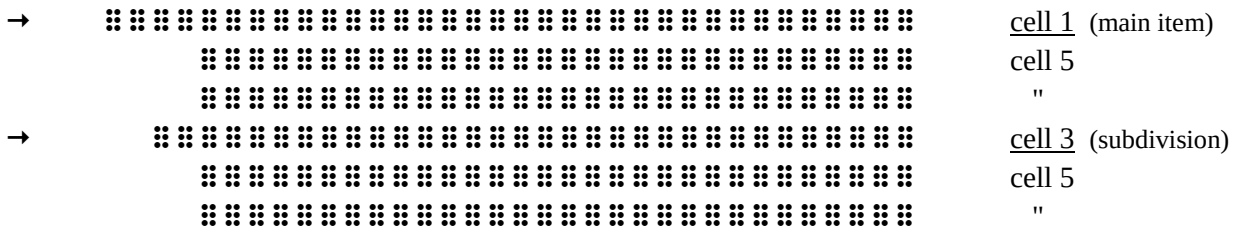
Margins: Itemized Material

Itemized Material with No Subdivisions (1-3): The identifier begins in cell 1; runovers begin in cell 3. If the material contains more than one paragraph, each subparagraph begins in cell 5 with runovers in cell 3. [**2.16**]

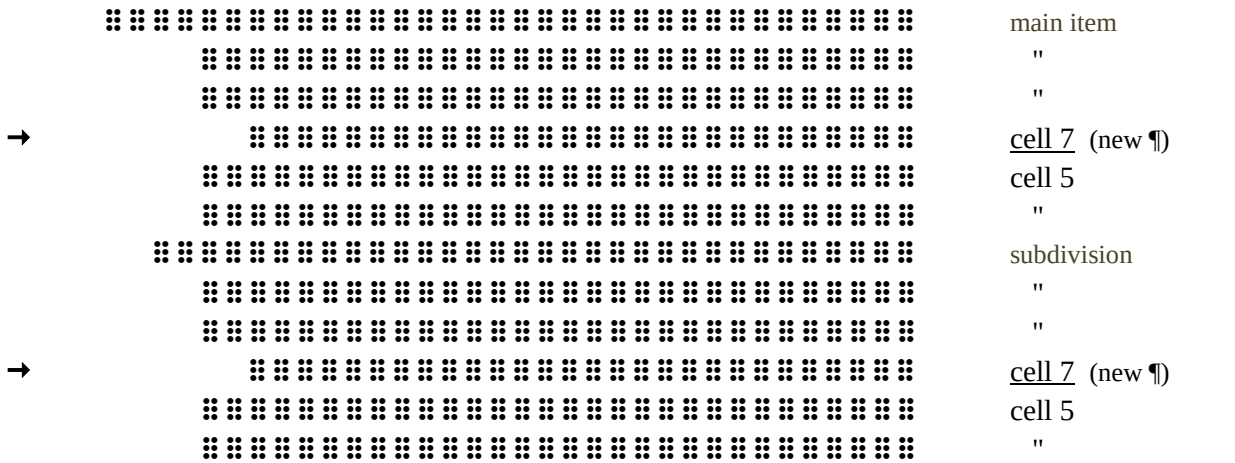


Itemized Material with No Subdivisions—Side-by-Side Print Layout: When the print copy arranges itemized material side-by-side across the page and there are no subdivisions, the braille format is changed so that all identifiers start in cell 1. [**3.20**] **EXCEPTION:** Spatially-arranged material may be arranged side-by-side across the width of the page as long as there are no subdivisions. [**10.21**]

Itemized Material with Subdivisions (1-5; 3-5): 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. [**7.18**]



Itemized Material with Subdivisions with More Than One Paragraph (7-5): 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. [**7.18.1**]

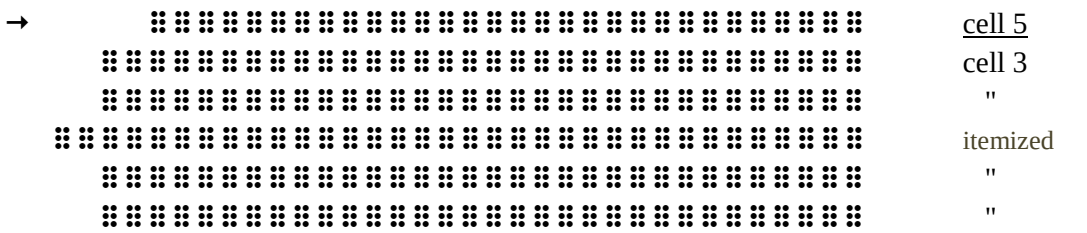


Itemized Material with Subdivisions—Side-by-Side Braille Layout Option: It is permissible to place the subdivisions side by side across a page if and only if all the subdivisions can be accommodated on one braille line. If all the subdivisions cannot be accommodated on one braille line, the (1-5; 3-5) format is used. This is an optional format style and applies only to subdivisions. (This restriction does not apply to spatial material, which will be studied later in this course.) [**7.18.2**]

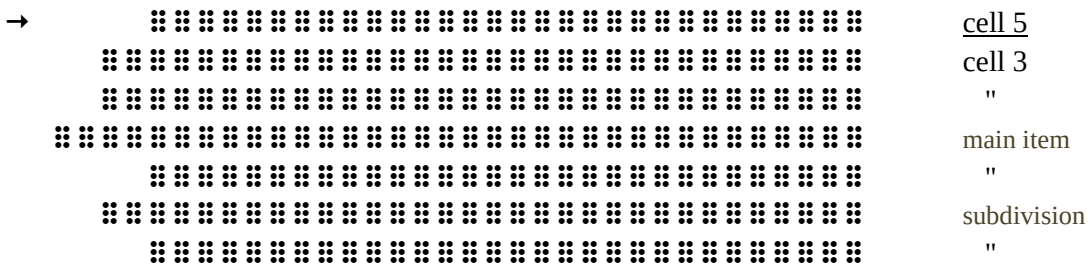
Tabular Form: When itemized material is arranged in tabular form so that items are numbered at the margin and subdivisions are aligned beneath lettered column headings, the material is transcribed in one of the following ways: [**7.18.3**]

- 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.

Instructions Preceding Itemized Material (5-3): When a group of numbered or lettered problems is preceded by instructions, the instructions begin in cell 5, with runovers in cell 3. 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.At least one line of the instructions must be on the same braille page as the related problems which follow. [**6.11**]



OR

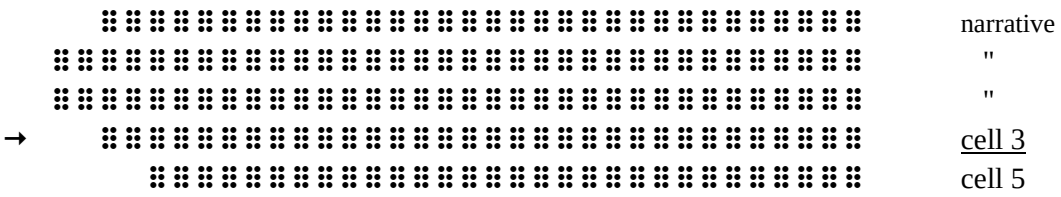


Exercise Set: Runover margins for itemized material are determined individually for each question. A problem with no subentries will be (1-3); the next problem may have subentries and so will be (1-5; 3-5), etc. [**7.19**]

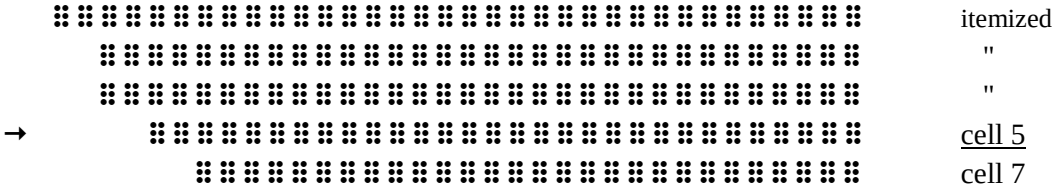
Margins: Displayed Mathematical Material

Displayed Mathematical Expressions: When mathematical material is set apart from the body of the text in the print copy, it is referred to as a displayed expression. In braille, margins for displayed mathematical material depend upon the margins 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. These margins apply regardless of the presence of runover material in the preceding paragraph. [**8.25**]

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

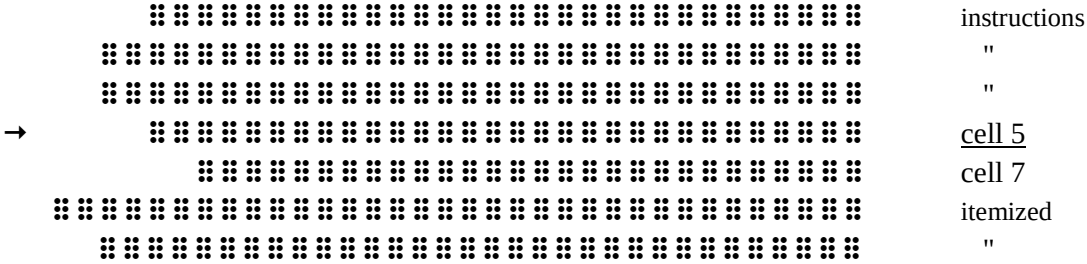


— *In itemized text without subdivisions*, displayed mathematical material begins in cell 5. Runovers begin in cell 7. [Text (1-3); displayed material (5-7)]



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

— *Within or following instructions*, displayed mathematical material begins in cell 5. Runovers begin in cell 7. [Instructions (5-3); displayed material (5-7)] [**8.25.3**]



Blank Lines with Displayed Material: A line is not skipped above or below displayed mathematical material unless the preceding or following material requires a blank line. [**8.25**]

Labeled Displayed Material: 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. [**11.36.1**]

Linked Expressions Requiring Special Margins: The print layout denoted as "special" (defined in **9.23**) can occur in one of the following three layouts. Note that the first cell of the displayed anchor is indented two cells to the right of the runover cell of the preceding material.

- **In Narrative:** When a linked expression requiring special margins 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. [**9.23.1**]
- **In Itemized Text Without Subdivisions:** When a linked expression requiring special margins 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. [**9.23.2**]
- **In Itemized Text With Subdivisions:** When a linked expression requiring special margins 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. [**9.23.3**]

Labeled Mathematical Statements

Spacing and Margins: A line is left blank before the beginning and after the end of the entire labeled statement. Normal paragraphing (3-1) is applied, with the label beginning the paragraph. [**11.38.3**] The label is transcribed in full capitals regardless of print style and is placed as a paragraph heading regardless of its location in the print copy. Nonregular typeface in the label is ignored. [**11.38.1**] See **11.39** for details regarding typeface in the text of the statement.

Auxiliary Captions: If a proof or labeled statement 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. If a caption is printed in a nonregular typeface, UEB typeform indicators are applied in accordance with the print text. Print capitalization is maintained. [**12.17.2**]

Formal Proofs

Spacing and Margins: A line is left blank before the beginning and after the end of the entire formal proof. The narrative portion of the formal proof begins in cell 3 and its runovers begin in cell 1. Portions of a formal proof which satisfy the definition of a labeled statement follow the format directives outlined in **Lesson 11**. [**12.17.1**]

Step-Number Format: When a formal proof is presented in step-number form and divided into two columns, often headed *Statements* and *Reasons*, the following format is used in the braille transcription. [**12.17.3**]

- A line is left blank before the beginning and after the end of the step-numbered items.
- Each item from the *Reason* column is placed beneath its matching item from the *Statement* column.
- The letters "S" for *Statement* and "R" for *Reason* is placed immediately after the appropriate step number. Similarly, other column headings should be indicated by appropriate letters. The step numbers are brailled in UEB.
- Each step number begins in cell 1 and any runovers begin in cell 3.

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. [**2.7.1**]

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. [**5.15.3.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, it is not necessary to divide at every comparison sign – use as much as the line as possible before dividing the expression.. The new line begins in the runover cell of the current format. [**9.22**] The comparison sign at which the new line begins must be on the baseline of writing. 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. [**9.22.1**] 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. [**9.22.2**]

Mathematical expressions: Formulas, equations, etc., which cannot fit on one braille line within the boundaries of the margins used should be divided between lines in the following order of preference. After making divisions according to an item higher up on the priority list, if the expression requires further division a division may be made at an item lower on the priority list.

- Before a sign of comparison, providing that the sign is on the baseline of writing. Additionally, the sign cannot be part of an item enclosed in grouping symbols, fraction indicators, radical signs, or be enclosed between the symbols of a modified expression. 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, just as it would if it were not divided between lines. [**14.13**]
- Before a sign of operation, providing that the sign is on the baseline of writing. If the transition to a new line is made before a minus sign, the numeric indicator is used after the minus sign when followed by a numeral or a decimal point and a numeral. [**14.14**]
- Before a fraction line, providing that the fraction line belongs to a fraction on the baseline of writing. Avoid division within a numerator or within a denominator. If the numerator or denominator requires a division, division at the fraction line is also applied.. [**14.15**]
- Before a baseline indicator [**14.16**]
- Before a level indicator [**14.17**]
- Between factors that are enclosed within grouping signs. Division should not be made within a factor unless unavoidable. [**14.18**]
- After a termination indicator of a modified expression or a radical. [**14.19**]

Placement of Code Switch Indicators

About Code Switching: The base code used in a complete transcription is Unified English Braille ("UEB"). When mathematical content occurs anywhere in the transcription, the non-technical notation follows UEB rules while the technical notation follows the rules of the Nemeth Code. The reader will assume he is reading Unified English Braille unless signaled otherwise by the use of an opening code switch indicator. The material between the opening Nemeth Code indicator and the Nemeth Code terminator follows Nemeth Code rules. UEB symbols are not used within the Nemeth Code switch indicators. [**2.1**]

The main objective is to keep the switch indicators on the same line as the mathematics to which they apply, with some exceptions listed below. There are also 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. The Nemeth Code terminator is preceded by a space (unless it begins a new line). These spaces do not represent spaces in print. [**2.1**] Within a paragraph, the switch indicators should appear on the same line as the expression if the mathematical expression and the two indicators will fit on one braille line within the current margins. [**2.5.1**] If two or more math expressions are brailled between the same code switch indicators, the line may wrap at the space between the expressions even if the entire Nemeth Code portion could fit on one line. [**2.5.1.a**]

Punctuation that relates to the main text is generally placed outside of the switch indicators when the surrounding text is in UEB. There is no space between the terminator and the following punctuation. [**2.4]** When punctuation occurs within mathematical material, Nemeth Code punctuation is used. To avoid excessive code switching between mathematical items, Nemeth Code punctuation may be used for punctuation which belongs to the sentence structure **[3.3**]; embedded identifiers may be brailled in Nemeth Code. [**3.18**]

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. [**2.5.2**]

Switch Indicators ...

> **... after Headings:** When itemized material immediately follows a centered heading, place the opening Nemeth Code indicator alone on the line immediately before the first identifier. [**5.24.1**] When itemized material immediately follows a cell-5 or a cell-7 heading, place the opening Nemeth Code indicator after the last word in the heading. If there is no room on the line, the indicator will fall in the runover cell of the heading. [**5.24.2**]
>
> **... at Page Turns:** Keep the opening switch indicator on the same braille page as the mathematical material to which it applies. Unless it is impossible to arrange, both the opening Nemeth Code indicator and the Nemeth Code terminator must appear on the same 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. Part of the expression to which it applies should appear on the same braille page as the indicator. [**2.5.3, 4.7, 4.8**]
>
> **... with Boxed Material:** When literary content is followed by boxed mathematical material, if all of the material in the box is in Nemeth Code place the opening Nemeth Code indicator at the beginning of the top box line, followed by a blank space. Place the Nemeth Code terminator at the end of the bottom box line, preceded by a space. See **17.6** for further details regarding code switching and box lines.

... with Comments: When short narrative comments alternate with math problems, switch out of Nemeth Code to transcribe the comments in contracted braille. [**15.11**]

... with Instructions: If exercise directions ("instructions") 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. [**6.11.1**]

... 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 (code switching may be required within the itemized portion). [**3.18**] To ensure that all identifiers begin in the same cell, the opening Nemeth Code indicator is placed at the end of the line of text that precedes the itemized material, or on the next line in the appropriate runover cell. The code switch indicator does not take the place of the blank line that must precede the itemized material. [**3.17**] If space permits, the terminator should be placed on the same line where Nemeth Code ends.

... with Displayed Mathematical Material: When displayed mathematical material is both preceded and followed by UEB text, the expression and the 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. The Nemeth Code terminator is placed at the completion of the displayed expression. In either case, if the indicator will not fit on the current line, it is placed on the following line in the runover position. [**8.25.1**]

... with Spatial Arrangements: The opening Nemeth Code indicator and the Nemeth Code terminator do not take the place of the required blank line before and after a spatial arrangement. The switch indicators must not interfere with the layout of the problem. 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, if space permits. 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 the runover position if it precedes itemized material, or in cell 1 on a line by itself if it precedes unitemized material. The required blank line follows. To close Nemeth Code after a spatial problem, first insert the required blank line that follows the arrangement. Then place the Nemeth Code terminator in cell 1 by itself on the following braille line. [**10.35**] Keep in mind that the blank lines required by the Nemeth Code are part of the spatial problem and so must be inside the Nemeth switches.

... with Tables: When table entries consist of technical material, the entire body of the table is brailled in Nemeth Code, including any words. One opening Nemeth Code indicator precedes row 1 and one Nemeth Code terminator is placed at the end of the table. Words within the table are brailled without contractions, and the single-word switch indicator is not used. **[6.5, 17.5]** When a mixture of narrative entries and mathematical data occur in the table, a switch to Nemeth Code may be applied only where needed. A table may be more clearly presented by brailling it entirely in Nemeth Code even when some entries do not require a switch. [**17.4.3**] See **17.6** for details regarding code switching and box lines.

... with Tactile Graphics: Nemeth Code remains in effect for a tactile graphic if the graphic intervenes between two items in Nemeth Code. [**17.9**]

For further code-switching guidelines and illustrative examples see the following BANA publication: "Guidance for Transcription Using the Nemeth Code within UEB Context."

Spatial Arrangements

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