Nemeth Code Basics

We will go over three worksheets in this workshop, including how they are formatted.

- Notice in the numbers below that literary numbers are in the upper part of the cell. Nemeth numbers are in the lower part of the cell.

<table>
<thead>
<tr>
<th>Literary Numbers</th>
<th>Nemeth Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>@g=@^=@_=@`=@a=@b=@c=@d=@e=@f=</td>
<td>@M=@N=@O=@P=@Q=@R=@S=@T=@U=@V=</td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9</td>
<td>0 1 2 3 4 5 6 7 8 9</td>
</tr>
</tbody>
</table>

Practice reading the numbers below.

- R
- TUV
- PR=C
- PS
- NQO
• The first portion of this worksheet shows numbers. Because Nemeth numbers are in the lower part of the braille cell, the punctuation indicator is needed after problem numbers and before punctuation. The punctuation indicator is | (dots 456).

• Directions are in cell 5 with runovers in cell 3. A blank line is left before directions unless they follow a page-change indicator. When a cell-5 heading is before directions, a blank line is required between the cell 5 heading and directions.

• No blank line is left after directions unless they are followed by spatial material.

• Special typeface is ignored in directions.

• In the example below, a centered heading precedes the directions. There is a blank line after the heading.

• The number to the right of the problem has been moved to the beginning of the directions. This is a section number to reference within the chapter.

![Chapter Test](image-url)
Superscripts and Subscripts

- The normal level of writing is called the baseline.
- When a number or letter is elevated it is called a superscript.
- When a number or letter is lowered it is called a subscript.
- The baseline indicator is used to put the level of writing back to the normal level. The indicator is not used when there is a space or punctuation indicator following the superscript or subscript.

Indicators

- Baseline (dot 5)
- Superscript (dots 45)
- Subscript (dots 56)

\[ 7^5 \]

\[ 2 \cdot 7^2 \]

\[ x^2 = 64 \]

\[ 55. \quad \frac{36xy}{16x^2y^3} \]
Subscript indicators are not used when a letter from any alphabet has a subscript of a number. The number can have a decimal point or a comma, but cannot have a superscript or subscript of its own.

When a subscript indicator isn’t used, the baseline indicator isn’t needed, like in the example below.

Practice reading the expressions below.
- This section shows directions followed by itemized problems. The directions are in cell 5 with runovers in cell 3.
- Problems begin in cell 1, with runovers in cell 3. The problems below are itemized, but do not contain subdivisions.
- The letters in the problems below are variables. No letter indicator is used unless the variable stands alone and is not part of an equation.

<table>
<thead>
<tr>
<th></th>
<th>Find the GCF.</th>
<th>Find the LCM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>36 and 64</td>
<td>8. 18 and 30</td>
</tr>
<tr>
<td>6</td>
<td>27a and 45a</td>
<td>9. 3cd and 8d</td>
</tr>
<tr>
<td>7</td>
<td>48z^2 and 112z^6</td>
<td>10. 5a^2 and 2a^5</td>
</tr>
</tbody>
</table>

Find the GCF:

5. 36 and 64
6. 27a and 45a
7. 48z^2 and 112z^6

Find the LCM:

8. 18 and 30
9. 3cd and 8d
10. 5a^2 and 2a^5
Fractions

- **Simple Fractions**: When writing simple fractions, be sure to use the opening and closing fraction indicators.
- Be sure that the number sign isn’t used instead of the opening fraction indicator.
- The opening fraction indicator precedes the numerator (top of fraction), the closing fraction indicator follows the denominator (bottom of fraction).

**Simple Fraction Indicators**

- Opening Fraction Indicator (dots 1456)
- Closing Fraction Indicator (dots 3456)
- Horizontal Simple Fraction Line (dots 34)

\[
\frac{0}{7}
\]

\[
\frac{4}{3}
\]

50. \(\frac{9m}{36mn}\)
Practice reading the fractions below.

\[
\frac{3}{4} \\
\frac{5}{6} \\
\frac{7}{8} \\
\frac{9}{10}
\]

**Mixed Number Indicators**

- A mixed number is an expression which begins with a numeral and is followed by a simple fraction whose numerator and denominator are both numerals.
- An expression is not a mixed number if it contains any letter, even if the expression is in the same form as a mixed number.

**Opening Indicator** (dots 456, 1456)

**Closing Indicator** (dots 456, 3456)

**Fraction Line** (dots 34)

**Examples:**

\[
10\frac{3}{4}
\]
\[ \frac{27}{12} = 2\frac{3}{12} = 2\frac{1}{4} \]

Practice reading the mixed fractions below.

Nemeth Comma

- The Nemeth comma is made up of dot (6),

- If a Literary comma (dot 2) were used, how would it be read?

Practice reading the numbers below.
Symbol of Omission

- The symbol of omission is made up of dots (123456).
- This symbol is used for spaces that are blank, or contain a question mark. It is not used for blank lines in print.
- It is spaced the same as what it replaces.

Change to equivalent fractions with the given denominators.

1. \( \frac{3}{8} = \frac{16}{6} \)
2. \( \frac{2}{5} = \frac{10}{6} \)
3. \( \frac{2}{3} = \frac{9}{6} \)
4. \( \frac{1}{2} = \frac{8}{6} \)
5. \( \frac{3}{4} = \frac{20}{6} \)
6. \( \frac{1}{5} = \frac{25}{6} \)
7. \( \frac{2}{3} = \frac{18}{6} \)
8. \( \frac{3}{4} = \frac{8}{6} \)

\[ ? + ? = 28 \]

Practice reading the problems below.

\[ \text{Practice reading the problems below.} \]
Signs of Operation

Plus: (dots 346)

Minus: (dots 36)

Times: (dots 4, 16)

Times: (dots 16)

Divided by: (dots 46, 34)

Curved division sign (dots 135)

Signs of Comparison

Equals: (dots 46, 13)

Greater than: (dots 46, 2)

Less than: (dots 5, 13)

Proportion (as) (dots 56, 23)

Ratio (is to) (dots 5, 2)
$6 \cdot x = 42$

$5n - 14 = 6 - 5n$

$2 \times 4 = 4 \times 2$

Practice reading the examples below.

cfsb\]G=JJJJ=Kh=cfcqbbk=

u=?h=v=
• The symbol of omission is used for the question marks above blank lines below.

• Notice that the word *with* is uncontracted in directions for problems 19-21. A word in direct contact with a sign of comparison can’t be contracted.

• The baseline indicator is used before the fraction line and closing fraction in problems 17 and 18 below.

• Notice the mixed fractions in problems 24 and 25.

<table>
<thead>
<tr>
<th>Write each fraction in lowest terms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. ( \frac{8}{12} )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Simplify.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. ( \frac{9x}{15} )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replace each ( ? ) with ( &gt;, &lt;, ) or ( = ).</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. ( \frac{1}{4} ) ? ( \frac{1}{6} )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write each fraction or mixed number as a decimal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. ( \frac{4}{5} )</td>
</tr>
</tbody>
</table>


Here are decimal fractions or mixed numbers with:

- A decimal point:
  - 4.75
  - 68.462
  - .254

**Decimal Point**

- The decimal point is made up of dots (46)

4.75

68.462

.254
Line Over

- When there is a single line over a number or letter, lower-case or uncapsulated, from any alphabet, the symbol below is used. If the line is over more than one letter, refer to the five-step rule in the Nemeth Code, Section 86.

 escalation
dot (156)

Practice reading the problems below.

\[ x \]
\[ xx \]
\[ x\underline{xx} \]
\[ \underline{x} \underline{xx} \]
\[ \underline{x} \underline{xx} \]
\[ \underline{x} \underline{xx} \]
\[ \underline{x} \underline{xx} \]
\[ \underline{x} \underline{xx} \]
Write each decimal as a fraction or mixed number in lowest terms.

26. 0.672  27. 0.27  28. 7.3  29. 2.88

30. Solve by using a diagram: Eight players participated in a single-elimination tennis tournament. In such a tournament, each player is out after one loss. How many games did the champion play?

Express each rational number as the quotient of two integers.

31. 7.4  32. -4.25  33. -8  34. 3\frac{1}{3}

35. Write the number \(-1\) as a quotient of two integers in three different ways.

36. Name three real numbers that are between \(\frac{1}{3}\) and \(\frac{1}{2}\).
## Signs of Comparison

- Signs of comparison are shown below.
- A space is required before and after signs of comparison. The numeric indicator is repeated after the comparison sign.

<table>
<thead>
<tr>
<th>Graph each open sentence.</th>
<th>Write each number in scientific notation.</th>
<th>Write each number in decimal notation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6 = x + 9$</td>
<td>$3w - 8 = 1$</td>
<td>$y \geq 5.5$</td>
</tr>
<tr>
<td>$39. m &lt; \frac{7}{8}$</td>
<td></td>
<td>$40. 4.7 \times 10^{-8}$</td>
</tr>
<tr>
<td>Write each number in scientific notation.</td>
<td>Write each number in decimal notation.</td>
<td></td>
</tr>
<tr>
<td>$41. 0.00076$</td>
<td>$42. 0.00000335$</td>
<td>$43. 3 \times 10^{-5}$</td>
</tr>
<tr>
<td>$44. 4.7 \times 10^{-8}$</td>
<td></td>
<td>$7-10$</td>
</tr>
</tbody>
</table>

**Answers:**
- Graph each open sentence.
- Write each number in scientific notation.
- Write each number in decimal notation.
Spatial Problems

- In spatial problems, the numeric indicator isn't used.
- There are blank lines above and below spatial problems, even when there is a page change indicator above or below them.
- The separation line is made up of dots 25.
- There must be one blank cell between separation lines when more than one problem is written across the page.
- The separation line goes one cell to the right and left of the widest item in the problem.
- When spatial arrangements are identified by a number or letter, no symbol of one spatial arrangement may be less than 3 cells distant from any symbol on any line except separation lines.
Addition and Subtraction

- Plus and minus signs are placed in the cell to the left of the widest number which appears above the separation line. If they are deliberately misaligned, follow print.

\[ \begin{array}{c}
  4 \\
+ 3 \\
\hline
\end{array} \]

\[ \begin{array}{c}
  8 \\
+ 3 \\
\hline
  11 \\
\end{array} \]

\[ \begin{array}{c}
  10 \\
- 7 \\
\hline
\end{array} \]

\[ \begin{array}{c}
  9 \\
+ 7 \\
\hline
\end{array} \]

\[ \begin{array}{c}
  7 \\
- 3 \\
\hline
\end{array} \]

\[ \begin{array}{c}
  9 \\
- 3 \\
\hline
\end{array} \]
Multiplication

- The multiplication cross is written in the cell next to the first digit above the line.

\[
\begin{array}{c}
4 \\
\times 3
\end{array}
\]

\[
\begin{array}{cccccc}
2 & 4 & 6 & 3 & 0 \\
\times 0 & \times 0 & \times 0 & \times 0 & \times 7
\end{array}
\]

\[
\begin{array}{cccccc}
9 & 8 & 2 & 1 & 3 \\
\times 1 & \times 1 & \times 1 & \times 5 & \times 1
\end{array}
\]
Practice reading the problems below.
**More Multiplication and Division Facts**

Find the product or quotient.

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>9</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>$\times 3$</td>
<td>$\times 5$</td>
<td>$\times 9$</td>
<td>$\times 8$</td>
<td>$\times 9$</td>
<td>$\times 3$</td>
<td>$\times 6$</td>
<td>$\times 8$</td>
<td>$\times 8$</td>
<td>$\times 8$</td>
<td>$\times 8$</td>
<td>$\times 9$</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>
• The Review and Name at the top of the page are left aligned.
• The heading for the worksheet is centered.
• Directions are in cell 5. A blank line is required below the directions because of the spatial material that follows.
Blank Line

- The blank line is used to show a space to be filled in when a blank line is shown in print.
- The blank line is spaced like what it is replacing.

.. .. .. ..  Blank Line (dots 36, 36, 36,36)

Examples:

6 × 7 = ________

... ... ...

... ... ...
• Blank lines are shown below. Notice that they are spaced away from the sign of comparison (equals).

• Two different symbols are used for division. Follow print for the symbol to be used. (See page 10 for symbols)

25. $8 + 4 = \underline{\hspace{1cm}}$
26. $10 + 5 = \underline{\hspace{1cm}}$
27. $20 + 4 = \underline{\hspace{1cm}}$

28. $36 + 4 = \underline{\hspace{1cm}}$
29. $45 + 5 = \underline{\hspace{1cm}}$
30. $40 + 8 = \underline{\hspace{1cm}}$

31. $4 \div 32$
32. $4 \div 28$
33. $9 \div 36$
34. $5 \div 30$

35. $9 \div 54$
36. $8 \div 56$
37. $7 \div 49$
38. $6 \div 48$

Think It Over
39. Write all the factors of the number 48. How can you be sure you have found them all?
Write all 6 factors as number.
- Itemized material with subdivisions is shown below. The main division goes in 1/5, subdivisions are in 3/5. This is a Nemeth rule.
- The dollar sign $ is used below. The numeric indicator isn't used with the dollar sign.

### Problem Solving

Practice

Write the letter of the solution.

1. One farm contains 430 acres of land. Its owner plans to sell some of it at $4,000 per acre. How much money will the owner receive if he sells half his land?
   a. $860,000
   b. 215 acres
   c. Yes, he does.

2. The Lees and the Sands each owned 250-acre farms. They each bought another 75 acres. Today, the Lees have 354 acres. Who owns more land?
   a. 29 acres more
   b. the Sands
   c. the Lees
Write a number sentence, and solve.

3. In 1982, there were 34 fewer farms in the United States than in 1981. If there were 2,400 farms in 1982, how many farms were there in 1981?

4. The Parker farm has 3 times as many cattle as the Steinway farm. The Parkers have 90 cattle. How many cattle do the Steinways have?
Write the letter of the best estimate.

5. An Alaskan chicken farmer sells 2,416 eggs in one month. The average hen on the farm lays about 16 eggs per month. How many hens does the farmer have?
   a. 15  
   b. 150  
   c. 1,500  
   d. 15,000

6. In 1983, a bushel of corn cost $3.30. A bushel of wheat cost $3.54. If a farmer sold 7,500 bushels of corn and 2 times as much wheat, about how much money would the farmer have received?
   a. $28,000  
   b. $53,000  
   c. $75,000  
   d. $773,000
List the information in the problem. Cross out the information that won't help you answer the question.

7. Jason Parker is loading bales of hay onto a mechanical arm. The arm moves the 50-pound bales up to the hayloft. Jason loads 1 bale every 5 seconds. How many bales will he load in 60 seconds?

8. Between 1970 and 1980, world production of eggs increased by 5,568,000 metric tons. In 1980, production was 26,700,000 metric tons. A metric ton equals 1,000 kilograms. How many metric tons of eggs were produced in 1970?
Reference Sheet

Nemeth Numbers

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Level Indicators

- Baseline (dot 5)
- Superscript (dots 45)
- Subscript (dots 56)

Simple Fraction Indicators

- Opening Fraction Indicator (dots 1456)
- Closing Fraction Indicator (dots 3456)
- Horizontal Simple Fraction Line (dots 34)

Mixed Number Indicators

- Opening Indicator (dots 456, 1456)
- Closing Indicator (dots 456, 3456)
- Fraction Line (dots 34)

Signs of Operation

- Plus: (dots 346)
- Minus: (dots 36)
- Times: (dots 4, 16)
- Times: (dots 16)
- Divided by: (dots 46, 34)
- Curved division symbol (dots 135)

Signs of Comparison

- Equals: (dots 46, 13)
- Greater than: (dots 46, 2)
- Less than: (dots 5, 13)
- Proportion (as): (dots 56, 23)
- Ratio (is to): (dots 5, 2)