Teaching and Learning of the Nemeth Braille Code

- Superscripts
- Subscripts
Definition of Terms

3 Level Indicators

- The normal level of writing is called the “base line”
  
  dot 5

- Superscript – above baseline, raised
  
  dot 4-5

- Subscript – below baseline, lowered
  
  dot 5-6
Examples

- $x^3 + 7$
- $y_f$
- $x^{-5}$
- $x^2 + 1$
- $\frac{1}{x^2}$
- $(x^2 + y^2)$
Left Superscripts and Subscripts

- Use level indicator first, then subscript or superscript symbol, then base line indicator, and finally the symbol on the baseline.

- Not used very often.
Examples

- \( \overline{x} \)
- \( ab \)
- \( cd \)
Hierarchy of Superscripts and Subscripts

- First Order – one level from base line
- Second Order – two levels from base line
- Etc.
Examples

- $x_{2r}$
- $y^{n^2}$
- $a_{x^y}$
- $b^{x^y}$
Numeric Subscripts

Do not use a subscript indicator if the subscript

- Is Numeric
- Is First Order
- Is associated with an abbreviated function name or a letter which has a separate identity
- Doesn’t have its own subscript or superscript

Note: A prime (’) is not considered a superscript
Examples

- $x_5$
- $y'_3$
- $a''_4$
- $n_{10,000}$
- $\log_3 x$
- $\log_2 8$
The baseline indicator is not needed after a numeric subscript

\[(x_2 - x_1)^2 + (y_2 - y_1)^2\]

\[m = \frac{y_2 - y_1}{x_2 - x_1}\]
Why Do These Need Subscript Indicators?

- $3x$
- $12_7$
- $x_{2'}$
- $x_{2+k}$
- $7_{3}$
Use of the Multipurpose Indicator with Subscripts

- The Multipurpose Indicator, dot 5, must be used between a numeric subscript and a numeral which follows it on the baseline.

\[ C_010^2 + C_110 + C_2 \]
Changes of Level

- No base line indicator is needed if the PI follows the superscript or subscript.
- Find the value of $x^3$.
- Find the value of $x^{2/3}$.
- Find the value of $x^2$’s.
Changes of Level #2

- No base line indicator is needed if a comma follows the superscript or subscript
  - $x^2, x^3$
- A comma within a long numeral does not have the same effect. Why?
  - $X^{16,000} +$
Changes of Level #3

No base line indicator is needed if a space or transition to a new line comes after the superscript or subscript and is followed by literary text, unrelated mathematical material, or a comparison symbol

- $2p^2$ is always even.
- $2^x < 3^x$
- Conversion of a base 5 numeral to a base 10 numeral: $2341_5 = 2 \cdot 5^3 + 3 \cdot 5^2 + 4 \cdot 5^1 + 1 \cdot 5^0$
Changes of Level

- A space after a symbol of shape or an abbreviated function name preserves the level already in effect, but if these items carry a superscript or subscript, the space following it reinstates the level that was in effect before
  - $\cos^2 x$
  - $A_{\Delta ABC}$
Changes of Level

Contractions may not be used in a word or abbreviation in contact with a level indicator.

- $13_{\text{seven}}$
- $\#13_{\text{seven}}$
- $\#13_{\text{seven}}$
- inch-pound^2
- $\#13_{\text{pounds}}$
The small hollow dot used in print as the sign for “degrees” is a superscript.

$90^\circ + 90^\circ = ?^\circ$
Assignment

p. 74 all