

... unless a page number shares the line.

This Braille example shows a long mathematical expression on the first line. A dashed line indicates a page turn. On the second line, the page number is placed at the beginning, followed by the continuation of the expression.

..OR..

This Braille example shows a long mathematical expression on the first line. A dashed line indicates a page turn. On the second line, the page number is placed on a separate line at the beginning, followed by the continuation of the expression.

The expression in the next example will fit on one line but the code switch indicators will not. One of the indicators must be placed on a different line.

Example 4.7-2 Expressed in words, minuend – subtrahend = difference.

This Braille example shows a long mathematical expression on the first line. A dashed line indicates a page turn. On the second line, the code switch indicators are placed at the beginning, followed by the continuation of the expression.

At a page turn, do not leave the switch indicator alone at the bottom of a braille page.

This Braille example shows a long mathematical expression on the first line. A dashed line indicates a page turn. On the second line, the code switch indicators are placed on a separate line at the beginning, followed by the continuation of the expression.

..OR..

This Braille example shows a long mathematical expression on the first line. A dashed line indicates a page turn. On the second line, the code switch indicators are placed on a separate line at the beginning, followed by the continuation of the expression.

The next example is similar to the example presented in **Lesson 2**—the expression itself requires a full braille line. The switch indicators are on the preceding and following lines.

A freestanding letter with an ordinal ending may also be brailled in UEB.

Example 4.9-3 Find the n th term of the arithmetic sequence.



Exception: Certain mathematical letters are characterized by a special typeface and must be brailled in Nemeth Code. Such letters will be studied in **Lesson 7**.

4.10 Single English Letters in Nemeth Code: An English letter that has mathematical meaning and which appears in technical context—that is, between Nemeth Code switches—is transcribed according to the rules of the Nemeth Code. Before illustrating the rules with examples, the definition of "single letter" as used in the Nemeth Code is presented.

4.10.1 Nemeth Code Definition of "Single Letter": To be defined as a "single letter" in the Nemeth Code several criteria must be met.

- i. A "single letter" must be from the English alphabet, in regular type, and unmodified.

These are "single letters" p D z R

These are not "single letters" π \mathbf{D} \bar{z} \mathbb{R} *The first letter is not from the English alphabet, the second and fourth letters are not in regular type, the third letter is modified.*

- o SPECIAL CASE: A letter representing a mathematical variable is often printed in italics but the italics are disregarded in braille. **Lesson 7** discusses typeform.

- ii. Furthermore, in the print copy the letter must be both preceded by a space or by one or more punctuation marks AND followed by a space or by one or more punctuation marks.

These are "single letters" "y" x, "w S" *Each letter is preceded and followed by punctuation or by a space.*

These are not "single letters" $-x$ "wS" *The x, z, and S are not preceded by a space or by punctuation ($-x$ is "negative x"); the y and the w are not followed by a space or by punctuation.*

- o *Note:* Nemeth Code grouping symbols are not considered to be punctuation marks. Rules for letters touching grouping symbols are discussed later.

- iii. Whether the leading punctuation mark is preceded by a space or not is irrelevant; whether the following punctuation mark is followed by a space or not is irrelevant.

These are "single letters" "x"+"y" *Each letter is both preceded and followed by punctuation.*

- iv. If the space shown in print is not shown in braille, the letter is no longer a "single letter."

These are not "single letters" $r + s$ *Although each letter is preceded and followed by a space in print, in braille the plus sign is unspaced from the letters.*

- v. And finally, to be defined as a "single letter" the letter must not be an abbreviation nor can it be a word ("a", "A", "I", or "O").

These are not "single letters" I need 4.5 m of fabric. *"I" is a word; "m" is an abbreviation for "meters".*

Single-letter abbreviations are discussed in a later lesson.

Throughout this course, when referring to the Nemeth Code definition of a single letter, the term "single letter" is in quotation marks.

Introduction to the English Letter Indicator

When a single letter from the English alphabet is used in mathematical context it may require the use of the English letter indicator. And—even though no contractions are used in Nemeth Code—a letter combination that is the same as a shortform may require the use of a letter indicator for clarity.

English Letter Indicator ("ELI") ⠠⠠

Several rules are in place regarding situations where the ELI is or is not used. It is important to note that the English letter indicator does not function in the same way as the UEB Grade 1 symbol indicator. The term "English letter indicator" clearly describes the function of the indicator.

4.11 Use of the English Letter Indicator with a "Single Letter": Except as noted in the next section, an ELI is required when a letter is a "single letter" as defined in [4.10.1](#), above.

4.11.1 Capitalization of "Single Letters": To indicate a single capitalized letter, the capitalization indicator is placed between the ELI and the letter. The effect of the capitalization indicator extends only to the letter which follows it.

Capitalization Indicator ⠠⠠⠠

4.11.2 Punctuation of "Single Letters": A "single letter" is punctuated mathematically if the letter and the punctuation fall within the Nemeth switch indicators.

The examples from [4.10.1](#) are illustrated below, assuming mathematical context. Note the placement of the capitalization indicator as well as the use of mathematical punctuation.

Instructions: Demonstrate the use and the nonuse of the English letter indicator for "single letters" by brailleing this practice entirely in Nemeth Code. To keep the identifiers beginning in the proper cell, braille an opening Nemeth Code indicator in cell 1 on the first line and begin the first item on the next line.

PRACTICE 4E

- (a) $r = \text{rate}$
 - (b) $"r" = \text{rate}$
 - (c) $x, y, z < 100$
 - (d) $n\text{¢} = \$4.95$
 - (e) $x > "3"$
 - (f) $a + b$
 - (g) $|y| = |-y|$
 - (h) $|x + y| = |x| + |y|$
 - (i) $P(\text{red and blue})$
-

Instructions: These examples illustrate both use and nonuse of the English letter indicator with a "single letter" or a "shortform letter combination". Explain your decisions.

PRACTICE 4F

- (A) Prove: If $a < b$ and $c < 0$, then $ac > bc$. Verify your proof by determining ac and bc when $a = 5$, $b = 7$, and $c = -4$.
- (B) $j = 1, 2, \dots, n$
- (C) 40% of $N = 120$
- (D) 40% of "N" = 120
- (E) If "rcv = rjc" does "v" = "j"?

FORMAT SUMMARY #2

Here is a summary of the Nemeth Code formats encountered in Lessons 3 and 4.

Side-by-Side Items in Itemized Material with No Subdivisions: When unsubdivided itemized material is arranged side by side across the page in print, the braille format must be changed so that all identifiers start in cell 1.

Keep Together—Hyphenated Expressions: A hyphenated expression containing one or more mathematical components must not be divided between braille lines.

Keep Together—Mathematical Expression: If a page number on line 25 or line 1 does not allow the entire mathematical expression to fit on the line, the expression must be brought down to the next line that has enough usable cells. If the expression will fit on one line but the code switch indicators will not, one or both of the indicators can be placed on a different line.

Keep Together—Abbreviation: An abbreviation and a preceding or following numeral to which it applies must not be divided between braille lines.

For further practice, see Appendix A—Reading Practice.

