

Geometry and Tactile Graphics for Students in Grades 3 to 8

Lesson 2: The Five-Step Rule and Exceptions



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Objectives

Participants will be able to:

1. Read and write modified expressions created using:
 - a) the Five-Step Rule
 - b) two important exceptions to the Five-Step Rule.
2. Read and write the Nemeth symbols for parallel, perpendicular, not parallel, and not perpendicular.
3. Read and write sentences containing modified expressions.

Modifying Expressions

- A modifier is defined as a symbol or a combination of symbols placed directly over or under its related symbol or expression (e.g., \overrightarrow{AB}).
- Modification Indicators
 - ∴ Multipurpose indicator
 - ∴ Directly-over indicator
 - ∴ Directly-under indicator
 - ∴ Termination indicator

Common Modifiers and How to Read Expressions Using Them

∴ Horizontal line (bar) —

\overline{PQ} Line segment PQ

$1.\overline{37}$ One point three seven with the three seven repeating

∴∴∴∴∴ Barbed arrow at both ends \longleftrightarrow

\overleftrightarrow{XY} Line XY

∴∴ Contracted right arrow \longrightarrow

\overrightarrow{AB} Ray AB

Five-Step Rule

Use the five-step rule when transcribing modified expressions

1. Multipurpose indicator ∴
2. Expression to be modified
3. Directly-over indicator ∴
or directly-under indicator ∴
4. Modifier (e.g., horizontal bar)
5. Termination indicator ∴

Examples of Modified Expressions Using the Five-Step Rule

\overline{PQ}



\overrightarrow{AB}



\overleftrightarrow{XY}



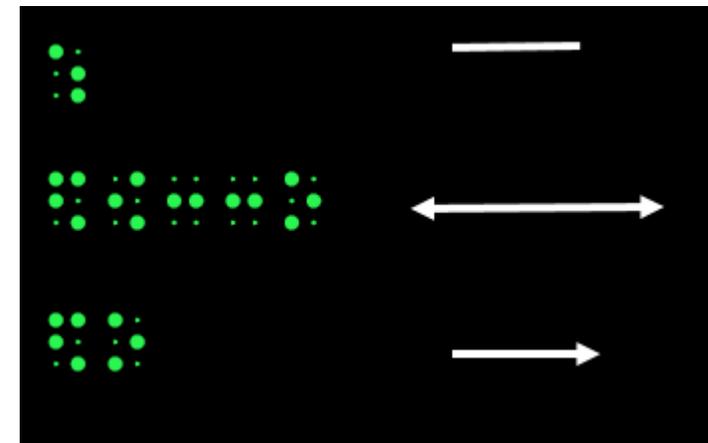
1. $\overline{37}$



4.5729 $\overline{}$



1. Multipurpose indicator ⠠
2. Expression to be modified
3. Directly-over indicator ⠠ or directly-under indicator ⠤
4. Modifier (e.g., horizontal bar)
5. Termination indicator ⠠



Activity 2A

Transcribe the following modified expressions.

3. $0.\overline{925}$

4. \overleftrightarrow{MN}

5. \overrightarrow{GH}

6. $5.23\overline{46}$

Contracted Form of Modified Expressions – Exception 1

- When a single digit or single letter is modified only by a horizontal bar directly over it, the symbol for the bar is placed after the digit or letter.
- The five-step rule must not be used.

0. $\bar{3}$ ⠠⠠⠠⠠⠠

0.41 $\bar{6}$ ⠠⠠⠠⠠⠠⠠⠠

Activity 2B

Transcribe the following modified expressions.

8. $0.\overline{6}$

9. $\underline{7}9$

10. $8.\overline{3}$

11. $4\underline{5},621$

Activity 2C

Transcribe the following.

1. $\overrightarrow{EF} \perp \overrightarrow{EG}$

2. $\frac{3}{7} = \overline{.428571}$

3. $\overline{PQ} \not\parallel \overline{RS}$

4. Identify the value of the underlined digit in $6.\underline{7}85$.

