



Teaching and Learning of the Nemeth Braille Code

- Abbreviations
- Signs and Symbols of Grouping
- The Enclosed List (NI, ELI, Signs of Omission, Functions and Run Over)
- Vertical Bars as Grouping Symbols
- Transcriber's Grouping Symbols
- Enlarged Grouping Symbols
- Punctuation and Grouping Symbols



Abbreviations

- English (literary) braille
 - Measurement Units
- Use ELI before
 - Single letter abbreviation when NOT followed by a period
 - Multiple letter abbreviation if following a hyphen
- Contractions are allowed only if the abbreviation ends with a period Why?
- Use a NI, if a numeral follows a hyphen that follows an abbreviation Why?



Spacing of Abbreviations

- Spacing on each side of abbreviation except for punctuation, fraction indicators, slash line, or grouping symbols
- No space between components of an abbreviation (a.m., p.m., cm, mm)



Examples

- $10\text{ g} + 10\text{ g} = 20\text{ g}$

- a.m.

Signs and Symbols of Grouping

- Use throughout mathematical transcriptions, even in literary context.
- Only use English braille to enclose literary materials on title pages.
- Parentheses () ⠠⠠ ⠠⠠
- Brackets [] ⠠⠠⠠⠠ ⠠⠠⠠⠠
- Braces { } ⠠⠠⠠⠠ ⠠⠠⠠⠠
- Infinity ∞ ⠠⠠⠠⠠



Example

(i.e.)

⠠⠠⠠⠠⠠⠠⠠⠠

$[0,1]$

⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠

$[5,\infty)$

⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠

{Wed., Thurs., Fri.}

⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠

Empty Set (use single space between)

{ } ⠠⠠⠠⠠⠠⠠



The Enclosed List

- An enclosed list consists of:
 - 2 or more items within grouping symbols
 - Items separated by commas
 - No word, ordinal ending, plural ending, sign of comparison, or abbreviation (except function names)
 - No marks of punctuation other than commas

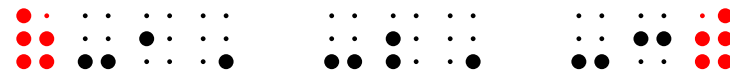
The NI with Items Enclosed in Grouping Symbols

The NI is not used at the beginning of an item in an "enclosed list." If the grouping is not an "enclosed list," the NI is used according to the other rules of the code.

■ [5-inch stick]



■ (-1, -2, -3)



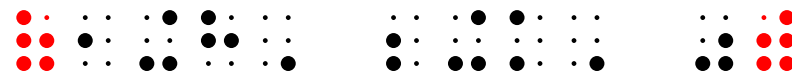
■ {0, -1, +2}



■ (1 2 3)



■ (1+h, 2+k, 0)



■ 1 yd. (3 ft.)



The ELI with Items in Grouping Symbols

The ELI must not be used with a “single letter” or “short-for combination” which is an item in an “enclosed list.”

■ $(0, a, 1, b, 2)$ ⠠⠐⠒⠠⠁⠠⠒⠠⠑⠠⠂⠠⠒

■ $\{a, b, c, d\}$ ⠠⠁⠠⠑⠠⠑⠠⠑⠠⠑

■ $[ab, cd]$ ⠠⠁⠠⠑⠠⠑⠠⠑

■ $(a, 2x, b)$ ⠠⠁⠠⠒⠠⠑⠠⠑⠠⠑

■ $(a=1, b=2, c=-4)$

⠠⠁⠠⠒⠠⠑⠠⠑⠠⠑⠠⠑

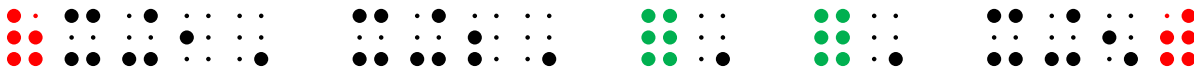
Signs of Omission in an Enclosed List

An item in an “enclosed list” may be indicated by the ellipsis or any other symbol used for omission.

■ {a, b, ..., j}



■ (x+1, x+2, ?, ?, x+5)



■ (4, 8, 12,)



Functions and Run Over in an Enclosed List

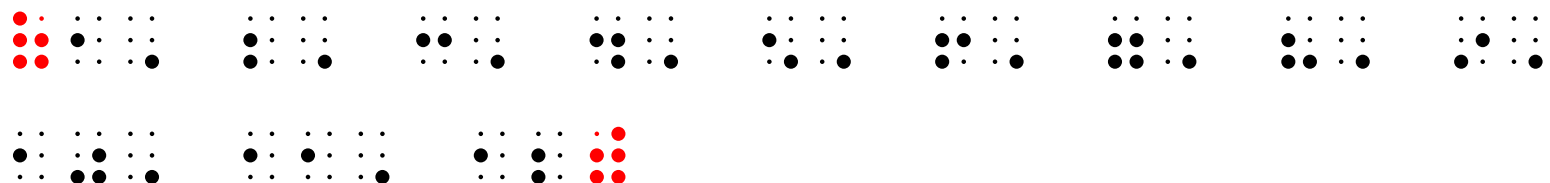
A function name such as sin, cos, tan, log, ln and the signs that follow it are considered a single item in an enclosed list.

■ (log x, log y) *this is 2 items



When an "enclosed list runs over to the next line, the NI is not needed before the first item on the new line.

■ (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)



The ELI and Groupings Other Than "Enclosed Lists"

The ELI must not be used when only one letter or any combination of unspaced letters, as in Roman numerals, is in direct contact with both its opening and closing grouping signs.

■ 1.



■ [iii]



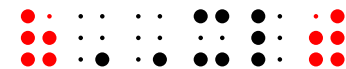
(a)



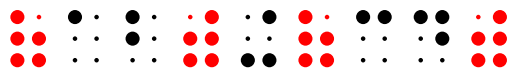
(b)



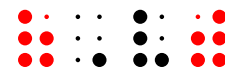
■ (XL)



■ (ab) + (cd)

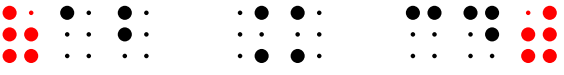


■ (V)




The ELI and Groupings Other Than “Enclosed Lists”

When only one letter or any combination of unspaced letters is in direct contact with only the opening or only the closing grouping sign, the ELI is used or not used as though the grouping sign were not present.


■ $(ab=cd)$ 

■ $(p \text{ is a positive integer})$



■ $[x\text{-intercept}]$ 

■ $(iv - v)$ 

■ $(mn; xy)$ 

Vertical Bars as Grouping Symbols

- Vertical Bar (“ou”contraction) ∴ ∴
- Single – used for “absolute value”, “magnitude of a complex number”, and “determinants of matrices”
- Double – used for “magnitude of a vector” and “norm”



Examples

- The absolute value of x

$|x|$

⠠⠨⠠⠭⠠⠖

- The magnitude of $a+bi$

$|a+bi|$

⠠⠨⠠⠁⠠⠖⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃

- The determinant of matrix A

$|A|$

⠠⠨⠠⠁⠠⠃⠠⠃⠠⠃⠠⠃

- The norm of f

$\|f\|$

⠠⠨⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃

- The magnitude of vector v

$\|v\|$

⠠⠨⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃⠠⠃

Transcriber's Grouping Symbols



- Used for inserting explanatory notes that are not in original text.
- Dot 6 followed by dot 3 ∴ ∴
- 7 words or less may be inserted into text.
- Longer notes are inserted at the nearest convenient point and indented.



Example

- Count the fathers.

TN: Shown as dot 5, f, below.

-



Enlarging Grouping Symbols

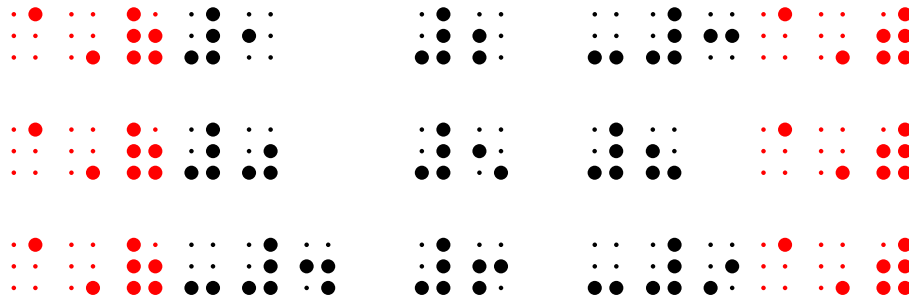
- Enlarged grouping signs are used in print to unify matrices, determinants, systems of equations, or compound or piecewise functions arranged on 2 or more lines of print.
- Indicated by adding dot 6 to the grouping symbol, or by drawing in the enlarged grouping sign.



Examples

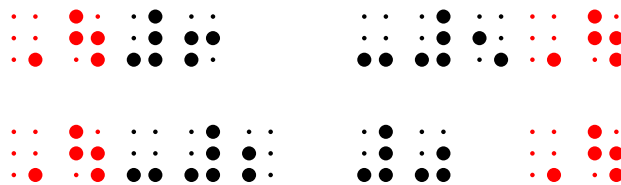
Matrices

$$\begin{bmatrix} 1 & 2 & -3 \\ 0 & 5 & 8 \\ -4 & 6 & -9 \end{bmatrix}$$



Determinants

$$\begin{vmatrix} 6 & -5 \\ -2 & 0 \end{vmatrix}$$





Other Examples

System of equations

$$\begin{cases} x + y = 2 \\ x - y = 0 \end{cases}$$

Braille representation of the system of equations above.

Compound or Piecewise function

$$y = \begin{cases} x, & \text{if } x < 2 \\ 7, & \text{if } x \geq 2 \end{cases}$$

Braille representation of the piecewise function above.



Punctuation and Grouping Symbols

- A comma that follows a grouping symbol is a mathematical comma.
- Other marks of punctuation, except the hyphen, dash, and ellipsis, must be preceded by the PI.



Examples

- Study paragraphs (1), (2), and (6).

- What is the least common denominator (LCD)?



Assignment

- p.43 all

- p. 47 all

Do only transcription

- p. 49 all