Recharge Your Nemeth Code

Presented by

Maylene Bird

and

Susan Osterhaus

Dedicated to Dr. Abraham Nemeth

October 16, 1918

October 2, 2013

Objectives

Participants will be able to:

- Locate the latest BANA Nemeth resources
- Understand the **most significant rule changes**
- Refresh their existing Nemeth knowledge—quickly but effectively
- And know where to go for more resources that include courses, curriculums, and reference sheets

New BANA Nemeth Code Documents

The Nemeth Braille Code for Mathematics and Science Notation 2022

Nemeth Braille Code Errata

Chemical Notation Using the Nemeth Braille Code 2023

Graphing Calculator Guidelines, 2018

Guidelines and Standards for Tactile Graphics, 2022 - In this revision, technical material is transcribed in Unified English Braille (UEB) as well as the Nemeth Code in UEB Contexts.

Important Appendix A Code Changes

- Rule 2: Nemeth Braille Indicators
  - Added Opening and Closing Switch Indicators to the list of Indicators
  - Added Single-word Switch Indicator construction and use
  - Changed from Carried Number Indicator to two different Regrouping Indicators
    - Broadened to include Addition, Subtraction, Multiplication, and Division

Rule 4 Code Switching – A Must Read!

- Opening Nemeth Code indicator (UEB indicator) ⠸⠩
- Nemeth Code terminator ⠸⠹
- Single-word switch indicator ⠨⠂

Note: Request the Braille Slides Handout if you need “real” braille.

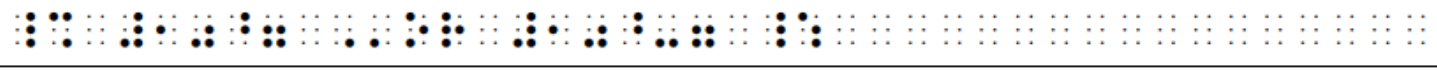
Single-Word Switch Indicator

When only one narrative word, hyphenated word, or abbreviation without an associated value occurs between two Nemeth expressions or symbols, the single-word switch indicator (⠸⠩) is used to indicate that the word is in UEB. The indicator is unspaced from the affected word. Contractions are used in the subsequent word as needed. The indicator is used whether or not the word contains contractions. The effect of the single-word switch indicator is terminated by a space.

Examples of the Use of the Single-Word Switch Indicator

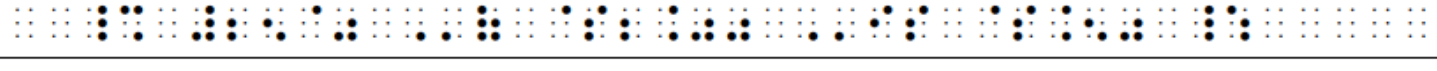
Example 4-46: One Word Between Math Expressions

10^{7} or 10^{-7}



Example 4-47: Single-Word Switch Between Math Expressions

25% of $2.00 is $.50



More Appendix A Code Changes – Rule 25!

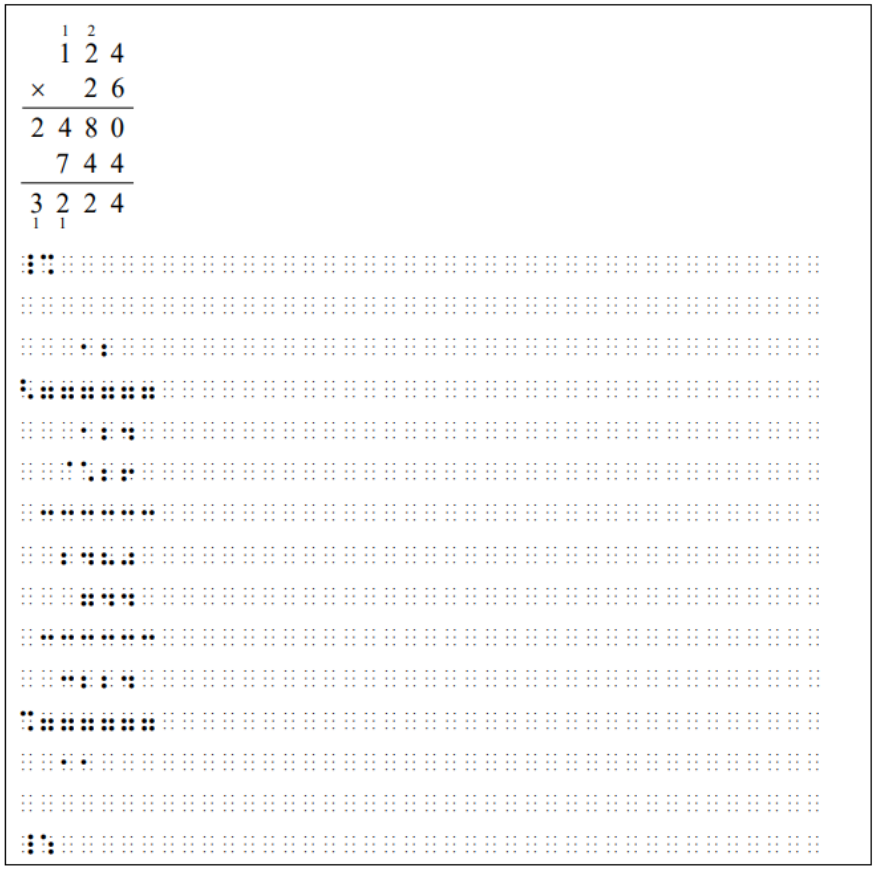
- Rule 25: Spatial Arrangements
  - Symbols for carried numbers (regrouping numbers) above and below the arrangement
  - Augmented matrix guidance
  - Symbols for vertical and diagonal ellipses
  - Transcription of matrices with blank entries and single dot entries
  - Systems of equations are spatial
  - Transcriber-Inserted Grouping Symbol

Regrouping Indicators

- For numbers above the arrangement (varying in length) ⠸⠸⠸
- For numbers below the arrangement (varying in length) ⠨⠸⠸

Example of Regrouping Numbers

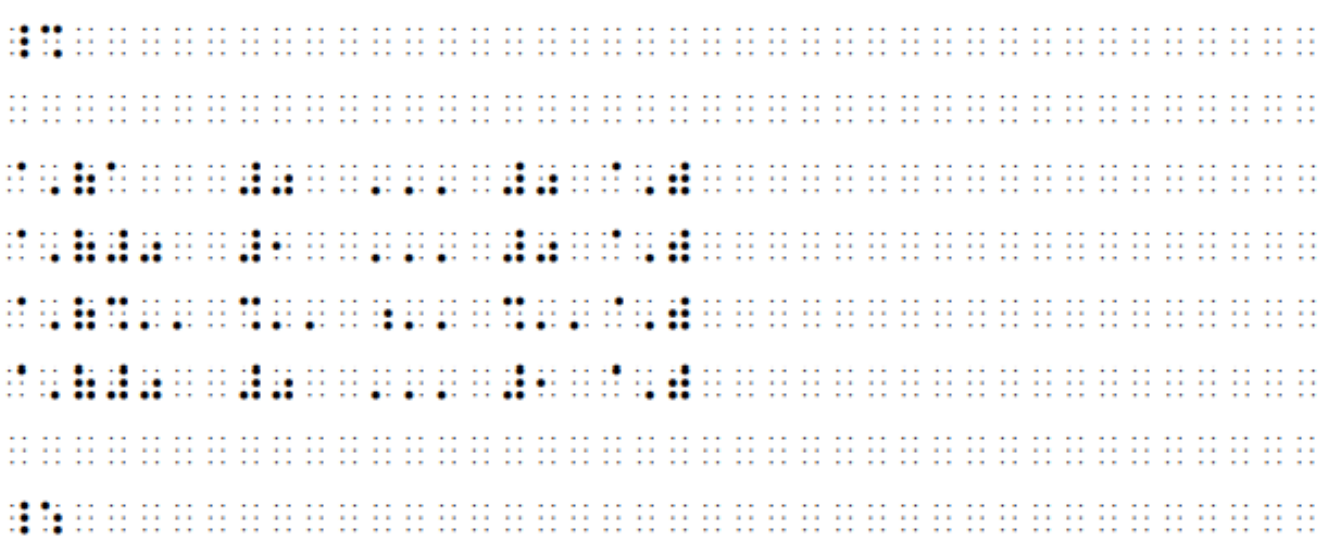
Example 25-31: Regrouping Numbers Above and Below



Example of a Matrix with Ellipses

Example 25-69: Matrix with Diagonal and Vertical Ellipses

$$\begin{pmatrix} a & 0 & \cdots & 0 \\ 0 & 1 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & 1 \end{pmatrix}$$

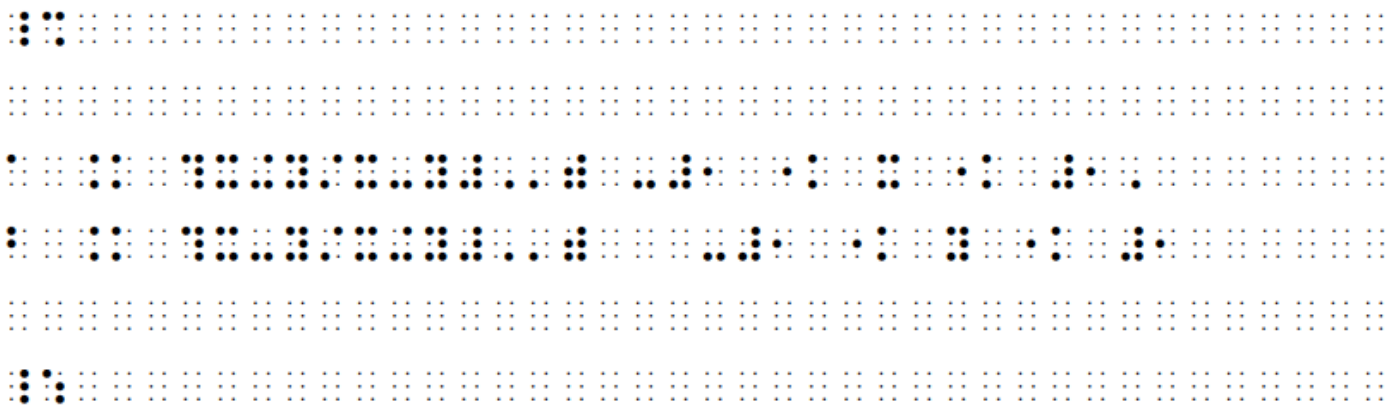


Example of a Transcriber Inserted Grouping Symbol

Example 25-80: Transcriber Inserted Grouping Symbol

$$a = \frac{x+y}{x-y} \qquad -1 < x < 1,\ -1 < y < 1$$

$$b = \frac{x-y}{x+y}$$



(in print, the explanation is centered to the right of the two equations to which it applies)

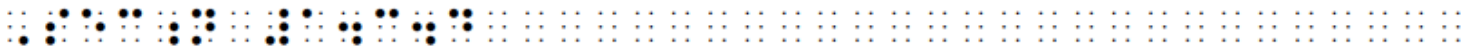
A Couple More Not-So-New Reminders

- Use of UEB Numerals. Numerals at the corners of pages and at the ends of page change indicators are transcribed as in UEB. Titles for figures, tables, sections, etc. are transcribed in UEB. UEB numerals may be used with freestanding, unmodified numbers, ordinals, and plurals. (See Rule 4.6)
- No contractions or short-form words in Nemeth with UEB.

Examples of When to Use UEB Numerals

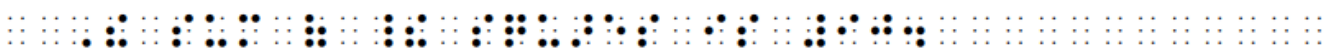
Example 3-1: Section Title

Section 1.3.4

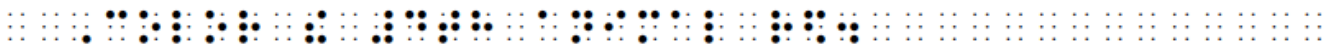


Example 4-25: Unmodified Number in UEB Context

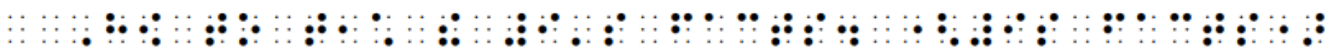
(1) The sum of their squares is 90.



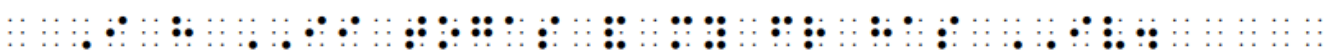
(2) Color the 4th animal red.



(3) How to teach the 9's facts. (9s facts)



(4) I have II togas and my friend has IV.



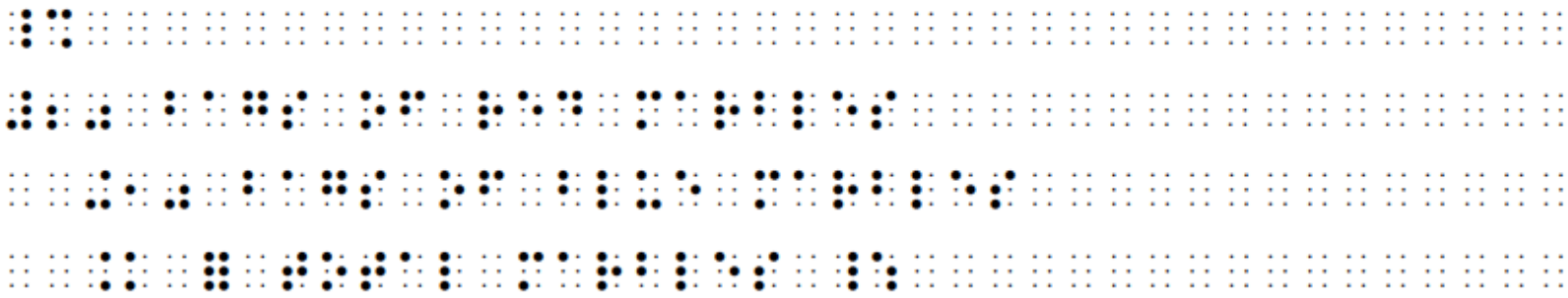
One or More Words in Mathematical Context

When one or more words are part of an equation or math expression, they are as much a part of the technical notation as are the variables (letters), numbers, signs of operation, etc. The entire expression is placed inside the Nemeth switches. No contractions are used in the words. Spacing rules of the Nemeth Code are followed.

Examples of Words in Mathematical Context

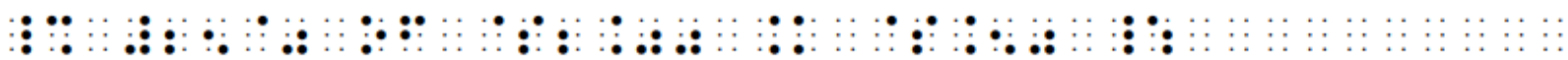
Example 4-43: Words in a Math Equation

20 bags of red marbles + 10 bags of blue marbles = ? total marbles



Example 4-44: One Word in a Math Equation

25% of $2.00 = $.50



Susan's Pet Peeves

- Spacing: To space or not to space
- Dot 5
- Numeric Indicator (NI)

TO SPACE OR NOT TO SPACE

1. (5,6)

Brailling the Equals Sign (=) ⠶ (dots 4-6, dots 1-3)

- Begin brailling using two fingers of the right hand.
- Then follow with two fingers of the left hand.
- Memory cues:
  - Two fingers are "equal to" two fingers.
  - Two dots are "equal to" two dots.

How to Remember > and < Symbols on the Braille Writer

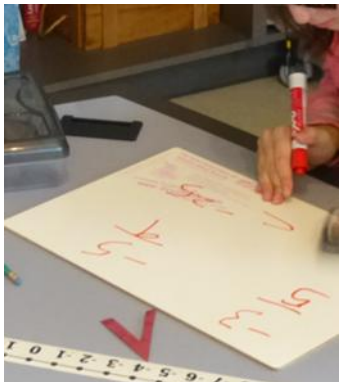
- Greater than: ⠸⠕
  - Right hand: dots 4-6
  - Left hand: dot 2
- Less than: ⠐⠣
  - Right hand: dot 5
  - Left hand: dots 1-3

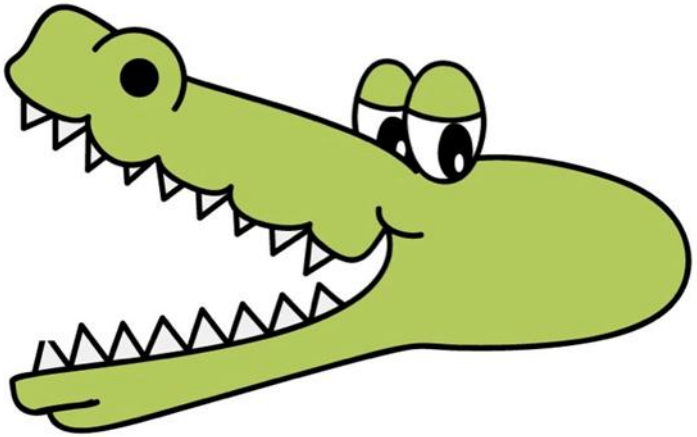
Space Before and After Signs of Comparison

2. $2 + 9 = 11$

3. $3 < 7$

4. $5 > 1$





Mores Signs of Comparison

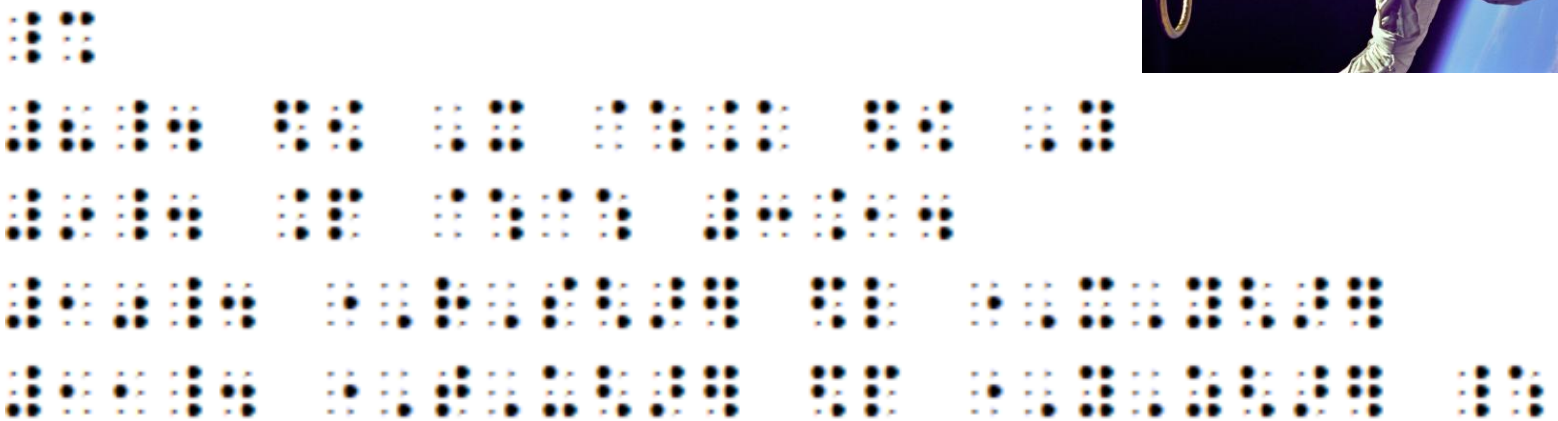
5. $x \neq 4$

6. $y \leq 15$

7. $r \geq 25$

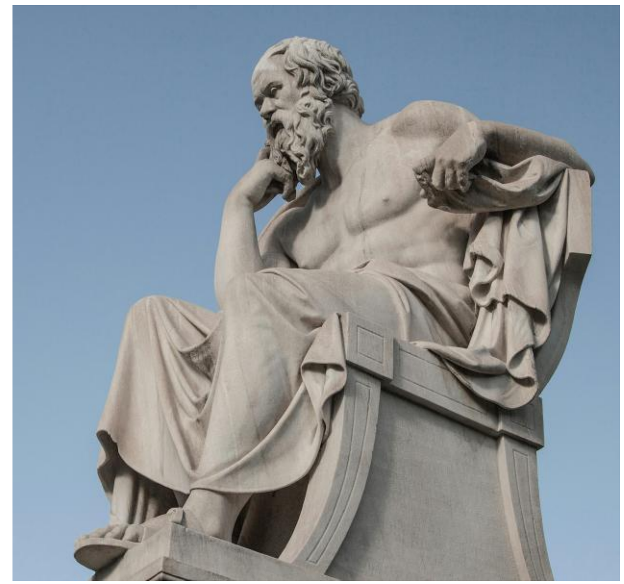
To Space or Not to Space: Signs of Comparison Continued

8. $\angle X \cong \angle Y$
9. $\pi \approx 3.14$
10. $\overline{RS} \parallel \overline{XY}$
11. $\overline{TU} \perp \overline{YZ}$



Set Notation and Logic

12. $A \subset B$
13. $x \in \mathbb{R}$
14. $\{x \mid 3 \leq x < 10\}$
15. $\therefore$
16. ▮ or □



⠸⠩

⠼⠂⠆⠸⠲ ⠠⠁ ⠸⠐⠅ ⠠⠃

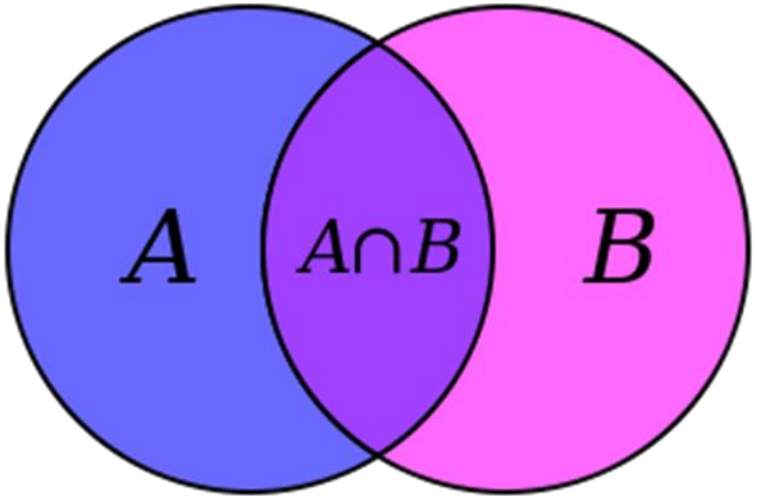
⠼⠂⠒⠸⠲ ⠭ ⠈⠑ ⠠⠸⠰⠠⠗

⠼⠂⠲⠸⠲ ⠨⠷⠭ ⠳ ⠼⠒ ⠐⠅⠱ ⠭ ⠐⠅ ⠼⠂⠴⠨⠾

⠼⠂⠢⠸⠲ ⠠⠡

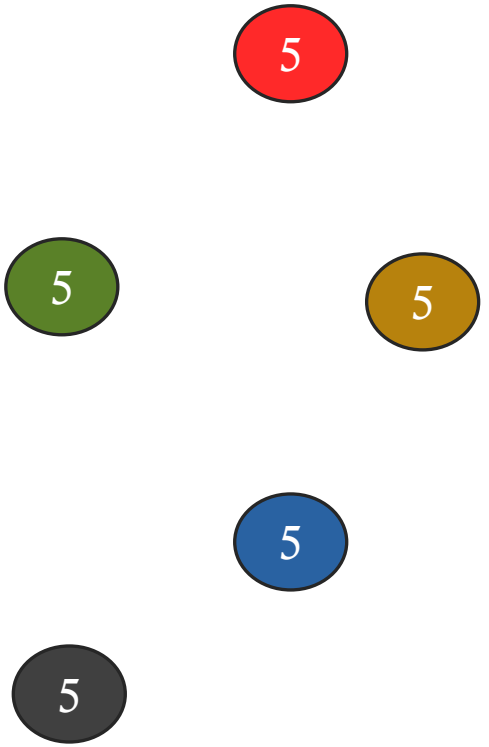
⠼⠂⠖⠸⠲ ⠈⠫⠟⠑⠙ ⠸⠱

Venn Diagram



17. Find $A \cap B$

Dot 5



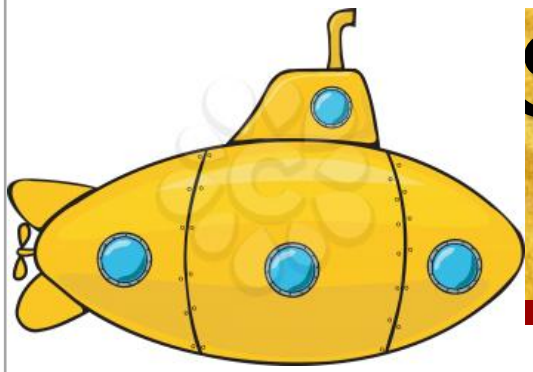
Superscripts (dots 4-5)

18. $90^\circ + 90^\circ = 180^\circ$

19. $x^2 + 6x + 3^2$

20. $x^2 + 1$

21. $\frac{1}{x^2} = 5$



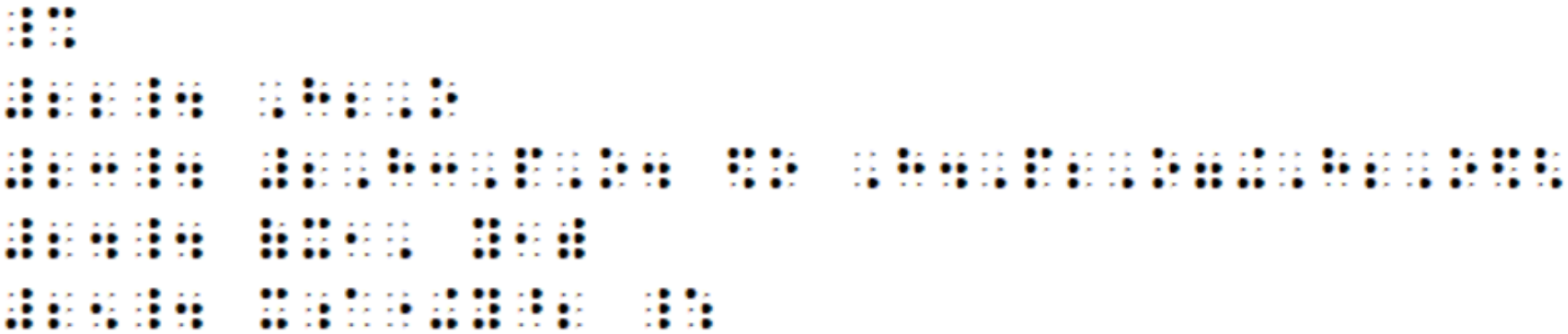
Subscripts (dots 5-6) & Numeric Subscript

22. H_2O

23. $2H_3PO_4 \rightarrow H_4P_2O_7 + H_2O\uparrow$

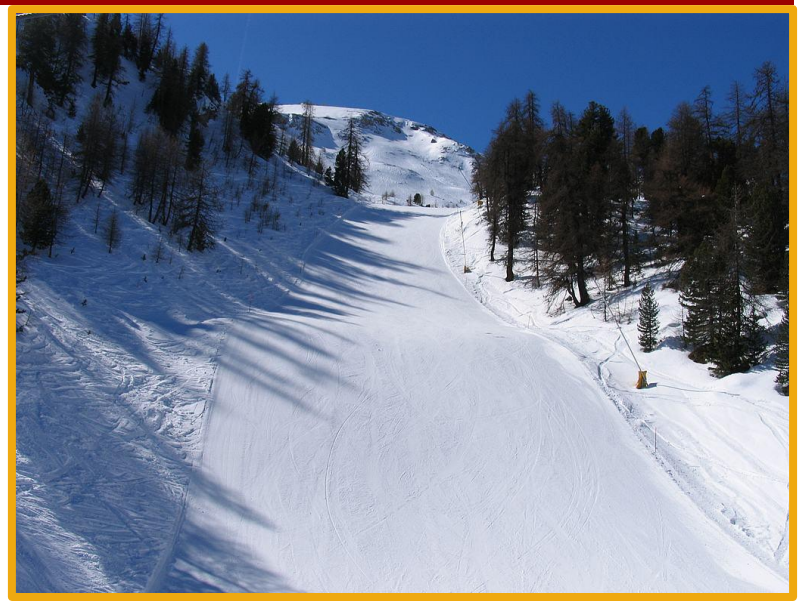
24. (x_1, y_1)

25. $x_a + y^2$

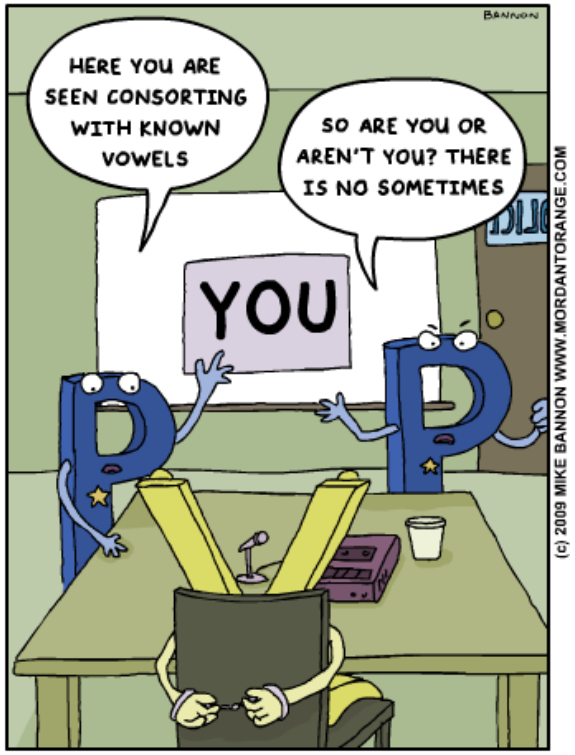


Slope

26. $m = \dfrac{y_2 - y_1}{x_2 - x_1}$



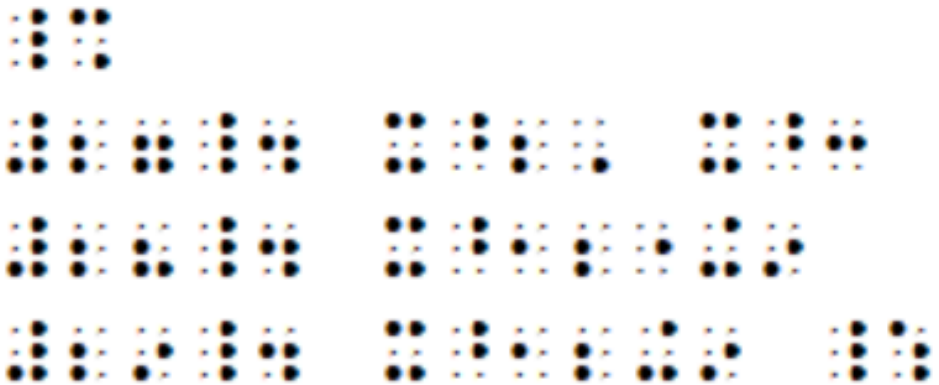
Exceptions to and Necessity for the Dot 5



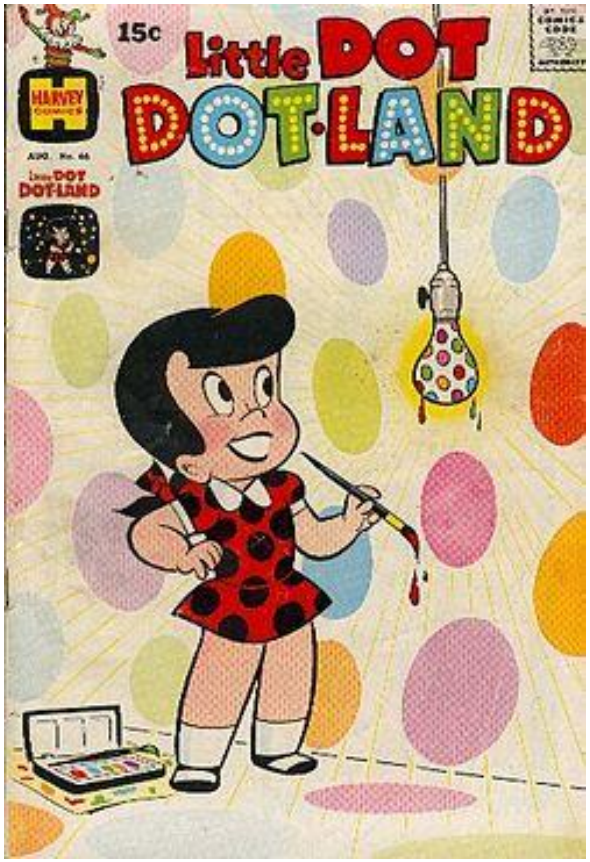
27. x^2, x^3

28. $x^{12} + 9$

29. x^{12+9}



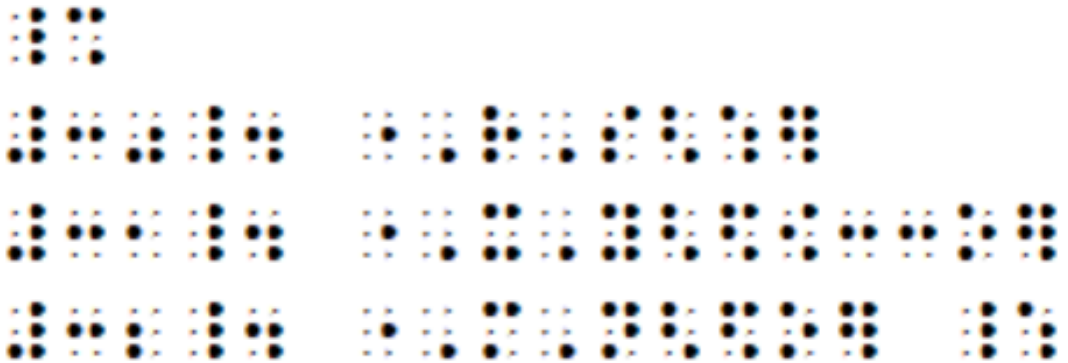
Dot 5 continued…



30. $\overline{RS}$

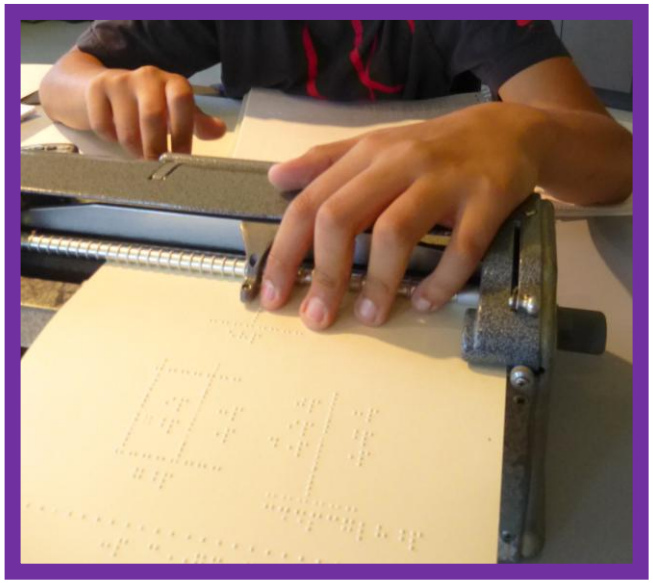
31. $\overrightarrow{XY}$

32. $\overrightarrow{MN}$



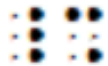
Numeric Indicator

- The last of Susan's big 3

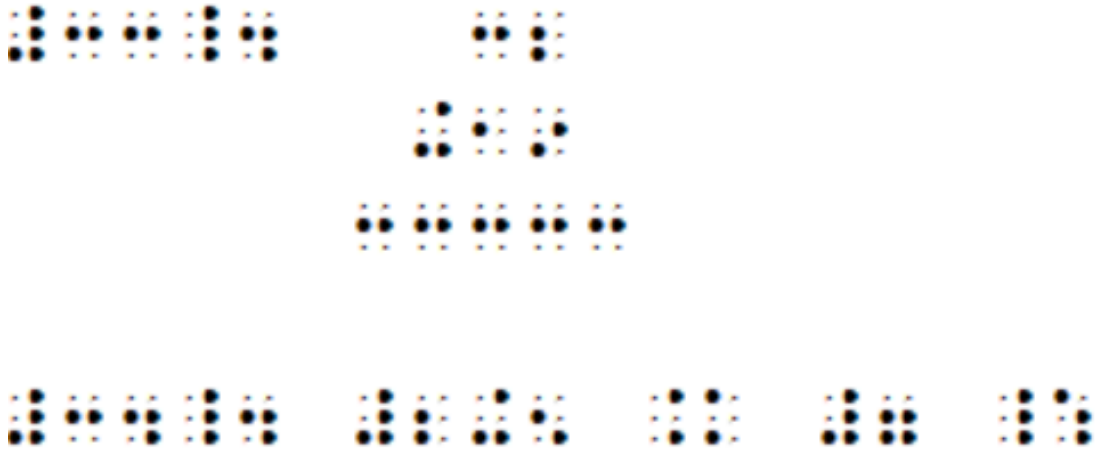


Use and Non-Use of the Numeric Indicator

33.
$$\begin{array}{r} 32 \\ +19 \\ \hline \end{array}$$



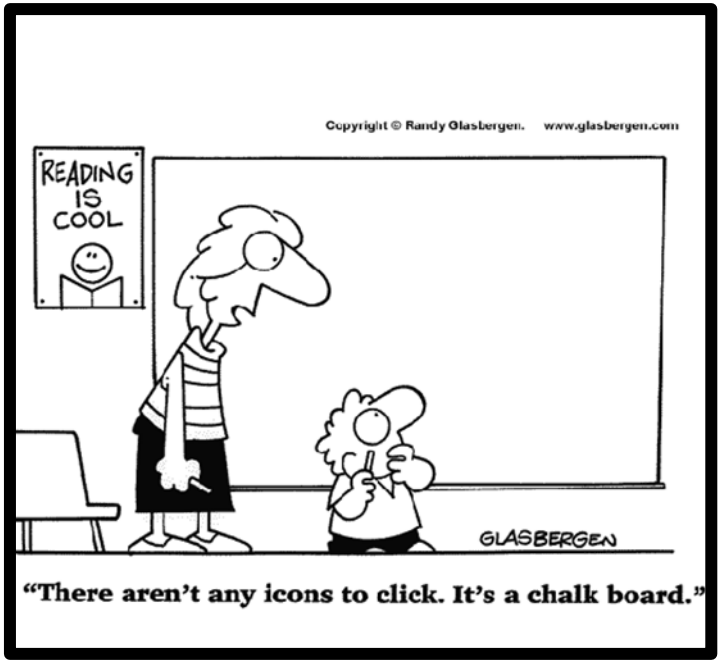
34. $2 + 5 = 7$

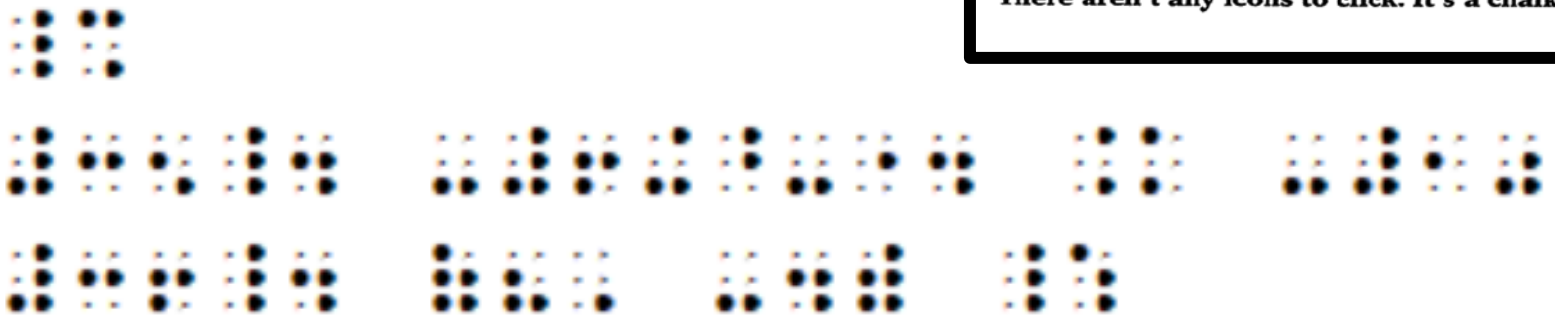


Pesky Negative Signs

35. $-6 + {}^{-}4 = -10$

36. $(8, -4)$



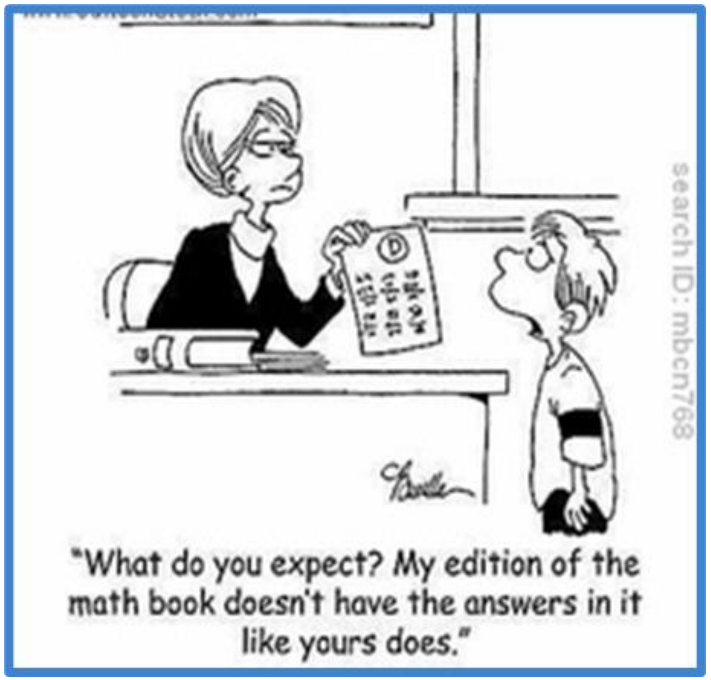


Fractions and Mixed Numbers

37. $\frac{1}{2} \times \frac{3}{4}$

38. $16\frac{1}{2}$

39. 1/2



Miscellaneous

The "Goes Into" Division Sign

$$40.\overline{)4284}\quad 714$$

Parentheses, Brackets and Braces

Parentheses (7)

Brackets [7]

Braces {7}

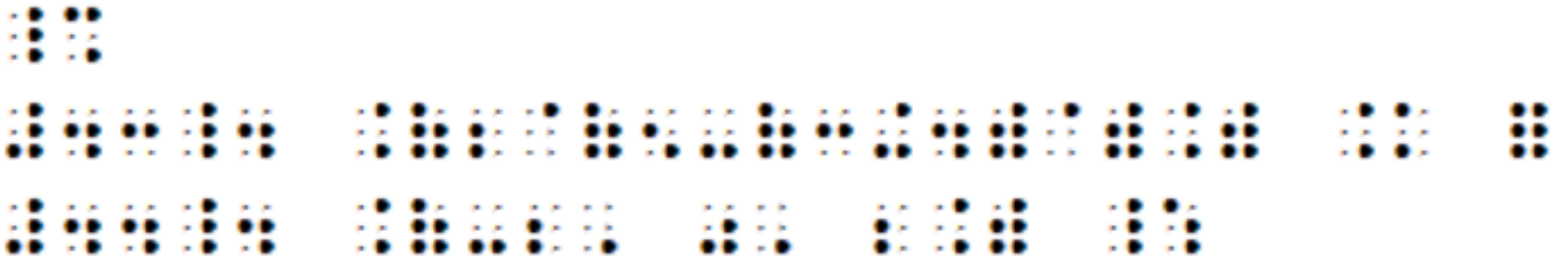
41. $\{x \mid -5 \le x < 5\}$

42. $[-5,5)$

More Parentheses, Brackets and Braces

43. $\{2[5-(3+4)]\} = ?$

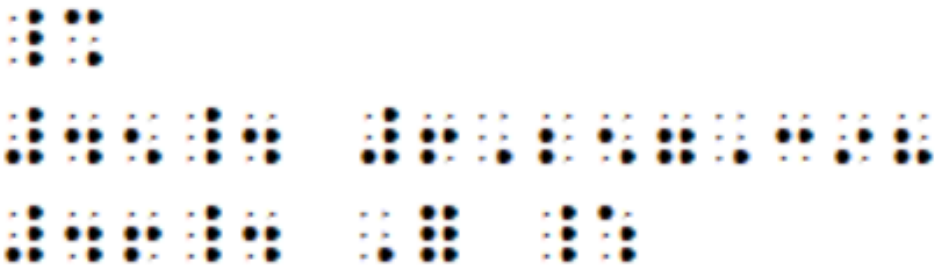
44. $\{-2, 0, 2\}$

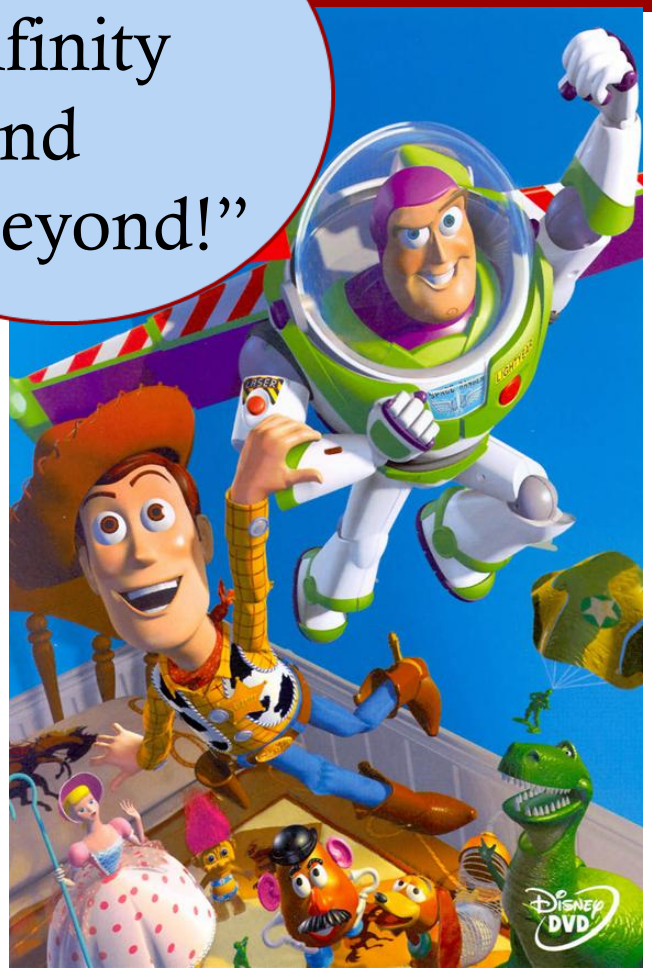


Large Numbers and Infinity

45. 6,257,398

46. ∞



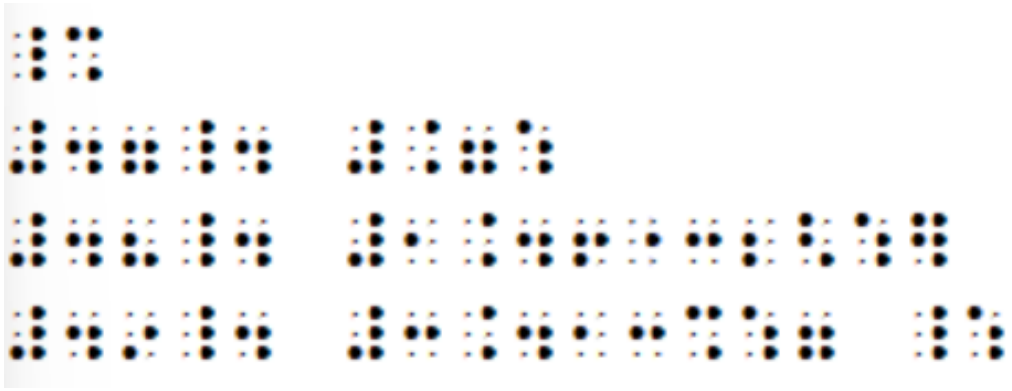


Repeating Decimals... and Underlining One Digit

47. $.\overline{7}$

48. $1.46\overline{32}$

49. $3.41\underline{3}7$



OR UNDERLINE

Tally Marks

50. 𝍸 𝍸 𝍷

⠼⠑⠚

Absolute Value

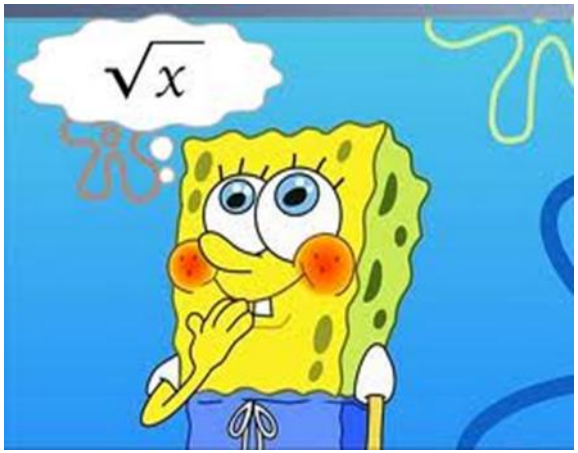
51. $|-6| = 6$

52. $|2 + -4| = 2$

Radical Expressions

53. $\sqrt{16} = \pm 4$

54. $\sqrt[3]{8} = 2$



Number Line Graphs

55. Graph $-2 < x \leq 1$.

Nemeth Resources - 1

- *NFB Course in Nemeth Code Transcribing Course Manual, 2024.* This manual is authored by Lindy Walton, a consultant to the BANA Nemeth Code Technical Committee, and adheres very closely to the new Nemeth Code book. It is available at no cost in PDF and BRF formats.
- *APH Nemeth Tutorial* . This tutorial is available at no cost, and it is interactive and accessible. However, it has not been updated, and all text is written in uncontracted braille. Nevertheless, it is useful for practicing isolated Nemeth Symbols without switch indicators.

Nemeth Resources - 2

- *Nemeth Braille Code for Instructors and Paraeducators Online Courses*. This online course is available at no cost and was designed as a companion to *Nemeth at a Glance*. It consists of videos only and needs updating to include all the latest additions and updates. All dot configurations are verbalized, and it is useful for persons who prefer videos.
- *Nemeth at a Glance: A Math Resource, Grade Level Chart, and Evaluation Tool,* February 2017. This book is available at a cost of $78. It is available in hard copy print or a digital version. It was the first book to introduce Nemeth within UEB Contexts and is an excellent resource, but it does not include all the latest updates.

Nemeth Resources - 3

Nemeth Reference Sheets from the National Braille Press are available in print and braille at a cost of $18 each or $30 if you order the set. These have been updated to include the switch indicators. They are especially nice because the braille version includes a raised line drawing of each corresponding print symbol – quite a valuable teaching tool for the mathematics classroom.

Free Nemeth Reference Sheets

- APH
  - Large Print Version
  - Braille Version
- Gloria Bennett and Susan Osterhaus
  - Algebra I,
  - Geometry
  - Algebra II
  - Set Notation

Nemeth Resources - 4

- The *Nemeth Braille Code Curriculum* consists of the step-by-step Pre-K to Second Grade Nemeth Curriculum, the engaging Nemeth Code Focused Lessons, and the user-friendly Nemeth Symbol Library.
- Project INSPIRE: Increasing the STEM Potential of Individuals who Read Braille created six free, self-paced courses for TVIs, paraprofessionals, braillists, transcribers, and others who support braille learners focusing on the Nemeth Code.

Nemeth Resources - 5

- Nemeth in a Box for Middle School Students contains seven lessons that teachers of students with visual impairments or others (e.g., paraprofessionals, family members) can use to review and/or introduce Nemeth Code symbols at the middle school level and review math concepts in a fun way.
- *Learning and Teaching the Nemeth Code within UEB Contexts: A Step-by-Step Guide* (2022) provides opportunities to build Nemeth Code skills and learn about strategies and resources for teaching the Nemeth Code. The book contains multiple examples of STEM materials transcribed into braille. Many universities are using this resource in pre-service training of TSVIs.

Nemeth Resources - 6

As stated, many of these resources were developed before the 2022 revisions to the Nemeth Braille Code for Mathematics and Science Notation. Much of the course content remains relevant as stipulated. However, for additional information, we recommend reading the following article, outlining key changes in the Nemeth code affecting K–12 braille transcription:

Osterhaus, S.A. and Bird, M. (2025). What's New in the Nemeth Code. *TX SenseAbilities Magazine*. Fall 2025 Issue.

Emails and Other Link

birdm@tsbvi.edu

osterhauss@tsbvi.edu

Susan's page on Paths to Literacy