

## **LESSON 1**

- INTRODUCTION TO CODE SWITCHING
  - Placement of the Code Switch Indicators
- THE HYPHEN AND THE DASH
- SIGNS OF OMISSION
- INTRODUCTION TO IDENTIFIERS

### *Format*

- Keep Together—Mathematical Expression
- Margins for Narrative (3-1)
- Margins for Itemized Material with No Subdivisions (1-3)
- FORMAT SUMMARY #1

### *Answers to Practice Material*

## **LESSON PREVIEW**



Introduction to the rules regarding code switching and use of Nemeth code switch indicators. The hyphen and the short dash are studied. Three signs of omission are introduced: the ellipsis, the long dash, and the general omission symbol. Two Nemeth Code formats are illustrated: 3-1 narrative and 1-3 itemized material.

*Do not begin Lesson 1 until you have completed the Preliminary Lesson.*

# *INTRODUCTION TO CODE SWITCHING*

## **1.1 A Complete Transcription**

The base code used in a "UEB with Nemeth" transcription is Unified English Braille ("UEB"). When mathematical content occurs anywhere in the transcription, the non mathematical notation follows UEB rules while the mathematical notation follows the rules of the Nemeth Code. The reader will be reading Unified English Braille unless signaled otherwise by the use of a code switch indicator.

	Opening Nemeth Code indicator
	Nemeth Code terminator

*These symbols must be listed on the Special Symbols page in the transcriber-generated portion of each volume. See the Final Lesson for further details.*

The opening Nemeth Code indicator is followed by a space (one blank cell). The Nemeth Code terminator is preceded by a space (one blank cell). These spaces do not represent a space in print.

The opening Nemeth Code indicator and the Nemeth Code terminator may also be referred to as "code switch indicators" or "switches".

The following principle is central to a smooth reading of UEB with Nemeth transcription: *UEB symbols are not used inside of the Nemeth code switches. Nemeth symbols are not used outside the switches.*

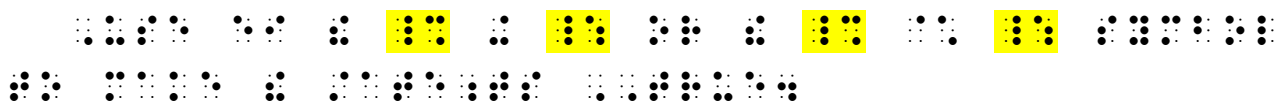
## **1.2 Use of the Code Switch Indicators**

Switch to Nemeth when a mathematical symbol or a mathematical expression is encountered.

*The code switch indicators are highlighted throughout this lesson.*

### Example 1-1

Use either the + or the  $\times$  symbol to make the statements TRUE.



*Recall that the space after the opening Nemeth Code indicator and the space before the Nemeth Code terminator do not represent a space in print.*



Example 1-4

A scale model of the *Nautilus* as depicted in the 1954 Disney film *20,000 Leagues Under the Sea* is shown in the 1st drawing in §5.7.

§ 5.7.1. A scale model of the *Nautilus* as depicted in the 1954 Disney film *20,000 Leagues Under the Sea* is shown in the 1st drawing in §5.7.

*Within this narrative sentence, the number with the internal comma is transcribed in UEB, as is the ordinal. The UEB section sign is used for the section reference.*

Example 1-5

A bag contains 10 marbles: 2 purple, 4 orange, 1 yellow, and 3 green. If the bag contains 1,000 marbles, what are the chances of drawing 4 yellow marbles on the 1st draw of 12 marbles?

10 marbles: 2 purple, 4 orange, 1 yellow, and 3 green. If the bag contains 1,000 marbles, what are the chances of drawing 4 yellow marbles on the 1st draw of 12 marbles?

*In this word problem, the freestanding, unmodified numbers are transcribed in UEB.*

Example 1-6

Which is more: two 3's, or three 2's? There are five 2s in 10. How many 5s are in 10?

Which is more: two 3's, or three 2's? There are five 2s in 10. How many 5s are in 10?

*In this word problem, plural numerals are transcribed in UEB.*

- a. When an unmodified number is touching literary punctuation such as quotes or parentheses, it is still considered to be freestanding and may be transcribed in UEB.

Example 1-7

Is the "5" in the number "5093" in the hundreds place (500) or in the thousands place (5,000)?

*Throughout this course, isolated examples which illustrate Nemeth constructions are marked with a chevron symbol. Nemeth switch indicators are omitted in order to focus on the construction itself. In the context of a complete transcription, code switch indicators are required. In many cases, the isolated construction is incorporated into the example which follows, where use of the code switch indicators is also demonstrated.*

1.3.3 **Nemeth Required.** If a freestanding number or letter is combined with anything other than an ordinal, an internal comma, or a plural, it is considered to be modified and is transcribed in Nemeth. Here are some examples.

- a. A numeral associated with an operation sign must be transcribed in Nemeth Code. A numeral associated with a monetary symbol or with a percent sign is included inside the switches.

➤ 10×12     

➤ \$7           

➤ 5%           

Example 1-8

How many cans of paint does Rosie need to paint her 10×12 foot bedroom? At \$7 per can, plus 5% tax, what will it cost to complete the job?

*A switch to Nemeth Code is required for the multiplication symbol, for the monetary symbol, and for the percent sign. The numbers associated with those symbols are also transcribed in Nemeth.*

- b. A negative numeral must be transcribed Nemeth Code. A decimal number with mathematical meaning is transcribed in Nemeth Code.

$$\begin{aligned} &\gg -5 \qquad \dots \dots \dots \\ &\gg 3.14159 \qquad \dots \dots \dots \end{aligned}$$

Example 1-9

Which is colder, -5 degrees Celsius or 5 degrees Fahrenheit?  
What does this famous decimal number represent? 3.14159

*A switch to Nemeth Code is required for the minus symbol and for the decimal point. The numbers associated with those symbols are also transcribed in Nemeth. The freestanding, unmodified number 5 is transcribed in UEB.*

**1.4 Placement of Literary Punctuation**

When Nemeth is terminating and punctuation follows, the function of the punctuation mark must be determined. If the punctuation applies to the structure of the sentence and is not actually part of the math expression, the Nemeth Code terminator is transcribed first. The punctuation mark then will follow the termination indicator. There is no space between the terminator and the punctuation mark.

$$\gg 931 684 572 \qquad \dots \dots \dots$$

Example 1-10

931684572 can be divided into groups of three digits each: 931 684 572.

*The period is placed outside of the Nemeth Code terminator. Note that the first numeral does not require a switch to Nemeth because it is a freestanding, unmodified numeral. The second numeral requires a switch because the UEB numeric space indicator is not used in a Nemeth transcription. Review the topic of partitioned numbers in Section P4.1 of the Preliminary Lesson.*

*Instructions:* Center the heading. Begin each problem in cell 3 with runovers in cell 1.

### PRACTICE 1B

If  $47 - 41 > 1$ , do you suppose that  $41 - 47 < 1$ ? Why or why not?

If  $5 + 10$  equals 15, what does  $10 + 5$  equal? Explain.

### *Format*

#### 1.5 Keep Together—General Principle Regarding 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.

$$\gg 0.999 = 1$$

*The equation constitutes one mathematical expression.*

#### Example 1-11

Catherine says she can prove that  $0.999 = 1$  but I need convincing.

$$0.999 = 1$$

*In the "keep together" examples, full cells of shadow dots show the space remaining on the preceding line.*

### *Placement of the Switch Indicators*

1.5.1 **Keep Together If Possible.** 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. In the previous example as well as the next one a new line is forced to begin with the opening Nemeth Code indicator even though the indicator could fit on the previous line.

#### Example 1-12

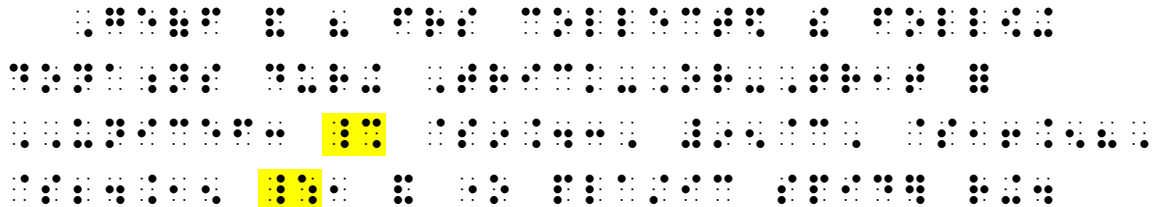
The final term can be expressed as  $2 \times 100 + 1$  in this series.

$$2 \times 100 + 1$$

- a. If two or more math expressions occur 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.

*Example 1-13*

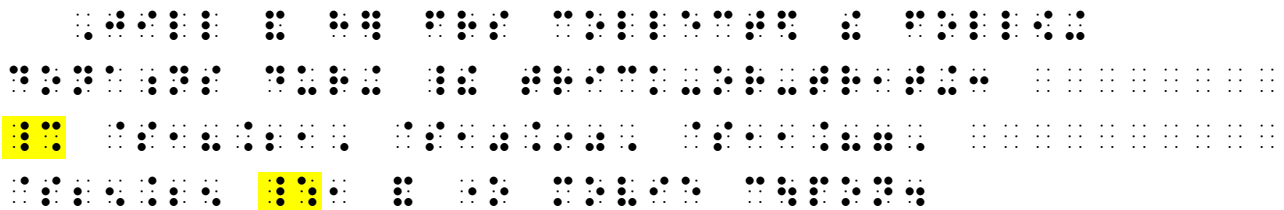
Geoff and his friends collected the following donations during Trick-Or-Treat for UNICEF: \$9.43, 95¢, \$16.58, \$24.15, and one plastic spider ring.



- b. Within a paragraph, a switch indicator should not stand alone on a line if there is room for it to fall on the line with the math expression to which it applies.

*Example 1-14*

Jill and her friends collected the following donations during their trick-or-treating: \$18.21, \$10.90, \$11.87, \$25.25, and one movie coupon.



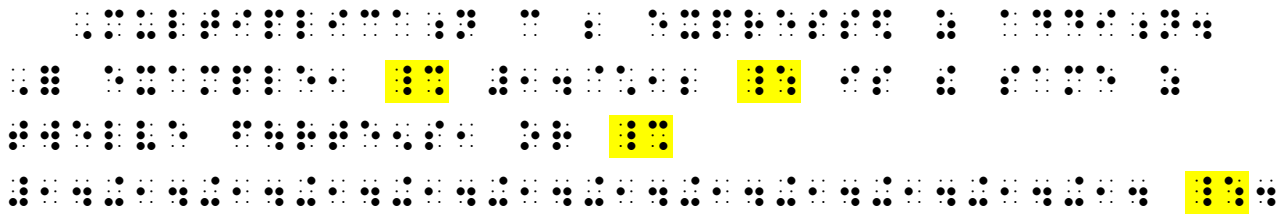
*The opening Nemeth Code indicator is placed on the same line as the first dollar amount, even though there is room for just the indicator on the previous line. The last dollar amount is placed on the same line as the Nemeth Code terminator, even though there is room for just the dollar amount on the previous line.*

- 1.5.2 **A Switch Indicator 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. Several layouts are illustrated below.



Example 1-15

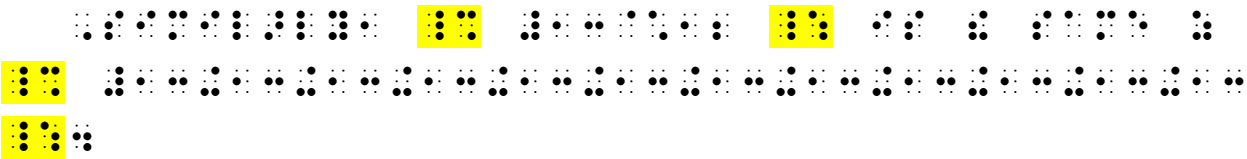
Multiplication can be expressed as addition. For example,  $14 \times 12$  is the same as twelve fourteens, or  $14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14$ .



*This opening Nemeth Code indicator falls on the line before the long expression.*

Example 1-16

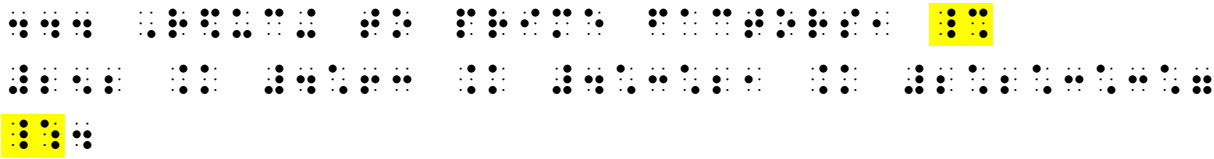
Similarly,  $13 \times 12$  is the same as  $13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13$ .



*This Nemeth Code terminator (along with the related punctuation) falls on the line after the long expression.*

Example 1-17

... Reducing to prime factors,  $252 = 4 \cdot 63 = 4 \cdot 3 \cdot 21 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 7$ .



*Because the expression takes up the full available line width, both the opening Nemeth Code indicator and the Nemeth Code terminator fall on separate lines.*





Note: A sign of comparison links the symbols on the left side of the comparison sign with the symbols on the right side of the comparison sign and so is considered to be one mathematical expression. The math portion in the example above is one expression, not four, and should not be divided between lines if it will fit on one line within the current margins.

1.5.3 **Switch Indicators at Braille Page Turns.** The effect of the opening Nemeth Code indicator is not terminated by transition to a new braille page. If, however, the switch to Nemeth occurs at a braille page turn, place the opening switch indicator on the same braille page as the mathematical material to which it applies. Similarly, the Nemeth Code terminator should be placed on the same braille page as the end of the mathematical material.

Example 1-18

... Reducing to prime factors,  $252 = 4 \cdot 63 = 4 \cdot 3 \cdot 21 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 7$ .

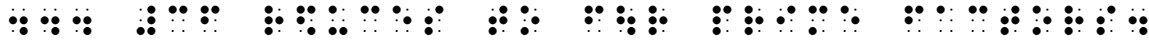
25 

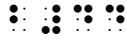



1    
 2   
 3 

*Although the opening switch indicator will fit after the word "factors," it would then fall on line 25 of the preceding braille page.*

Example 1-19

... 36 reduces to four prime factors.  $36 = 2 \cdot 18 = 2 \cdot 2 \cdot 9 = 2 \cdot 2 \cdot 3 \cdot 3$

24   
 25 

1   
 2   

*Although the opening switch indicator will fit after the word "factors," and the math would fit on line 25, the Nemeth Code terminator will not fit there because of the braille page number. Instead, the math expression and the two switch indicators are arranged so they will fall on the same braille page. This expression and its two code switch indicators will fit on one line so it begins on line 2.*

Switch indicators at print page turns will be discussed in Lesson 3.





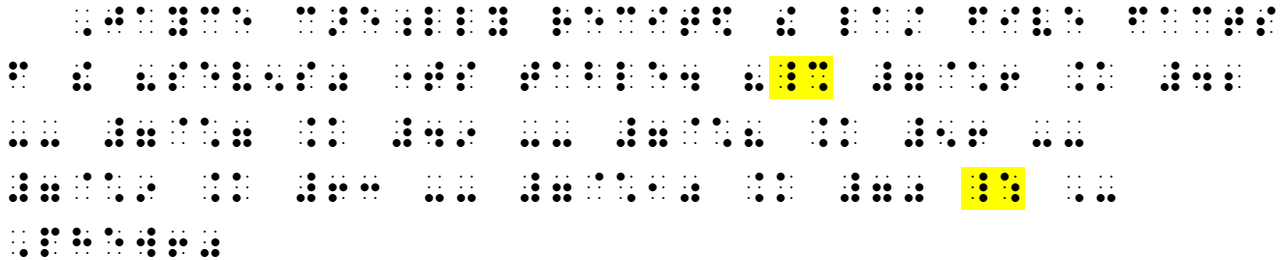




- a. Even though the symbols differ between UEB and Nemeth, you may use the two dash forms within a sentence.

Example 1-29

Jayce carefully recited the last five facts from the "sevens" times table.  
 "7 × 6 = 42 — 7 × 7 = 49 — 7 × 8 = 56 — 7 × 9 = 63 — 7 × 10 = 70 — Phew!"

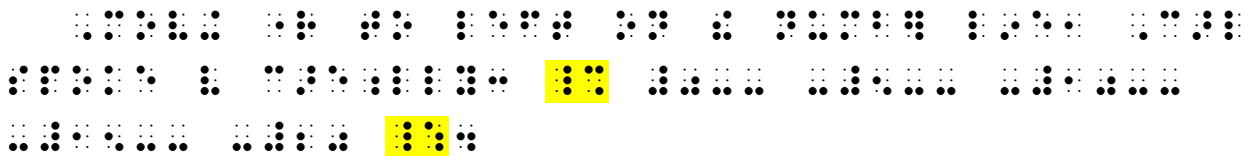


*The Nemeth dash is used in the math portion, and the UEB dash is used after Nemeth is terminated. Each dash is preceded and followed by a space, as in print. Recall that the space before the Nemeth Code terminator does not represent a space in print.*

- 1.7.4 **Hyphen, Dash, or Minus Sign?** Read carefully to determine whether a symbol is a hyphen, a dash or a minus/negative sign. A space must come between a hyphen and a minus sign or between a dash and a minus sign in order to distinguish the similar constructions.

Example 1-30

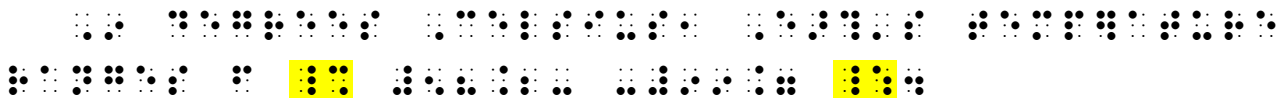
Moving right to left on the number line, Carl spoke very carefully: 0— -5— -10— -15— -20.



*Although the numbers will fit all together on one line, they are five individual expressions and so the fullest available extent of the line is used.*

Example 1-31

In degrees Celsius, Earth's temperature ranges from 58.2- -99.7.



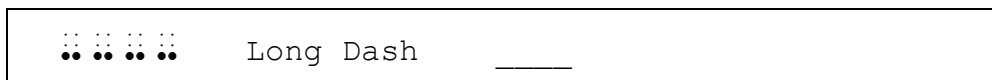
*Because a space must be inserted between the hyphen and the minus sign, a numeric indicator is required for -99.*





## 1.10 Long Dash

When a low line (underscore) is used to denote an omission in print, within mathematical context the Nemeth "long dash" is transcribed. Outside of the code switches, the UEB underscore is used.



### Example 1-34

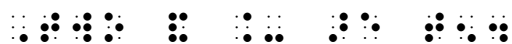
Multiply:  $79 \times 542 = \underline{\hspace{2cm}}$



*The Nemeth long dash is used inside the switches.*

### Example 1-35

Two and     are ten.

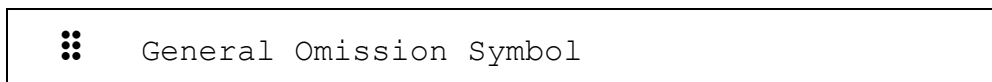


*The UEB underscore is used in nonmathematical context.*

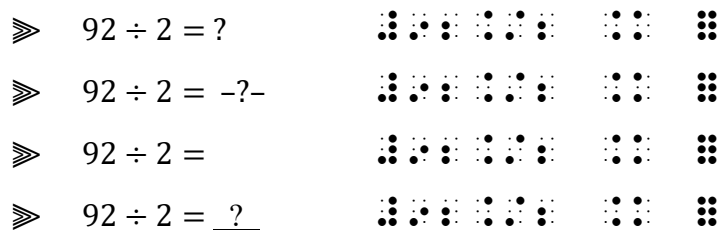
*Exception:* When a long dash is used to show missing digits within a number, the general omission symbol is used to represent the omission, as explained in the next section.

## 1.11 General Omission Symbol

An omission may be printed as a question mark, or a blank space may indicate a missing sign. The printed question mark can be standing alone, underlined, or be shown with hyphens. In all cases, the general omission symbol is transcribed.



All four examples below are transcribed the same way.



- a. The general omission symbol follows the spacing rules of the material which it represents.

$$\gg 6 + ? = 15 \quad \dots\dots\dots\dots\dots$$

*The omitted digit is unspaced from the plus sign and spaced from the equals sign.*

$$\gg 1,5?4 + 200 = 1,734$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

*The omitted digit in the tens place is unspaced from the digits in the hundreds place and the ones place.*

Example 1-36

Greater than or less than?  $24 \div 3 \quad ? \quad 24 \div 4$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

*The omitted comparison sign is preceded and followed by a space, according to the spacing rules for signs of comparison.*

- b. The number of general omission symbols used in braille must correspond to the number of omission signs used in print. A box or or a shaded region that does not show a specific number of places is represented by a single general omission symbol.

Example 1-37

$$678 \times 27 = \text{?????}$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

*A 5-digit answer is implied by showing five omission signs, which represent the five question marks shown in print.*

Example 1-38

$$197 \times \text{[gray box]} = 4925$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

*A gray rectangle indicates a missing factor.*

- c. When an internal dash or underscore is used to show missing digits within a number, the number is considered to be "modified" (as defined in the Preliminary Lesson, section P3.1) and so is transcribed in Nemeth. The general omission symbol is used to represent the omission in this case.



Example 1-42

Subtract:  $\$3.52 - \$7.14 = \$ \underline{\quad}$

The Braille transcription of the subtraction problem is:  $\$3.52 - \$7.14 = \$ \underline{\quad}$ . The numbers 3, 5, 2, 7, 1, 4, and the dollar signs are represented by their standard Braille numerals. The blank space is represented by a series of empty cells.

Example 1-43

Multiply.  $92\% \times .04 = \dots \%$

The Braille transcription of the multiplication problem is:  $92\% \times .04 = \dots \%$ . The percent signs and decimal points are represented by their standard Braille symbols.

Example 1-44

Convert inches to feet:  $24'' = \underline{\quad}'$

The Braille transcription of the conversion problem is:  $24'' = \underline{\quad}'$ . The double and single quote symbols are represented by their standard Braille symbols.

- c. More rules regarding the spacing of an ellipsis or a long dash will be addressed in later lessons.

**1.13 Other Omission Symbols**

Omissions are frequently shown in other ways besides a blank space, a question mark, a dash, or an ellipsis. A shape, such as a square or a circle, may indicate an omission. If the omission sign used in print has no braille equivalent in the code, the sign may be represented by a devised braille symbol or by a drawing. Shape symbols, devised symbols, and drawings will be discussed in Lesson 11.

***Format***

**1.14 Paragraph Margins for Narrative Portions of Text (3-1)**

The Nemeth Code states that each paragraph is to begin in cell 3, with runovers in cell 1. Nemeth formats are applied throughout a Nemeth transcription, including the UEB portions of text. If the print copy uses blocked paragraphing style, the transcriber must follow Nemeth format rules and begin each new paragraph in cell 3. There is no blank line inserted between paragraphs unless another situation requires a blank line according to *Braille Formats* or according to other Nemeth formats (yet to be studied).

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*Instructions:* Treat the marginal heading as a cell-5 heading.

**PRACTICE 1F**

**Numerical Prefixes** Here are some examples of numeral prefixes: "Tetra-" means 4; "hexa-" means 6; "hepta-" means 7; "deca-" means 10; "dodeca-" means 12.

If a *dodecagon* is a 12-sided figure, a *dodecahedron* is a \_\_-faced solid. A 10-faced solid is called a \_\_\_\_\_.

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## **INTRODUCTION TO IDENTIFIERS**

### 1.15 Terminology

When material is identified sequentially by number or letter, as in exercise material, it is referred to as *itemized material*. The number or letter is referred to as the *identifier*. Itemized subentries are referred to as *subdivisions*.

Labeled steps such as "Step 1" are not considered to be itemized material.

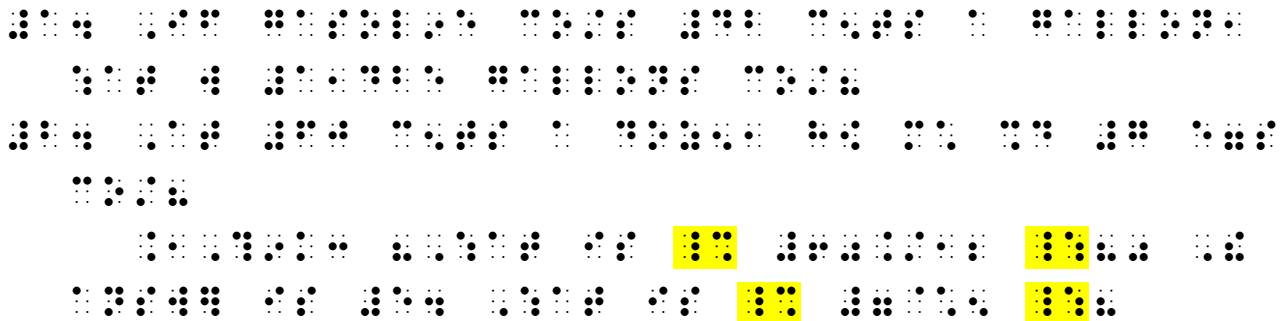
### *Format*

### 1.16 Margins for 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.

Example 1-45

- |   |
|---|
| <p>1. If gasoline costs 42 cents a gallon, what will 1,425 gallons cost?</p> <p>2. At 60 cents a dozen, how much should 7 eggs cost?</p> <p style="margin-left: 40px;"><i>Think: "What is 60 ÷ 12 ?" The answer is 5. What is 7 × 5 ?</i></p> |
|---|



Use clues from the print layout as well as the information in the paragraph to determine if the new paragraph is indeed a continuation of the item or if it is separate material. Compare Example 1-45 above with the next example.

*Example 1-46*

- A. If gasoline costs 42 cents a gallon, what will 1,425 gallons cost?
- B. At 60 cents a dozen, how much should 7 eggs cost?

*Think:* "Should I multiply or should I divide?  
Can I solve the problem in one step?"

*Example 1-46* A. If gasoline costs 42 cents a gallon, what will 1,425 gallons cost?  
B. At 60 cents a dozen, how much should 7 eggs cost?

*Think:* "Should I multiply or should I divide?  
Can I solve the problem in one step?"

*Notice that a blank line is left between itemized format and a 3-1 narrative paragraph.*

*Instructions:* Format the first sentence as a narrative paragraph. Retain boldface for the paragraph heading. Insert a blank line between the narrative paragraph and the itemized material. Ignore typeface of the identifiers.

### PRACTICE 1G

**Refresher.** These problems will test your skill with decimals.

1. First, addition:  $42.6 + 37.23 + 3.215 =$
2. Now subtract:  $87.6 - 51.35 =$
3. Try multiplication:  $625.1 \times 2.7 =$
4. And now divide:  $4.864 \div 3.2 =$

## FORMAT SUMMARY #1

Here is a summary of the Nemeth formats encountered so far in this course.

General Principles When an item in a UEB transcription requires the use of Nemeth 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* should be followed.

Mathematical Expressions—Keep Together If a mathematical expression will fit on one braille line within the current margins, it must not be divided between lines. The entire expression is brought down to the next line.

Paragraph Margins for Narrative Portions of Text (3-1) In a document governed by Nemeth formatting, an unitemized paragraph in explanatory portions of text begins in cell 3 and all runovers begin in cell 1. Blocked paragraphing is not used in a Nemeth transcription. A blank line is inserted after a paragraph when itemized material follows.

Margins for 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. A blank line is inserted after itemized material when a (3-1) narrative paragraph follows.

Placement of Code Switch Indicators within Narrative Place the entire math expression and the two code switch indicators on the same braille line if they will fit within the current margins. If the entire string will not fit on one line, a switch indicator may stand alone on a line to allow the math expression to remain undivided. It is preferable to keep the switch indicators on the same braille page as the mathematical material to which they apply.

*For further practice, see Appendix A—Reading Practice.*











## ***HOW TO PREPARE THE EXERCISES***

Each lesson ends with an exercise which will be turned in for grading. Prepare the exercise for each lesson in the following way:

- (1) Use a 40-cell line and 25 lines per page.
- (2) Include the print page number on every page. Use the page number shown at the bottom of each exercise page. Insert page change indicators as needed. The upper-cell numerals of UEB are used for page number designations.
- (3) Include a braille page number on every page, starting each lesson exercise with braille page number 1. The upper-cell numerals of UEB are used for page number designations.
- (4) Instructions for the transcriber may precede the exercise material itself. Do not transcribe those instructions.
- (5) Transcribe the EXERCISE heading on line 1. Center that heading.
- (6) Do not use a running head. Do not divide words.
- (7) Itemized problems may begin at the bottom of a braille page and continue on the next braille page. Do not force a numbered/lettered problem to begin on a new page unless other format rules apply. An identifier should not stand alone at the bottom of a braille page.
- (8) Include your name after a blank line on the last page of the exercise.
- (9) If you send electronic files, submit your first file as a brf file. Your grader will then let you know what file type is preferred. Include your name and date in the filename.

*Example: LastnameInitials Ex# Date*  
*HobartEW Ex1 3-25-22*

The Study Tips on pages viii-ix (Front Matter) offer ways to get the most out of the lesson exercises.



*Instructions:* Prepare Exercise 1 according to the guidelines given on page 1-29. Treat the first sentence as a narrative paragraph. Follow *simple vertical list* format from *Braille Formats* for the unnumbered items. For the items arranged in columns, arrange them as printed, following *lists in columns* from *Braille Formats*. Note that this exercise includes symbols and rules from the Preliminary Lesson. On page 3, center the heading "HOMEWORK PROBLEMS". *Code Switching Guidance:* Switch to Nemeth Code at the end of the first paragraph, on the same line as the word "statements." Terminate Nemeth Code on the line following the three-column list, in cell 1.

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## EXERCISE 1

Here is a list of several math symbols and statements.

$$5.3 \times 71 = 53 \times 7.1 = 376.3$$

$$14 \times .5 = 14 \div 2$$

$$.3 > .2 > -.2 > -.3$$

$$957 \div 3 - 14 = 319 - 14 = 305$$

$$46.0 < 460 > 4.6$$

$$18 - 6 - 6 < 18 + 6 - 6$$

$$94 \cdot 3 = 90 \cdot 3 + 4 \cdot 3 = 270 + 12 = 282$$

$$+5, +3, +1, 0, -1, -3, -5$$

$$\$19,343,541,768,824$$

$$9-26 = \qquad -4-15 =$$

$$50 \div 10 = \qquad 6 \div 3 =$$

$$1.8 \div 2 = \qquad -30 \div 6 =$$

$$\$7.98 \cdot 4.3\% = \qquad \$99 - 40\% =$$

$$£530 + £218 = £748, £1 = \$1.31$$

$$£35 \times 1.435 = \$50.225 = \$50.23$$

$$49¢ + 49¢ < \$1.00$$

$$6 : 4.5 :: 4 : 3$$

$$13'11'' < 180''$$

$$12'10'' \div 2 = 6'5''$$

$$? + 64 + 58 + 97 = 265$$

$$-45 \div 9 = -5$$

$$7.25'' + 3.5'' + 1.5'' = 12.25'' > 1'$$

$$4:3 = 4 * 2:3 * 2 = 8:6$$

$$36,000,000 = 3.6 \times \text{-?}$$

$$1435 \times 6 = 86??$$

$$\$9.86 - \$0.07 + \$468.57 = \$478.36$$

$$41\text{¢} - 32\text{¢} = 9\text{¢} = \$\dots$$

$$.01 - .25 < -.25 - .01$$

$$55\% + 62\% = \underline{\hspace{1cm}}\%$$

$$1.141222 \dots 2 \dots$$

$$35' + 49' > 80'$$

$$8 : 15 :: 24 : \underline{\hspace{1cm}}?$$

$$51,858 \div ? = 402$$

$$.769 \qquad - .246 \qquad 79,086$$

$$99.9\% \qquad 2'11'' \qquad 83\text{¢}$$

$$548,712 \qquad 365 \div 12 \qquad 68.94$$

$$-6.87 \qquad 0 \qquad -4 > -5$$

$$97.6'' \qquad +.54 \qquad \$0.84$$

$$72\text{‰} \qquad +33.8 \qquad -45.67$$

### HOMEWORK PROBLEMS

1. A box measures 2'4" in height. Express the height in inches only.
2. **Rounding:** Round 79¢ to the nearest dollar. Round 5.16 to the nearest hundredth. Round 3,794 to the nearest ten.
3. The 2nd decimal place represents 100ths. Does .014 indicate 14 hundredths or 1.4 hundredths?
4. The ratio 12 : 15 is the same as  $12 \div 3 : 15 \div 3 = 4 : 5$  or "4 out of 5".  
Similarly, 4 : 5 is equivalent to  $4 \times 20 : 5 \times 20 = 80 : 100$  or "80 out of 100" which—expressed as a percent—is \_\_\_\_%.
5. An *integer* is a positive or negative whole number, or zero. Is -3 an integer? Is 0?



6. As of August 2016, the world population estimate was 7.4 billion humans. The "worldometer" estimated 7 454 043 645 at noon on September 30th.
7. **True or False?**  $15 > 9$ ,  $6 + 3 < 7$ ,  $14 - 2 < 1$ ,  $-5 > 3$

*Mental Multiplication:* To solve the problem  $67 \times 46$ , think of 67 as  $60 + 7$  and think of 46 as  $40 + 6$ . Now simply multiply each number by the other,  $60 \cdot 40$ ,  $60 \cdot 6$ ,  $7 \cdot 40$ ,  $7 \cdot 6$ , and then add the products:  $2400 + 360 + 280 + 42 = 3082$ .

- A. There *must* be a better way to write the number  
0.00111122223333444455556666777788889999!
- B. One DVD costs 10.52 euro. How much will five DVDs cost?  $\text{€}10.52 \times 5 = \text{€}52.60$
- C. In Exercise 9.7, each expression in your answer must include at least three of the four basic operations:  $+$   $-$   $\times$   $\div$
- D. The sample size, 2.0791812460, rounds to 2.
- E. On a number line, show that  $-4$  is the opposite of  $+4$ .
- F. List the numerals from .01-.25 on the whiteboard.
- G. Todd just celebrated his 18th birthday. In what year was he born?  
 $2022 - 18 = ?$
- H. Never divide 0 by 0.
- I. Is  $6 \cdot 7 \cdot 8$  the same as  $8 \cdot 7 \cdot 6$ ? What rule supports your answer?