Nemeth Code Symbols Used in High School and Strategies for Supporting Math Learning

Lesson 4: Formatting Materials for High School Students

Objectives

Participants will be able to:

1. Locate and use formatting resources
2. Transcribe and/or prepare the following:
   - Word problems
   - Keeping math expressions together
   - Dividing math expressions
3. Format the following:
   - Headings
   - Directions
   - Numbered problems
   - Formal proofs
Guidance for Transcription Using the Nemeth Code within UEB Contexts

- Available from the Braille Authority of North America (BANA)
- Information about formatting begins on page 15.
- The new Nemeth Code book has been approved by BANA and should be online later this year!

https://www.brailleauthority.org/nemeth-code

Resource to Use When Transcribing Math Materials

An Introduction to Braille Mathematics Using Nemeth Code within UEB Contexts

- Available from the National Federation of the Blind
- Lesson 12 offers examples of formal proofs.
- Lesson 17 offers examples of matrices and determinants.

https://nfb.org/programs-services/braille-certification/mathematics-braille-transcribing
Formatting Basics for High School Students

- Materials are single-spaced.
- BANA refers to titles as “centered headings.”
- Center the title of a worksheet on the first line of the page and leave a blank line following it.
- Follow print for the sequence of problems, punctuation, and capitalization.
- Do not change directions or problems.

Example of a Worksheet in Print

Title: Algebra 2 Review

Directions: Solve the inequality and put answers in interval notation.

1. \[ \left| \frac{x - 3}{2} \right| \geq 5 \]
Example of a Worksheet in Braille

- Begin with a centered heading followed by a blank line.
- Directions begin in cell 5 with runover in cell 3.
- The opening Nemeth Code indicator is placed on the same line as the directions.
- Problems begin in cell 1 with runover in cell 3.
- We chose to close Nemeth after the problem.

Activity 4A

- Transcribe the worksheet below.

Algebra 2 Worksheet

Solve for x.

1. \( (15x^2 - 6) - (-8x^3 - 14x^2 - 17) = 0 \)
2. \( \sqrt{3x - 2} = 4 - x \)
3. \( 4|x + 3| - 7 = 0 \)
Activity 4A: Answer Key

Keeping Math Expressions Together When Possible

- A math expression cannot be divided across lines if it fits on a single braille line.
- Switch indicators may be separated from the math.

11. Find a set C and a set D where $C \cap D = \emptyset$ and $C \cup D = \{1, 2, 3, 4, 5, 6, 7, 8\}$. 
Dividing Long Problems Across Lines

• When a math expression will not fit on one line, divide
  • before the sign of comparison
  • before an operation sign

\[ \frac{\sqrt{27}}{\sqrt{343}} = \frac{\sqrt{3}}{\sqrt{7^3}} = \frac{3}{7} \]

Example of a Word Problem

• Numbering of word problems can be in UEB.
• There is a blank line before and after the piecewise equation.
• Enlarged grouping symbols begin in the same braille cell.
• The period is placed at the end of the first line of the equation.

9. Graph \( y = \begin{cases} \frac{2}{x}, & x \neq 0, \\ -3, & x = 0 \end{cases} \).

10. State the Interval \((-5, 7]\) using inequality notation.
Activity 4B

• Transcribe the problems below.

1. Graph \( y = \begin{cases} 
-x - 2, & x \leq -2 \\
\sqrt{4 - x^2}, & -2 < x < 2 \\
x - 2, & x \geq 2 
\end{cases} \)

2. What is the final step? \( \frac{\sqrt[3]{y^5}}{x^3} = \frac{\sqrt[3]{y^5}}{\sqrt[3]{x^3}} = \frac{\sqrt[3]{y^5} \cdot y^2}{2\sqrt[3]{x^3}} = \)

Activity 4B: Answer Key

1A. Graph

1B. What is the final step in

Activity 4B: Answer Key
Formal Geometry Proofs

• Leave a blank line between auxiliary paragraphs and the beginning of the formal proof.
• Start each step in cell 1.
• After each step number, transcribe “S” for statement or “R” for reason. There is no space between the number and subsequent letter.
• If necessary, run-over lines for each step begin in cell 3.
• It is important that “each step from the Statements column is immediately followed by the corresponding step from the Reasons column.”

Example of a Formal Proof

Given: $BC \equiv DC, AB \parallel DE$
Prove: $\triangle ABC \equiv \triangle EDC$

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>$BC \equiv DC, AB \parallel DE$</td>
<td>1. Given</td>
</tr>
<tr>
<td>$\angle ACB \equiv \angle ECD$</td>
<td>2. Vertical angles are congruent</td>
</tr>
<tr>
<td>$\angle ABC \equiv \angle EDC$</td>
<td>3. If parallel, alternate interior angles are congruent</td>
</tr>
<tr>
<td>$\triangle ABC \equiv \triangle EDC$</td>
<td>4. ASA</td>
</tr>
</tbody>
</table>

Auxiliary statements
Activity 4C

Transcribe the auxiliary paragraphs and formal proof below:

Given: \( \angle 1 \) and \( \angle 3 \) are vertical angles.
Prove: \( \angle 1 \equiv \angle 3 \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
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</thead>
<tbody>
<tr>
<td>1. ( \angle 1 ) and ( \angle 3 ) are vertical angles.</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. ( m\angle 1 + m\angle 2 = 180 ) ( m\angle 3 + m\angle 2 = 180 )</td>
<td>2. Linear Pair Postulate</td>
</tr>
<tr>
<td>3. ( m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2 )</td>
<td>3. Substitution Property of Equality</td>
</tr>
<tr>
<td>4. ( m\angle 1 = m\angle 3 )</td>
<td>4. Subtraction Property of Equality</td>
</tr>
<tr>
<td>5. ( \angle 1 \equiv \angle 3 )</td>
<td>5. Definition of congruent angles</td>
</tr>
</tbody>
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Activity 4C: Answer Key

Given: \( \angle 1 \) and \( \angle 3 \) are vertical angles.
Prove: \( \angle 1 \equiv \angle 3 \)

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