

# Nemeth Code for Math and Science

## Nemeth and Formats and How They Work Together, 2<sup>nd</sup> version

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**NATIONAL BRAILLE ASSOCIATION**

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## Introduction

In this workshop we will examine a series of examples transcribed using UEB with Nemeth and formatted according to the currently accepted “marriage” of formatting rules from the Nemeth Code and formatting rules from *Braille Formats 2016*. A foundational concept of that “marriage” is to follow Nemeth Code’s rules for formatting and when Nemeth Code does not give a formatting rule, to follow Braille Formats’ principles.

Our goal is to illustrate and explain best practices for 10 formatting topics. These topics are the main headings in this workshop’s table of contents.

This workshop has been prepared according to *Braille Formats: Principles of Print-to-Braille Transcription, 2016* and the *Guidance for Transcription Using the Nemeth Code within UEB Contexts* (Approved April 2018).

In commentary, *The Nemeth Braille Code for Mathematics and Science Notation, 1972 Revision, 2007-2015 Updates* may be referred to as “NC;” the *Guidance for Transcription Using the Nemeth Code within UEB Contexts* (Approved April 2018) may be referred to as “the *Guidance*,” and the Rules of Unified English Braille, Second Edition, 2013, 2015-May 2020 Updates may be referred to as “RUEB.”

This workshop does not replace or supersede any BANA publication.

## A note on consistent formatting within a transcription

from the *Guidance* (highlighting added):

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 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.

Code switching is not formatting. All parts of a transcription are subject to the same formatting rules.

## Terminology, UEB Math/Science & UEB with Nemeth

On September 21, 2020, the Braille Authority of North America (BANA) adopted a document entitled “Terminology: UEB Math/Science and UEB with Nemeth.” In short, it suggests specific terms for everyone to use when talking about transcriptions of math and science material. The approved terms are **UEB Math/Science** (for what has been called “UEB Technical,” “Straight UEB,” and more) and **UEB with Nemeth** (for what has been called “Nemeth within UEB,” “Encapsulated Nemeth,” and more).

The creators of this workshop have endeavored to use the BANA-approved terminology wherever appropriate.

## Paragraphs, *Guidance* Formatting #3

### No blocked paragraphs for UEB with Nemeth

You might say that there is no such thing as a blocked paragraph in a transcription using UEB with Nemeth. It's true; every paragraph has runovers at the margin in effect (often cell 1), and *every* paragraph in a UEB with Nemeth document has a *beginning indented two cells* from that runover (often cell 3).

### New paragraph vs. continuation

It can indeed be tricky to discern what is a new paragraph and what is a continuation. Print formatting can give some clues. Ultimately, let content be your guide. As you do this, it may help to remember that it is particularly common in math books to interrupt a paragraph with an example, and then continue that same paragraph after the example.

### Some characteristics of new paragraph vs. continuation

#### It might be a new paragraph if ...

- it is vertically separated from preceding text by a relatively large area of blank space.
- it begins with a conclusive phrase (e.g., "So, ..." "Therefore, ...").

#### It might be a continuation if ...

- it starts with a lowercase letter.
- it continues the thought of what came before.

A continuation begins in its paragraph's runover cell (usually cell 1).



## Transcriber's Notes page

The *Guidance for Transcription Using the Nemeth Code within UEB Contexts* (Approved April 2018) says the Transcriber's Notes page should include 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*."

If [formal proofs](#) appear in the volume, a note should be given on the transcriber's notes page to explain how those are formatted.

## Transcriber's Notes page note about Nemeth Code (Example 1)

Mathematical content is transcribed according to *The Nemeth Braille Code for Mathematics and Science Notation, 1972 Revision, 2007-2015 Updates* including the *Guidance for Transcription Using the Nemeth Code within UEB Contexts*.

Figure 1 displays the spatial distribution of the six most abundant taxa (numbered 1 through 6) across the study area. Each taxon is represented by a unique pattern of dots in a 10x10 grid. The patterns show varying degrees of clustering and spread across the spatial area.

## Only UEB transcriber's note indicators ⠠⠨⠶⠢⠨⠠⠨⠸

The UEB transcriber’s note indicators are the only ones we’ve got, and UEB symbols may not be used within Nemeth. So, Nemeth Code must be terminated before the beginning of any transcriber’s note. Also, any “bubble” of Nemeth Code that occurs within a transcriber’s note must be terminated before the end of the note.

## Transcriber's notes with boxes

From the *Guidance*, **Formatting #2**: 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.

In other words, if a transcriber decides to put a transcriber's note inside of a box, then that box's lines cannot have code switch indicators in them.





An alternative (possibly better) transcription of Example 2 explains the transcriber-generated column headings in a transcriber's note before the columns instead of using embedded transcriber's notes.

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### Key ends with Nemeth Code (Example 4, partially from BF2016 §11.8.2.i)

Hello Eggs! (HE) recently became Frizzled-feather Investigations (FI). The table below shows, by state, what proportion of HE employees were retained in the transition to the new business name and model and whether in that state there were chicken protests against layoffs.

State	Number of HE employees 1999/2000	Number of FI employees 2001/2002	Proportion of HE workforce (%)	Chicken Protests?
Tuscaloosacana	77,000	57,750	75	Yes
Flibertygibbit	4,940	1,235	25	Yes
Squawkyhoma	42	42	100	No

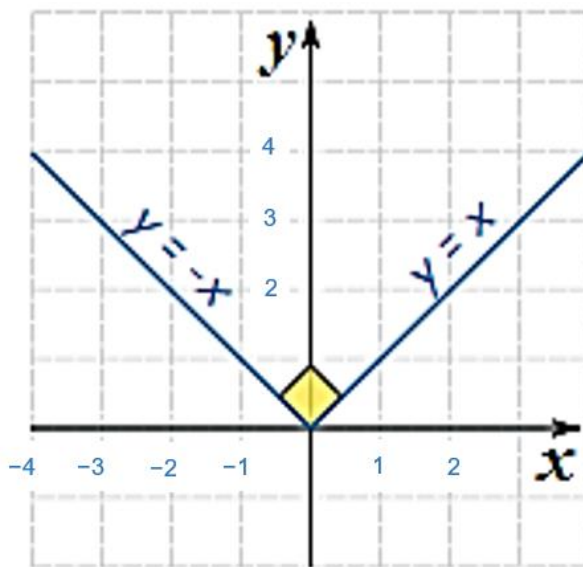
Line 9: The percent sign and the grouping symbols that enclose it are transcribed in Nemeth Code. The Nemeth Code terminator precedes the closing transcriber's note indicator.

## Key ends with Nemeth Code before a graphic in Nemeth Code (Example 5)

This is the Absolute Value Function:

$$f(x) = |x|$$

and this is its graph:



$$f(x) = |x|$$

### Commentary for the following braille:

1<sup>st</sup> page:

Line 2: A math expression displayed to material in 3-1 is formatted in 3-5. (**#7** under **Formatting** in the *Guidance*)

2<sup>nd</sup> page:

Line 1: The key is brailled below the graphic title. (Guidelines and Standards for Tactile Graphics 5.8.3) The Nemeth Code that is required for the graphic heading (because it is an equation) is terminated before the opening transcriber's note indicator at the beginning of the key.

Line 6: The last part of the transcriber's note is a mathematical expression at the end of a key listing. Nemeth Code is terminated before the closing transcriber's note indicator.

Line 8: Nemeth Code is opened again for the graphic, because it includes negative numbers. (**#3** under **Basic Guidance on When to Switch** in the *Guidance*)

Lines 9 & 23: A blank line is left before and after the tactile graphic.

*Text modified from <https://www.mathsisfun.com/sets/function-absolute-value.html>*





## Displayed material, *Guidance* Formatting #7

Follow Braille Formats for displayed literary text, with the exception of blocking paragraphs. All paragraphs are indented in a UEB with Nemeth transcription.

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).

(NC §§190.b, 191.a.iii, and 191.b.iv)

Displayed mathematical/technical material is formatted according to Nemeth Code rules. Displayed literary material is formatted according to Braille Formats 2016 principles.

## Nemeth formats for displayed technical material

Displayed math expression (Example 6)

Now, be careful with the notation for inverses. The “-1” is NOT an exponent despite the fact that it sure does look like one! When dealing with inverse functions we’ve got to remember that

$$f^{-1}(x) \neq \frac{1}{f(x)}$$

This is one of the more common mistakes that students make when first studying inverse functions.

The process for finding ...

Figure 1 displays a grid of 8 rows and 10 columns of binary patterns. Each cell in the grid contains a 4x4 grid of black dots on a white background, representing a binary image. The patterns vary across the grid, showing different arrangements of dots.

Line 5: Displayed math material is formatted starting two cells to the right of the runover of the preceding material – cell 3 in this case. Nonspatial displayed math material requires no blank lines around it. (NC §190.b)

Text taken from "Paul's Online Notes, Section 1-2 : Inverse Functions"  
(<https://tutorial.math.lamar.edu/classes/calci/inversefunctions.aspx>)





Alternatively, authors' comments may be blocked four cells to the right of the runover of the expression. This is the appropriate format when any of the comments is a math expression; otherwise, it would be difficult for the reader to tell what is a solution and what is a comment.

$$\begin{aligned} R_Y &= (1 + \frac{r}{n})^n - 1 && \text{Use the formula for the effective rate.} \\ &= (1 + \frac{0.0248}{12})^{12} - 1 && 2.48\% \text{ per month is the nominal rate.} \\ &\approx 0.02508 && \text{Simplify.} \end{aligned}$$

The figure displays a 13x13 grid of dot patterns. Each pattern is a 3x3 arrangement of dots. The dots are either black or pink. The grid is labeled 1 to 13 on both the top and left sides. The patterns are arranged in a grid where each row and column contains 13 unique patterns. The patterns are composed of black and pink dots on a white background. The grid is labeled 1 to 13 on both the top and left sides.

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**Comment to unified system of equations that has no right grouping sign (Example 9)**

$$\begin{cases} b = 2 - 5c & b \text{ is 5 less than twice the number } c. \\ 45 = bc & \text{The product of } b \text{ and } c \text{ is 45.} \end{cases}$$



Joanie writes the following.

$$2x + y - z = -6$$

Solve this system by isolating each individual term.

Conversely, Marcus writes ...

[illegible]

Lines 8-9: Author's comment is placed following a blank line after the end of the system of equations, blocked in the runover cell of the displayed material.

## Exercises and Instructions

### Itemized material format determined item by item, *Guidance* Formatting #4

Nemeth Code **does** include rules that dictate indentions for exercises (see below). Nemeth Code does **not** include a rule saying that margins are determined for an exercise set as a whole. So, in itemized exercises, we determine format for each item individually.

### Nemeth indentions for exercises (1-3 and 1-5, 3-5), *Guidance* #5

**§191. Margins for Non-Spatial Itemized Materials:** When material is identified sequentially by number or letter, as in exercises, it will be referred to as *itemized material*.

a. When non-spatial itemized material contains main divisions only (no subdivisions) the following rules concerning margins must be observed:

i. The main division numbers or letters must begin in cell 1 and the associated material must be run over, if necessary, in cell 3.

b. When non-spatial itemized material contains both main divisions and subdivisions to whatever depth, the following rules concerning margins must be observed:

i. The main division numbers or letters must begin in cell 1 and the associated material must be run over, if necessary, in cell 5.

ii. Subdivision numbers or letters, regardless of depth, must begin in cell 3 and must be run over, if necessary, in cell 5.

—Nemeth Code §191 excerpts (including update to wording from 2012), pp. 193 & 195



### Indentions for Nemeth exercises (Example 11)

1. Which of the following is the Pythagorean Theorem?

A.  $A = P \left( 1 + \frac{r}{n} \right)^{nt}$

B.  $(x + a)^n = \sum_{k=0}^n \binom{n}{k} x^k a^{n-k}$

C.  $a^2 + b^2 = c^2$

D.  $\exists x \left( \text{Person}(x) \wedge \forall y \left( \text{Time}(y) \rightarrow \text{Happy}(x, y) \right) \right)$

2. In your own words, define the word proof as it applies to geometry.

3. What is the slope of a vertical line?

A. 1

B. undefined

C. 0

D. horizontal





## Instructions, *Guidance* Formatting #8

Instructions are transcribed in 5-3 (follows Nemeth formatting rules). (NC §191.a.v and §191.b.vi) The Braille Formats 5-5 format is not used for any instructions (aka directions) in a UEB with Nemeth transcription.

At least one line of the instructions, formatted in 5-3, must be on the same braille page as the questions or itemized text that follow. See Nemeth Code for more on formatting instructions (excerpt in the next section).

### Indentation for instructions (Example 12)

Answer the following questions using complete sentences.

1. What is the meaning of **parallel**?
2. Is a square a rhombus?

[illegible]

Lines 1-2: Instructions start in cell 5 and run over in cell 3.

## Definition of instructions, *Guidance* Formatting #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.

**§191. Margins for Non-Spatial Itemized Materials:** When material is identified sequentially by number or letter, as in exercises, it will be referred to as *itemized material*.

- a. When non-spatial itemized material contains main divisions only (no subdivisions) the following rules concerning margins must be observed:
  - v. Instructions which apply to a group of problems which follow must begin in cell 5 and must be run over, if necessary, in cell 3. There must be a blank line above such instructions, but not below. No blank line is left before instructions that follow a cell-5 heading. The last line of an instruction and the first line of a problem to which it applies must be on the same braille page. Follow *Braille Formats: Principles of Print to Braille Transcription* for spacing following a page-change line.
- b. When non-spatial itemized material contains both main divisions and subdivisions to whatever depth, the following rules concerning margins must be observed:
  - vi. Instructions which apply to a group of problems which follow must begin in cell 5 and must be run over, if necessary, in cell 3. There must be a blank line above such instructions, but not below. No blank line is left before instructions that follow a cell-5 heading. The last line of an instruction and the first line of a problem to which it applies must be on the same braille page. Follow *Braille Formats: Principles of Print to Braille Transcription* for spacing following a page-change line.

—Nemeth Code §191 excerpts (including update to wording from April 2011), pp. 194 & 196

The Nemeth Code gives formatting rules for instructions **ONLY** in reference to itemized material. So, in a transcription using Nemeth within UEB, text can only be instructions if it precedes itemized material, which is exercise material with identifiers.



### No itemized material? Not instructions. (Example 13)

Use complete sentences to answer the following questions.

- **Perpendicular** means what?
- Are all isosceles triangles acute triangles?

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

### Exercise items *and* directive text are itemized? Not instructions. (Example 14)

1. In complete sentences, answer the following questions.
  - a. What are complementary angles?
  - b. What shape denotes a right angle?

- 1.
- 2.
- 3.
- 4.



## Displayed material and blank lines

### Displayed literary text (Example 20)

“ Although many billions of doses of acetaminophen/paracetamol are consumed each year, scientists have yet to discover its mode of action. ”

So, although we know *what* it is, we still do not fully understand *how it works* in the human body.

1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8																
9		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
10	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
11	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
13																
14	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Lines 4-6: For this print from an electronic document, the transcriber chose to transcribe the web address for the underlined text as an embedded transcriber's note following the hyperlinked text.



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## Displayed mix of math/science and literary (Example 21)

When displayed material is a mix of literary text and math expressions, we can display it according to Braille Formats 2016 principles.

Harold found Wanda's example of tax bracket calculation (below) really helpful.

If you had \$50,000 of taxable income, you'd pay 10% on that first \$9,525 and 12% on the chunk of income between \$9,526 and \$38,700. That is,  $9525 \times 10\% \approx \mathbf{952}$ ,  $38700 - 9526 = 29174$ , and  $29174 \times 12\% \approx \mathbf{3500}$ .

And then you'd pay 22% on the rest, because some of your \$50,000 of taxable income falls into the 22% tax bracket. So,  $50000 - 38700 = 11300$  and  $11300 \times 22\% \approx \mathbf{2486}$ . The total bill would be about \$6,900 ( $952 + 3500 + 2486$ ) – that is about 14% of your taxable income, even though you're in the 22% bracket.

Reginald thought Wanda's example unnecessarily complicated, because ...

Lines 3 & 20: Blank lines inserted around displayed material in accordance with BF2016.

*Text modified from article "2018 Federal Income Tax Brackets and New Tax Rates" By Tina Orem (<https://www.nerdwallet.com/blog/taxes/federal-income-tax-brackets/>)*



A blank line is required above and below a spatial arrangement (unless the spatial arrangement starts on line 1 or ends on line 25 of the braille page). (NC §185.a) If a code switch indicator is needed immediately before or immediately after a spatial arrangement, the switches are placed outside of the arrangement (on the same page with the arrangement). *If literary material following the Nemeth Code terminator requires a preceding blank line (according to Braille Formats), another blank line is inserted.*

... Last, what belongs in the blanks below?

$$\begin{array}{r} 25 \\ + \square\square \\ \hline 50 \end{array}$$

The world is a strange and wonderful place.

Line 9: The blank line that Braille Formats requires before a centered heading is placed after the Nemeth Code terminator.





If a termination indicator is not needed after a spatial arrangement, only one blank line is required.

$$\begin{array}{r} 75 \\ - ?? \\ \hline 25 \end{array}$$

- 

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## Formal Proofs in Two Columns

When two or more formal proofs appear in a volume, a note about their format should be included on the Transcriber's Notes Page. If only one such proof appears in a volume, then the transcriber's note should appear right before the proof.

Two-column proofs are formatted with the following characteristics.

- The statement and auxiliary captions before the two columns are formatted according to Nemeth Code rules.
  - If it appears, a label like *Theorem*, *Proposition*, or *Lemma* is fully capitalized (according to the Nemeth Code rules for labeled statements).
  - The labeled statement is formatted in 3-1, and so are its auxiliary captions (e.g., *Given*, *Hypothesis*, *Prove*, or *Conclusion*).
  - A labeled statement, including its auxiliary captions (like "Given"), is preceded and followed by a blank line.
- A two-column list of steps in a proof is brailled as a simple list, with items from the left column alternating with items from the right column. These are itemized using numbers with alternating letters added; the letters correspond to the column from which the listed item came.
- A blank line follows the end of the two columns.

For different explanations and more examples, see Nemeth Code §194 and Lesson 12 of the Provisional Revised Nemeth Course Manual, posted by NFB.

### Proof with two columns (Example 26)

Given : $\triangle WHZ$ has $HW \cong HZ$ Prove : $\angle W \cong \angle Z$	
Statement	Reason
1 $HW \cong HZ$	Given
2 Construct $\angle H$ bisector to point I on Side WZ	Every interior $\angle$ has exactly one $\angle$ bisector
3 $\angle WHI \cong \angle ZHI$	Definition, $\angle$ bisector
4 $HI \cong HI$	Reflexive PoE
5 $\triangle HWI \cong \triangle HZI$	SAS Postulate
6 $\angle W \cong \angle Z$	CPCTC



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

Line 1: A blank line is left before the beginning of the proof. (NC §194.a.i)

Line 5: The last auxiliary caption is followed by a blank line. (NC §194.a.iii)

Line 15: PoE is simply short for Property of Equality

Line 17: SAS is simply short for Side Angle Side

Line 19: CPCTC is simply short for "Corresponding Parts of Congruent Triangles are Congruent."

Lines 6-19: Step numbers are transcribed in whichever code they fall into.

### Sample note about two-column formal proofs, for Transcriber's Notes page (Example 27)

Formal proofs printed in columns headed "Statements" and "Reasons" are brailled as follows: An S or R is added to the step number to show the column in which the step appears. Each step from the Statements column is immediately followed by the corresponding step from the Reasons column.

## Tables and Boxes

### Tables of numbers and omitting the numeric indicator, *Guidance* Formatting #10

Within Nemeth Code switches, if 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. Omission of the numeric indicator need not be explained in a transcriber's note. (Nemeth Code §17)

In a UEB with Nemeth transcription, a numeric passage should not be used for a table. Numeric indicators may only be omitted from a table if it is a table of numbers and is transcribed within Nemeth Code switch indicators.

#### Definition of table of numbers

In a table of numbers, everything below the column separation lines in braille is either a number, a decimal in a number, or a comma in a number. This includes the entries in the first column (sometimes known as row headings).

#### Deal-breakers!

If **any** of the following are true, the table is NOT a candidate for omission of the numeric indicator.

- Table includes guide dots.
- Table includes blank entry.
- Table contains below column headings something other than a number, a decimal in a number, or a comma in a number. This includes (but is not limited to):
  - word
  - letter
  - minus sign
  - dollar sign
  - percent sign
  - prime
  - fraction line

### Numeric indicators omitted from a table of numbers in Nemeth Code (Example 28)

<i>Leaf</i>	<b>Width (in)</b>	<b>Height (in)</b>	<b>Weight (oz)</b>
152	0.50	1.00	0.10
207	0.25	1.50	0.14
396	0.72	2.33	0.16
422	0.12	0.50	0.07

The figure shows an 11x25 grid of dots. The grid is divided into four quadrants by a vertical line at column 12 and a horizontal line at row 6. The top-left quadrant (rows 1-5, columns 1-11) contains sparse dot patterns. The top-right quadrant (rows 1-5, columns 13-25) contains a single row of dots at row 1. The bottom-left quadrant (rows 6-11, columns 1-11) contains sparse dot patterns. The bottom-right quadrant (rows 6-11, columns 13-25) contains a single row of dots at row 11.

The entries in a table of numbers can always be transcribed in Nemeth Code. In this table consisting only of numbers and decimals in numbers, *within Nemeth Code switch indicators*, the numeric indicators may be omitted. (NC §17)



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## Table with omitted numeric indicators must be within code switch indicators (Example 29)

Consider the following table.

Day	Account Balance (euros)
1	1.00
30	10,000.00

And this one.

Day	Balance (Euros)	Balance (Dollars)	Balance (Krone)
60	100,000	117,725	952,436
120	1,000,000	1,177,253	9,524,365
365	10,000,000	11,772,531	95,243,653

Does your bank account look like this?

25 



Study the chart below to answer the question that follows.

	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15

What is the row and column position of the product of 3 and 4?

Although this table could have been transcribed in Nemeth Code, there is no call to do so, because it contains only simple unmodified numbers, and it fits across the braille page with numeric indicators used.

Line 6 & 7: The numeric table entries follow print's alignment by place value.

$\times$	<b>0.1</b>	<b>0.2</b>	<b>0.3</b>
<b>0.1</b>	0.01	0.02	0.03
<b>0.2</b>	0.02	0.04	0.06

### Definition of table of numbers, restated

If a table of numbers includes no decimals, it may be transcribed in UEB or in Nemeth Code. Though, it can only have its numeric indicators omitted if it is transcribed within Nemeth Code switch indicators. A number with a decimal must be transcribed in Nemeth Code.

For different explanations and more examples, see Lesson 17 of the Provisional Revised Nemeth Course Manual, posted by NFB.



## Blanks to be filled within a LISTED Nemeth table, *Guidance* Formatting #11

In **listed** table format, when transcribing within the Nemeth switches, a long dash (four cells of dots 36) is used for **blank entries** that are to be filled in. (NC §57)

### Listed Nemeth table with blank entry to be filled (Example 32)

What sign is missing in the following table?

	$x + 1$	$x - 2$	$f(x) = \frac{x + 1}{x - 2}$	$f^{-1}(x) = \frac{1 + 2x}{x - 1}$
$x < -1$	—	—	+	+
$-1 < x < 2$	+		—	—
$x > 2$	+	+	+	+



Line 17: Long dash is used for a blank-to-be-filled within a listed table in Nemeth Code (highlighted yellow above).



In listed table format, a series of three guide dots is used for a blank that indicates no information.

### Listed Nemeth table with blank entry indicating no information (Example 33)

**Table 1.5 Composition of the Atmosphere of Giant Planets**

<i>Gas</i>	<i>Jupiter</i>	<i>Saturn</i>	<i>Uranus</i>	<i>Neptune</i>
$H_2$	$8.64 \pm 0.3\%$	$88 \pm 2\%$	$\sim 82.5 \pm 3.3\%$	$\sim 80 \pm 3.2\%$
$H_2O$	$520^{+340}_{-240}$ ppm	2-20 ppb		

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Uranus and Neptune have  
NO water in their  
atmospheres.

Empty entries in a listed table are highlighted yellow above.

## Blanks in tables, *Guidance* Formatting #11

A **blank** entry or heading area is one that **does not contain any print symbol** (e.g., dash or ellipsis).

A printed blank entry or heading area is transcribed according to the code in which it appears. If the blank area appears in UEB, it is transcribed using guide dots. If the blank area appears in Nemeth Code, it is transcribed according to whether it is a blank-to-be-filled or a blank that indicates no information. In Nemeth Code, a blank-to-be-filled *in a table that is not listed* is transcribed using the general omission indicator, and a blank that indicates no information is transcribed using guide dots.

### A thought process for blanks in a table

1. Is the blank indicated with some print symbol (e.g., underscore, dash, question mark, ellipsis)?
  - Yes: Then transcribe that braille symbol in the code being used.
  - No: Move on to the next question in this list.
2. Is the blank merely an empty space in the table grid?
  - Yes:
    - Is the blank meant to be filled in by the reader?
      - Yes:
        - In Nemeth Code, use a general omission indicator *in a table that is not listed*.
        - In UEB, use a series of guide dots, as described below.
      - No: Use a series of guide dots across the width of the column to indicate the blank space. Explain this in a transcriber's note. *[If this blank that indicates no information occurs in a listed table, use a series of three guide dots to indicate the blank.]*



### Nemeth table with blanks to be filled (Example 34)

13. Fill in the empty spots in the Tangent Table below.

Figure 6.98 – Tangent Table

x (rad)	x (°)	tan(x)
$-\pi/2$		$-\infty$
-1.2490	$-71.565^\circ$	
	$-63.435^\circ$	-2
$-\pi/3$		$-\sqrt{3}$
$-\pi/4$	$-45^\circ$	
	$-30^\circ$	$-1/\sqrt{3}$
-0.4636	$-26.565^\circ$	
0	$0^\circ$	0

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### UEB table with blanks to be filled (Example 35)

After reading the passage, complete the following summary table.

<u>Nation or Territory</u>	<u>Population</u>	<u>Urban population</u>
<b>Albania</b>	2,994,667	53 percent
<b>Algeria</b>	34,994,937	
<b>American Samoa</b>	67,242	NA
<b>Andorra</b>		88 percent
<b>Angola</b>	18,056,072	59 percent

Lines 11 & 14: Guide dots across the width of a column are used for blank entries in the table (highlighted yellow above). In a UEB table, this format is used for any blank entry, whether or not it is meant to be filled in (BF2016 §11.6.4).

The entries in the “Population” column are not aligned by place value, because they are centered in print (i.e., not aligned by place value in print).

## How much Nemeth Code does this table need? A thought process.

- **Does every part of the table need to be in Nemeth Code?**  
Yes or No?  
If yes, then use Nemeth for the whole table. **May** every part of the table be in Nemeth Code?  
*If no, then move to the next question.*
- **Does every part of the table's rows [not columns] need to be in Nemeth Code?**  
Yes or No?  
If yes, then insert an opening switch indicator on a line by itself following the column separation lines. **May** every part of the table's rows be in Nemeth Code?  
*If no, then move to the next question.*
- **Does every entry (not including row headings) need to be in Nemeth Code?**  
Yes or No?  
If yes, then do as above and treat the row headings as technical material. **May** every entry be in Nemeth Code?  
*If no, then consider using separate pairs of code switch indicators for the few pieces of the table that need to be in Nemeth Code.*

## Boxes, *Guidance* Formatting #2

### All Nemeth content in a sea of UEB (Example 36)

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 cell. 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.

This applies to boxes that are preceded and followed by UEB; i.e., the box is floating in a sea of UEB.

Remember what the *Guidance* says about [transcriber's notes with boxes](#) (p. 6 in this workshop).

Examine the following tangent table.

x (rad)	x (°)	tan(x)
$-\pi/2$	$-90^\circ$	$-\infty$
-1.2490	$-71.565^\circ$	-3
-1.1071	$-63.435^\circ$	-2
$-\pi/3$	$-60^\circ$	$-\sqrt{3}$
$-\pi/4$	$-45^\circ$	-1
$-\pi/6$	$-30^\circ$	$-1/\sqrt{3}$
-0.4636	$-26.565^\circ$	-0.5
0	$0^\circ$	0

What is the relation between the values in the first and second columns?







If technical material follows immediately after a box that is all in Nemeth Code, begin Nemeth Code before and outside the box, and terminate Nemeth Code after the technical material following the box.

*Same table as above. Not repeated here.*

A 17x17 grid of black dots on a white background, representing a sparse matrix. The dots are arranged in a pattern that is symmetric about the main diagonal. The main diagonal is highlighted in yellow. The grid is labeled with numbers 1 through 17 on the left side.

Line 17: Nemeth Code is terminated after the end of the math material that follows the box.





Lastly, if technical material both immediately precedes and follows a box that is all in Nemeth Code, begin Nemeth Code before the technical material that precedes the box, and terminate Nemeth Code after the technical material that follows the box.

*Same table as above. Not repeated here.*

[illegible]

In summary, a box can either have an opening Nemeth Code indicator as part of its opening box line *and* a Nemeth Code terminator as part of its closing box line, or it can have neither code switch indicator as part of a box line.

## Words enclosed in shapes, *Guidance* Formatting #14

Words enclosed in shapes are transcribed according to the methods for shapes with internal modification [Nemeth Code §111] and thus must be enclosed within Nemeth switches.

This includes print representations of computer or calculator keys. The NBA webinar “Calculators and Computer Keys – Click Away!” gives some examples of calculator and computer keys transcribed.



A fence post in Tina's garden is 4.5 ft tall. When she

9.2 ft long. A tree in Tina's yard had a shadow of 72 feet.

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Lines 5-11: Displayed literary text is formatted according to Braille Formats 2016, with a blank line before and after it and an adjusted left margin that is two cells to the right of the margin in effect for the preceding text. So, 5-3 are the margins for the paragraph that is displayed to a narrative paragraph.

- 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

### Matrix embedded in text (Example 41)

The *transpose* of an  $m$ -by- $n$  matrix  $\mathbf{A}$  is the  $n$ -by- $m$  matrix  $\mathbf{A}^T$ . So  $\begin{bmatrix} 1 & 0 \\ 2 & -6 \\ 3 & 7 \end{bmatrix}$  is the transpose of  $\begin{bmatrix} 1 & 2 & 3 \\ 0 & -6 & 7 \end{bmatrix}$ .

Line 2: Nemeth Code opens before “A superscript T” and continues over a sort of one-word bridge for “So” to encompass the first matrix. A punctuation indicator is required before the period after “A superscript T”.

Line 4: Nemeth Code is terminated on the top line of the embedded matrix before the multiple words "is the transpose of".

Line 8: Nemeth Code switch indicators are kept on the same line with the material that they enclose if possible.

Lines 3, 7, & 10: Blank lines are required both before and after a matrix, which is a spatial arrangement (even an embedded matrix is spatial).



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## Closing Words

Thank you! Thank you for your attention, your questions, and your time; all of those are so valuable, and we appreciate the work you do to share them.

For more commentary on Nemeth Code formatting rules, see the [Provisional Revised Nemeth Course Manual, posted by NFB](#) (especially Appendix C).

As always, NBA's forum [Ask an Expert](#) is open 24/7.

End of the material for  
"Nemeth and Formats and how they work together, 2<sup>nd</sup> version"