# Nemeth Code Symbols Used in the Middle Grades and Strategies for Supporting Math Learning

## Lesson 2: Nemeth Code Symbols Used in the Middle Grades, Part 2

# Objectives

Participants will be able to:

- Read and write problems containing
  1. absolute values
  2. inequality signs (less than or equal to, greater than or equal to, and not equal to)
  3. the Greek letter pi (lowercase) $\pi$
  4. the approximately equal to sign
  5. superscripts
  6. subscripts without indicators
  7. square roots
- Read and write math word problems that require use of the opening Nemeth Code indicator, the Nemeth Code terminator, and the single-word switch indicator.

# Nemeth Code Switch Indicators

⠼⠼ Opening Nemeth Code indicator

⠼⠼ Nemeth Code terminator

⠨⠤ Single-word switch indicator

- The opening Nemeth Code indicator can be placed at the end of a line of literary text **or** on its own line.

- The Nemeth code terminator can also be placed after the math it ends **or** on its own line.

- When using the single-word switch indicator, write the single word in contracted braille (UEB).

- When deciding where to place indicators, consider consistency and clarity for the braille reader.

- Keep all mathematical content on the same line whenever possible.

# Absolute Value (2 vertical bars)

⠿ ⠿   absolute value | |

A number enclosed in vertical bars does not need a numeric indicator.

⠿⠦⠿   $\left|-5\right|$   absolute value of negative 5

⠦⠿⠦⠿   $-\left|-2\right|$   negative absolute value of negative 2

$$\left|-14\right| - 7 = \underline{\qquad}$$

⠿⠦� ⠿⠦⠿   ⠒⠒   ⠿⠿⠿⠿

24. Is $-\left|-8\right|$ positive?

⠿⠦⠿ ⠒⠒⠀ ⠿⠿ ⠦⠿⠦⠿ ⠿⠿ ⠒⠒⠿⠿⠿⠿⠿⠿

# Inequality Signs

⠀ ≤ less than or equal to

⠀ ≥ greater than or equal to

⠀ ≠ not equal to

$4 \leq x$

$2y \geq 4x - 8$

$32 \neq -\left|-32\right|$

# The Greek Letter pi (lowercase) $\pi$

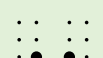⠨⠏ $\pi$ Greek letter pi (lowercase)

- The Greek letter indicator ⠨ identifies a letter as being from the Greek alphabet.

- Greek letters are often used in math and science.

- "Pi" is the first Greek letter students learn.

- Even though the lowercase form of $\pi$ in Nemeth Code is identical to the lowercase form in UEB, you must switch to Nemeth Code when $\pi$ appears in Nemeth within UEB Contexts.
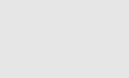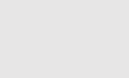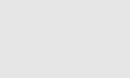
# Approximately Equal To
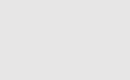
⠿ ≈ approximately equal to
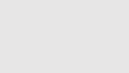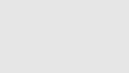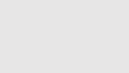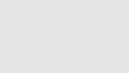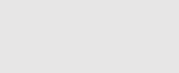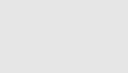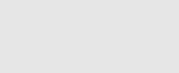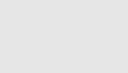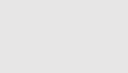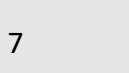
- Two numbers are approximately equal to each other when they are almost equal to each other – very close for all practical purposes, but not exactly equal.

- In print the symbol looks like a wavy equals sign or two tilde signs – one on top of the other, which is why the Nemeth version is two tilde signs written together with no spacing between the two symbols.

2. If $\pi \approx 3.14$ and $C = 2\pi r$, then $C \approx 6.28r$.

Single-word switch indicator ⠰⠱

# Activity 2A

Interline the following.

⠿⠃⠙⠃⠿ ⠃⠃ ⠘⠃⠃⠘ ⠿⠃⠃⠿

⠿⠃⠙⠃⠿ ⠘⠃⠿⠽⠃⠿⠽⠃⠿ ⠘⠃ ⠃⠃

⠿⠃⠙⠃⠿ ⠘⠃⠘⠽⠃⠃⠘ ⠃⠘⠃⠘⠃ ⠿⠃⠃⠿⠃

# Activity 2A: Answer Key

1. $x \leq -3$

⠼⠁⠲ ⠭ ⠀ ⠈⠣⠱ ⠐⠔⠒

2. $\left|4-6\right|-9 = ?$

⠼⠃⠲ ⠳⠆⠙⠤⠋⠳ ⠤⠊ ⠀⠶

3. $\dfrac{1}{7} \approx .14$

⠼⠉⠲ ⠹⠂⠌⠛⠼ ⠐⠔⠤⠲⠁⠙

# Activity 2B

Braille the following problems.

1. $y \geq -4$

2. $\left|5 - 8\right| \neq -\left|8 - 5\right|$

3. $2y \leq x + 4$

4. $\dfrac{2}{3} \approx .666$

5. $\left|5 - 9\right| + 3 = $ _____

# Activity 2B: Answer Key

1. $y \geq -4$

2. $\left|5 - 8\right| \neq -\left|8 - 5\right|$
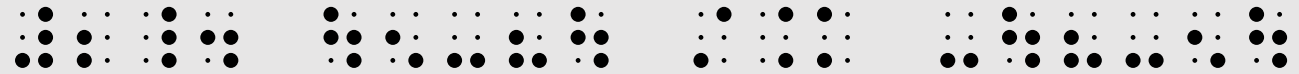
3. $2y \leq x + 4$

4. $\dfrac{2}{3} \approx .666$
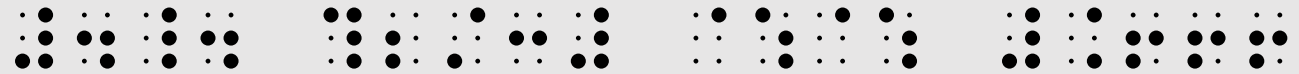
5. $\left|5 - 9\right| + 3 =$ _____

# Superscript

⠰  superscript indicator (dots 4-5)

⠐  baseline indicator (dot 5)

- A baseline indicator is needed if a superscript **is not** followed by a space.

- No baseline indicator is needed if a space follows a superscript.

$y^2$              ⠽⠰⠃

$4^3 = 64$        ⠼⠙⠰⠉⠀⠐⠶⠀⠼⠋⠙

$3^2 - 8$         ⠼⠉⠰⠃⠐⠤⠼⠓

$(5^2 - 6^3)$     ⠦⠼⠑⠰⠃⠐⠤⠼⠋⠰⠉⠐⠴

# Subscripts Without Indicators

- A variable with a numeric subscript does not use a subscript indicator.

- No baseline indicator is needed if no subscript indicator is used.
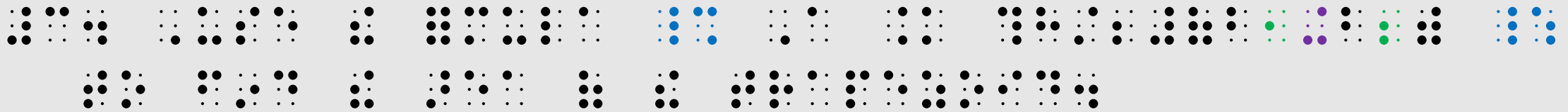
$$(x_1, y_1)$$

3. Use the formula $A = \dfrac{h}{2}(b_1 + b_2)$ to find the area of the trapezoid.

# Square Roots

⠜ radical symbol

⠻ termination symbol

$\sqrt{81}$   ⠜�⠼⠓⠁⠻   the square root of 81

$\sqrt{\dfrac{1}{16}}$   ⠜⠼⠁⠲⠼⠁⠋⠻   the square root of one-sixteenth

$\sqrt{0.36}$   ⠜⠼⠴⠨⠒⠖⠻   the square root of zero point three six

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# Square Roots continued

- Say "end root" to tell the braille reader when radicand ends.

- Use a baseline indicator within a radicand as needed, for example to end a square root (example 1).

$\sqrt{y^3}$      ⠰⠩⠽⠰⠂�ⁱ the square root of y cubed end root

$\sqrt{y}^3$      ⠩⠽�ⁱ⠂ the square root of y end root cubed

# Activity 2C

Braille the problems.

(1) $y^3 = 2^3$

(2) $2(7^2 + 5^3) = ?$

(3) $(x_2, y_2)$

(4) $\sqrt{100}$

(5) $\sqrt{x^8}$

# Activity 2C: Answer Key

(1) $y^3 = 2^3$ ⠿⠀⠿ ⠿⠀⠿ ⠀⠀ ⠿⠿⠀⠿

(2) $2(7^2 + 5^3) = ?$ ⠿⠀⠿ ⠿⠿⠿⠿⠿⠿⠿⠿⠿⠿⠿ ⠀⠀ ⠿

(3) $(x_2, y_2)$ ⠿⠀⠿ ⠿⠿⠿⠀ ⠿⠀⠿

(4) $\sqrt{100}$ ⠿⠀⠿ ⠀⠀⠿⠿⠿

(5) $\sqrt{x^8}$ ⠿⠀⠿ ⠀⠿⠿⠀⠿

# Activity 2D

Braille the following.

1. Is $-\left|-54\right|$ a negative number?

2. $\pi \approx 3.14$ or $\dfrac{22}{7}$ .

3. To find the area of a trapezoid with bases $b_1$ and $b_2$, use the formula $A = \dfrac{h}{2}(b_1 + b_2)$ .

# Activity 2D: Answer Key