APPENDIX B — GLOSSARY OF TERMS

> This glossary contains a sampling of terminology encountered in K-12 mathematics which transcribers may find useful when communicating in workshops, forums, and blogs. There are many dictionaries of mathematical terms for those interested in a more comprehensive glossary.

Mathematical expression: A combination of mathematical symbols grouped together to designate the value of something.

Numerical expression: A mathematical expression containing only numbers and operation symbols. EXAMPLE $14 \div 2$

Algebraic expression: A mathematical expression containing variables, numbers, and operation symbols. EXAMPLE $3x + 2y - 7$

The Four Basic Operations

Addition

```
  2    addend
 +3    addend
  5    sum
```

Subtraction

```
  7    minuend
 -1    subtrahend
  6    difference
```

Multiplication

```
  2    multiplicand
 ×3    multiplier
  6    product
```

```
   5.009
 ×  .27
   35063      partial product
   10018      partial product
 1,352.43     product
```

Division   dividend ÷ divisor = quotient

```
      4                  quotient
 10 ) 40            divisor )dividend
```

```
     4  r4          the "r" number is the remainder
 9 ) 40
     36            partial quotient
      4            difference
```

Many Ways to Denote Multiplication

Print has several ways of denoting multiplication. Nemeth Code provides symbols for all of them, which enables us to follow print. Print may space between items for clarity, but factors are not spaced in braille unless abbreviations, function names, or certain symbols are contained in the expression.

All of the following mean "two times y".

$2 \times y$	�	(a)
$2 \cdot y$		(b)
$2 * y$		(c)
$2y$		(d)
$(2)(y)$		(e)

(a) 2×3 The multiplication cross is used the most in the lower grades.

(b) $2 \cdot 3$ The multiplication dot is used when the "x" variable is introduced, since the x and the multiplication cross can be confused in print.

(c) $2 * 3$ The multiplication asterisk is used most often in calculator operations since, on calculator keys, the multiplication cross may be confused with the variable x and the multiplication dot may be confused with the decimal.

(d) $2y$ is the form you will see most often when one of the factors is a variable, a constant, or a radical expression. $2xy$ means "two time x times y". 2π means "two times pi". $2\sqrt{5}$ means "two times the square root of 5".

(e) Enclosure symbols are used to group factors when the multipliers require calcuations.

> EXAMPLE $(x + y)(x - y)$ means "multiply $x + y$ times $x - y$".

If a factor uses parentheses, brackets group the outer factor.

> EXAMPLE $5[(x + y)(x - y)]$ means "five times the product of $x + y$ times $x - y$".

The expression $(3\sqrt{2})(5\sqrt{3}) + (3\sqrt{2})(2\sqrt{5})$ can be analyzed as follows.

- The overall expression is the sum (addition) of two terms. Addition is indicated with a plus sign. __ + __

- Each addend is the product (multiplication) of two factors, indicated with side-by-side parentheses. (__)(__)

- Each multiplier is the product of a numeral and a square root. No multiplication sign is shown but multiplication is implied. __√__

Spoken: "(Three times the square root of two TIMES five times the square root of three) PLUS (three times the square root of two TIMES two times the square root of five)."

Transcription: The braille contains no spaces:

Fractions

A fraction consists of a *numerator* and a *denominator* separated by a *fraction line*.

Simple Fraction   This fraction has a horizontal fraction line.

$$\frac{3}{4} \qquad \begin{array}{l} \text{numerator} \\ \text{denominator} \end{array}$$

This fraction has a diagonal fraction line. $^3/_4$

Mixed Number   A mixed number is one quantity made up of a whole number and a simple fraction.

$$7\frac{1}{2}$$

Complex Fraction   A complex fraction's numerator and/or denominator is also a fraction.

$$\frac{^1/_2}{4} \qquad \begin{array}{l} \text{numerator} \\ \text{denominator} \end{array} \qquad \frac{4}{^1/_2}$$

Geometry

Irregular polygon: A closed figure with at least two unequal sides and two unequal angles

Regular polygon: A closed figure with equal sides and equal angles

Types of triangles: *Acute:* All angles are less than 90°
Equilateral: Three equal sides; three equal angles (always 60°)
Isosceles: Two equal sides; two equal angles
Obtuse: Has one angle greater than 90°
Right: Contains one right angle (90°)
Scalene: No equal sides; no equal angles

Radical Expressions

$$\begin{array}{cc} 12 & \text{root} \\ \sqrt{144} & \sqrt{\text{radicand}} \end{array}$$

Radical sign: $\sqrt{}$
Vinculum: The line which extends above the radicand.
Index: A small number that may appear next to the radical sign is the *index* of the radical.

$$\sqrt[3]{9} \qquad \text{3 is the index of this radical.}$$

Statements and Functions

Exponential statement: $b^e = x$ b is the base; e is the exponent.

Logarithmic statement: $\log_b x = y$ x is the *argument* of the log.

Trigonometric function: $\sin\theta = 1$ θ (theta) is the *argument* of the function.

Algebra

The following algebraic expression is used as a sample in the definitions below. $3x + 2y - 7$

Coefficient: When a term is made up of a constant placed before a variable, the constant is called a coefficient. In the sample expression, the coefficient of *x* is 3. The coefficient of *y* is 2.

Constant: A constant is a number that is fixed and known, or a letter which stands for a fixed number, such as π. The constants in the sample expression are 3, 2, and 7.

Term: An algebraic expression is made up of terms. Each term is separated by a + or a – sign. The terms in the sample expression are 3*x*, 2*y*, and 7.

Variable: A variable is a symbol for an unknown number, usually a letter. The variables in the sample expression are *x* and *y*.

Other Terminology Used With Algebraic Expressions

Binomial: An algebraic expression consisting of the sum or the difference of two terms is a binomial. EXAMPLE   3x + 9

Degree: The degree of a term is the sum of the term's exponents. For example, the degree of the term $2y^3$ is 3. The degree of the term $16x^2y^3$ is 5.

Equality: An equality consists of two expressions which have the same value. EXAMPLE   A = B

Equation: An equation is a mathematical statement of an equality which contains at least one variable. EXAMPLE $x + 1 = 4$
The process of finding out the variable value that makes the equation true is called *solving* the equation.

Equivalent equations: Two equations that have the same solution are called equivalent equations. EXAMPLE $x = 1$ and $2x = 2$.

Exponent: In x^2, the exponent is 2.

Factor: Factors are numbers which, when multiplied together, result in another number. A number can have many factors. For example, 3 and 4 are factors of 12 because $3 \times 4 = 12$. 2 and 6 are also factors of 12 because $2 \times 6 = 12$.

Inequality: An inequality consists of two expressions, one on each side of a comparison sign that is not an equals sign. EXAMPLES $3x < 10$ and $a \leq b$.

Like terms: Like terms are terms which have the same variable raised to the same exponent. For example, $3x^2$ and $9x^2$ are like terms.

Monomial: An algebraic expression consisting of one term is a monomial. Monomials include numbers, whole numbers and variables that are multiplied together, and variables that are multiplied together. EXAMPLE   3xy

Polynomial: An algebraic expression consisting of more than two terms is a polynomial. The sample expression 3x + 2y – 7 is a polynomial. A polynomial may also include a term with exponents. EXAMPLE $x^2 - 4x + 7$.