*Lesson 14*

*Roman Numerals,  Fractions,  Decimals,*
*Mathematical Signs of Operation,  Superscripts and Subscripts,*
*Clock Time,  Sports Scores and Votes,  Slash between Numbers,*
*Electronic Addresses*

## 14.1   Roman Numerals  [VII.30]

**14.1*a*   In general.** Use the braille letters, just as in print, when transcribing roman numerals. If roman numerals are printed in capital letters, in braille those consisting of a single letter are preceded by a single capital sign, and those consisting of more than one letter are preceded by the double capital sign. If roman numerals are printed in lowercase letters, a single letter sign is placed before the corresponding braille letter or letters. Examples:

| V | XL | x | iii |
|---|---|---|---|
| ⠨⠧ | ⠠⠠⠭⠇ | ⠰⠭ | ⠰⠊⠊⠊ |

- Note: For roman numerals representing the number 500 and higher, see *EBAE* VII.30.c.

**14.1*b*   With hyphen, dash, or colon.** When roman numerals are separated by a hyphen, dash, or colon, the appropriate capital sign, double capital sign, or letter sign is repeated after the punctuation. For readability, these units should not be divided between braille lines. Examples:

| VI-X | vi-x | V—X | v:x |
|---|---|---|---|
| ⠠⠠⠧⠊⠤⠨⠭ | ⠰⠧⠊⠤⠰⠭ | ⠨⠧⠠⠤⠨⠭ | ⠰⠧⠂⠰⠭ |

**14.1*c*   In reference numbers.** Follow print when roman numerals are used in references to outlines, page numbers, or full citations. Examples:

| pages ix - xii | ⠏⠁⠛� ⠰⠊⠭ ⠤ ⠰⠭⠊⠊ |
|---|---|
| see §VII | ⠎⠑⠑ ⠘⠎ ⠠⠠⠧⠊⠊ |

- Note: For reference numbers containing roman numerals see §17.4.

**14.1*d*   When followed by letters or ordinal endings.** When roman numerals are followed by a letter or letters, including ordinal endings, the letter sign precedes these additions. Do not divide these units between braille lines. Examples:

| XXVa | xxA | VI.A |
|---|---|---|
| ⠠⠠⠭⠭⠧⠰⠁ | ⠰⠭⠭⠠⠁ | ⠠⠠⠧⠊⠲⠰⠠⠁ |

As with arabic numbers, contractions can be used in English ordinal endings only. [VII.30.b] Examples:

|  10th | xth | 21st | XXIst |
|-------|-----|------|-------|
| ⠼⠁⠕⠹ | ⠭⠹ | ⠼⠃⠁⠌ | ⠠⠭⠠⠭⠠⠊⠌ |

Ier (French ordinal ending)            5sten (German ordinal ending)

⠠⠊⠻            ⠼⠑⠌⠢

**14.1e** **Confusion with contractions.** When a roman numeral could be mistaken for a one-cell, whole-word contraction, or vice versa, as in the sentence, *"Charles Very wrote a biography of Charles V."* the contraction must be sacrificed, and, in this case, the name spelled out. ( ⠉� ... ⠠⠧⠑⠗⠽ )

### Drill 27

Practice brailling the following sentences.

1. Edward VIII, son of George V, gave up his throne to marry the woman he loved.
2. The pertinent provisions may be found in §59B(ii).
3. Study the Introduction, x-xv, and §15 on pages 23-25.
4. The map of the Czech Republic is found on page XVI—XVI being one of the removable pages.
5. Her house is furnished with Louis XIVth furniture.
6. The pros and cons of socialized medicine are set forth in XIV.B of my outline.

## 14.2  Fractions  [VII.28.c, d]

The fraction line is represented in braille by dots 3-4. This symbol is used to separate the numerator and the denominator. The number sign is not repeated following the fraction line. Do not divide a fraction between braille lines. Examples:

½ [*or*] ⟋            ⠼⠁⠌⠃            16/19 [*or*] ✠            ⠼⠁⠋⠌⠁⠊

**14.2a** **Mixed numbers.** In braille a whole number is joined to a fraction by a hyphen. The number sign is not repeated before the fraction. A mixed number cannot be divided between braille lines. Example:

2½      ⠼⠃⠤⠁⠌⠃

When a whole number is shown separated from a fraction by a space (as in stock quotations), it is brailled in the same way as a mixed number with a hyphen substituted for the space. Do not divide this unit between braille lines. Example:

16 3/8     ⠼⠁⠋⠤⠉⠌⠓

**14.2***b*  **With hyphens and dashes.** As you learned in Lesson Three, when whole numbers are connected by a hyphen, only one number sign is required; when whole numbers are connected by a dash, two number signs are needed. Fractions, on the other hand, are always treated individually. When a fraction or a mixed number is connected to another fraction, mixed number, or whole number, either by a hyphen or a short or long dash, a second number sign is required. No space is left in braille before or after the hyphen or dash. Division between braille lines may be made following the *print* hyphen or dash only. Examples:

½-¾   ⠼⠂⠲⠤⠼⠹⠲        ½ — ½   ⠼⠂⠲⠤⠤⠼⠂⠂⠲

½ - 1  ⠼⠂⠲⠤⠼⠁        1½ -1- ½  ⠼⠂⠂⠲⠤⠼⠁⠤⠼⠂⠲

3½-4½  ⠼⠉⠂⠲⠤⠼⠙⠂⠲        2½—3  ⠼⠃⠂⠲⠤⠤⠼⠉

3-6 ⠼⠉⠤⠼⠖        0 — ½  ⠼⠚⠤⠤⠼⠂⠲        9 - 8½  ⠼⠊⠤⠼⠓⠂⠲

## 14.3  Decimals  [VII.28.f, g]

In braille the decimal point is represented by dots 4-6, not the period. The number sign is always placed before the decimal point. Like fractions, when a decimal fraction is joined to another number by a hyphen or a dash, a second number sign is required. Examples:

.7  ⠼⠨⠶        .03  ⠼⠨⠚⠉        .5 - .7  ⠼⠨⠢⠤⠼⠨⠶

• Note: For reference numbers containing decimals see §17.4.

**14.3***a*  **Mixed numbers.** When a number consists of a whole number and a decimal fraction, only one number sign is used, and it is placed before the whole number. When numbers with decimals are joined to other numbers, the number sign is repeated following the hyphen or dash. A number containing a decimal point can never be divided between lines. Examples:

90.9 MHz    ⠼⠊⠚⠨⠊ ⠠⠍⠓⠵        .5-1.2    ⠼⠨⠢⠤⠼⠁⠨⠃

6—7.25    ⠼⠖⠤⠤⠼⠛⠨⠃⠢        7.25—8   ⠼⠛⠨⠃⠢⠤⠤⠼⠓

**14.3***b*  **Coinage.** The decimal point and the appropriate dollar or pound sign are used in braille when print shows them to represent American or British decimal coinage. Examples:

$8.75  ⠈⠎⠼⠓⠨⠛⠢        $.15  ⠈⠎⠼⠨⠁⠢        $0.32  ⠈⠎⠼⠚⠨⠉⠃

£1.13  ⠈⠇⠼⠁⠨⠁⠉        $5.50—$8.75  ⠈⠎⠼⠢⠨⠢⠚⠤⠤⠈⠎⠼⠓⠨⠛⠢

## 14.4  Mathematical Signs of Operation  [VII.28.j]

Books on mathematics, pages of mathematical formulas, and the like, are brailled using a system developed by Dr. Abraham Nemeth called the *Nemeth Braille Code for Mathematics and Science Notation*. Transcriptions that include computer-related symbols are brailled according to the rules in the *Computer Braille Code*. These codes are quite different from the literary braille code because they use a unique braille symbol for each of the print mathematical and computer symbols, and should only be studied after the literary braille code has been thoroughly mastered.

In general literature, the literary braille code uses words to express common mathematical signs of operation for *plus, minus, times, divided by, squared, equals,* etc. Examples:

2 x 2 - 1 = 3

⠼⠃⠀⠰⠦���

4x6=24

The map was drawn on a scale of 1:500.

When dimensions are given in print by using the *times sign* between measurements, in braille the word *by* is substituted for the times sign. Examples:

a 9x12 ft. rug

a 7x9x2" box

7'W x 9"D

• Note: For ease of reading it is suggested that a space be left before the contracted "to" in a ratio. It is also suggested that a space be left before a contracted "by" when it represents the times sign.

## 14.5  Superscript and Subscript Numbers and Letters  [VIII.31.f and *BF* Rule 5, §5.f]

Small superscript letters that represent known words, such as © for copyright or ™ for trademark, are represented in braille by the words enclosed in parentheses using normal spacing. Other superscript or subscript letters or numerals *that are not footnote indicators* and cannot be easily expressed in words are also enclosed in parentheses. (Footnotes will be studied in Lesson 17.) They are brailled before or after the word in accordance with their placement and spacing in print. Explain this usage in a transcriber's note (to be studied later). Example:

"A Quick-Fix Bar® and lots of $H_2O$ is our favorite snack," said the smiling crew-member of America[3].

⠐⠢⠴ ⠲⠼�⠐⠲⠲�⠲ ⠲� ⠿⠲⠲⠲⠲⠲⠲⠿⠿ ⠸⠿⠲⠲⠲⠲⠿⠼⠿
⠒ ⠲⠲⠲⠐⠂ ⠆ ⠲⠿⠲⠲⠿⠲⠴ ⠒⠂ ⠲⠒ ⠿⠲⠲⠲⠲⠲⠿
⠲⠲⠲⠲⠲⠲⠴ ⠒⠂ ⠴ ⠲⠲⠲⠲⠲⠲ ⠿⠲⠲⠲⠲⠲⠲⠿ ⠒
⠲⠲⠲⠿⠲⠲⠲⠲⠒⠲⠲⠒⠲

\* Note: America$^3$ [America, cubed] is the name of a sailing ship.

## 14.6  Clock Time  [VII.28.h]

**14.6*a*  Definite points of time.** When a definite point of time is expressed in figures, regardless of how it is shown in print, a colon is always used in braille to separate the hours, minutes, and seconds. Only one number sign is required. These numerical units cannot be divided between braille lines. Examples:

11:30 p.m.  ⠼⠁⠁⠒⠉⠚ ⠏⠄⠍⠄     1:00:15 a.m.  ⠼⠁⠒⠚⠚⠒⠁⠑ ⠁⠄⠍⠄

**14.6*b*  Intervals of time.** When intervals of time are expressed by whole numbers, such as *6-7 p.m.*, only one number sign is needed (unless they are divided between braille lines) —the same way as any other hyphenated numerical expression. However, when two units of time are joined and the first unit consists of hours and minutes, a number sign is required before the second unit. In other words, whenever hours follow minutes, repeat the number sign.

In print, intervals of time are joined either by an en (short) dash or by a hyphen. In braille, always use a hyphen. Regardless of print spacing, no space should be left before or after the braille hyphen. Division between braille lines can be made only following a print hyphen. Examples:

3–4 a.m.  ⠼⠉⠤⠙ ⠁⠄⠍⠄        6 - 7:12  ⠼⠋⠤⠛⠒⠁⠃

4:15-5:00  ⠼⠙⠒⠁⠑⠤⠼⠑⠒⠚⠚        4:15-5:00  ⠼⠙⠒⠁⠑⠤⠼⠑⠒⠚⠚

5:15–6  ⠼⠑⠒⠁⠑⠤⠼⠋

## 14.7  Sports Scores and Votes  [VII.28.a]

Regardless of print punctuation, a hyphen should be used to separate the numbers of sports scores and the results of votes. Do not divide between lines. See also §3.1e.

## 14.8  Slash between Numbers  [VII.28.e]

When the slash (oblique stroke) acts as a division line between numbers other than fractions, the number sign is repeated before the second number. Do not divide these units between braille lines. See §13.8 for treatment of slashes between numbers in dates. Examples:

Sally has perfect eyesight, 20/20.

⠀⠀⠀⠀⠀⠀⠠⠎⠁⠇⠇⠽⠀⠓⠁⠎⠀⠏⠻⠋⠑⠉⠞⠀⠑⠽⠑⠎⠊⠛⠓⠞⠂⠀⠼⠃⠚⠌⠼⠃⠚⠲

Model #09/52    ⠠⠍⠕⠙⠑⠇⠀⠸�⠼⠚⠊⠌⠼⠑⠃

## 14.9   Electronic Addresses

Detailed instructions for transcribing e-mail, website, and Internet addresses, as well as filenames are located in Appendix C.3 of *English Braille American Edition 1994*. These instructions must be followed carefully in order to render an accurate and usable electronic address in braille.

### Drill 28

Practice brailling the following sentences.

1.   1/2 x 6 2/3 = 3 1/3.
2.   The young ballistics expert determined that death had been caused by a .32-caliber automatic.
3.   He bought the stock at 85 5/16 and sold it at 88 15/16.
4.   A rod equals 5 1/2 yd., or 16 1/2 ft.
5.   The length of the astronomical year is about 365 1/4 days, or 365 da., 5 hr., 48 min., 45.51 sec.
6.   After deducting withholding tax, 6½% for retirement and $3.75 for life insurance, his take-home pay amounted to $463.29 every week.
7.   The nurse reported that the patient's pulse had ceased at 1:00:25 a.m.
8.   For 30 minutes, 6:15–6:45, the fog was heavy; by 7:00 it was gone.
9.   He won the match in three straight sets: 6-3, 6-2, and 6-2, although his opponent had been a 3-1 favorite.
10.   General Custer's men were armed with .45/70 Springfield rifles.
11.   The cherry pie recipe calls for 2½-3 cups of sugar.
12.   The board he cut was ½ - ¾ in. too long.
13.   The rug measured 9' x 12', but the room was 8' ½" x 11' ¾".
14.   E = mc$^2$ expresses the theory of relativity.
15.   Internet users can travel to   http://www.zkware.com   for more details.

### EXERCISE

Prepare the following exercise for submission to the instructor.

LESSON 14

1. The high jump was won by Samuel Speed III, who cleared the bar at 6 ft., 10¾ in.—¼ in. higher than the previous school record.

2. At 6½% interest his investment of $3700.00 yielded a return of just $240.50.

3. In 1952 the principal causes of accidents were: automobiles, 40%; at home, 22.5%; sports and recreation, 15.4%; pedestrians, 8.3%; travel, 6.6%.

4. In the late nineteenth century the American Experience Table of Mortality gave the life expectancy at age 10 as 48.72 years and at age 95 as .50 years.

5. We learned today that the ratio of the circumference of a circle to the radius is expressed C = 2 x R x 3.1416 (or 3 1/7).

6. For many years a minute of silent prayer was observed each November 11, 11:00–11:01 a.m., to commemorate the signing of the armistice ending World War I.

7. Friday, 2-4 p.m., will be devoted to interviewing applicants for the new position.

8. The banquet will begin promptly at 6:30 p.m.

9. The missile took off from the launching pad at exactly 6:00:15 a.m.

10. With 2/3 of the precincts already reported, the Governor leads his nearest competitor 189,769–160,323, though he had been given less than a 50-50 chance of winning by the pollsters.

11. After 15 innings the two teams were still deadlocked 3–3.

12. The motor number of the stolen car is 030/692.

13. To-day ATandT stock closed at 36 3/4, up 5/8.

14. Articles V-VII of the society's constitution deal with the powers and duties of the officers.

15. The title page at the beginning of every braille volume lists the number of braille pages contained in that volume—thus, Pages i-xix and 1-79.

16. Pope John XXIIIrd did much to promote the ecumenical movement.

17. King Louis XVth of France is supposed to have said, "After me, the deluge."

18. Many cities were demolished by the end of World War II—III will probably see the destruction of civilization.

19. Charles I (1600-1649) was beheaded by the Parliamentary faction in England.

20. The mysterious crate measured 6'H x 9'W x 2'D.

21. Move all of the little girls' dresses, sizes 4½-6, to the next rack.

22. Barber, please trim my hair ¼ - ½ inch.

23. You need not worry; a person's temperature is normal when it falls in the 98.4 – 99.2 range.

24.   Add a hydrogen ion to $H_2O$ to get heavy water, $D_2O$.

25.   More than 1/3 of our staff will be on vacation from 6/14 to 7/1.

26.   The e-mail address for NLS is nls@loc.gov.