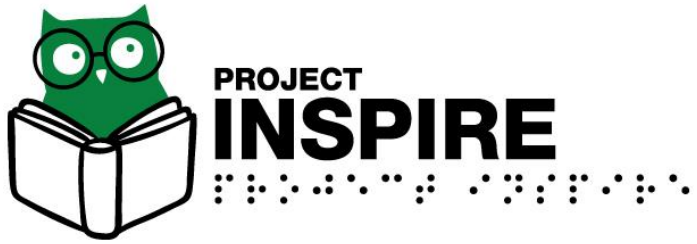
Grades 2 to 5: Nemeth Code Symbols for Fractions and Spatial Problems, Instructional Tools, Materials, and Technology

Lesson 1: Fractions and Mixed Numbers



University of South Carolina Upstate, Summer 2020

Lesson 1 Objectives

Participants will be able to read and write:

- simple fractions using the Nemeth Code opening and closing simple fraction indicators.
- mixed numbers using the Nemeth Code opening and closing mixed number fraction indicators.
- linear math problems and word problems using fractions and mixed numbers.

Simple Fractions

$$\frac{2}{3}$$

- Numerator: Top part – number of parts being counted
- Fraction line: (horizontal) – separates the numerator and denominator
- Denominator: Bottom part – the whole (total) parts

Simple fractions do not have a fraction in the numerator or denominator.

Simple Fractions with a Horizontal Fraction Line

⠰ Opening simple fraction indicator (dots 1-4-5-6)
⠸ Closing simple fraction indicator (dots 3-4-5-6)
⠌ Horizontal fraction line (dots 3-4)

$\frac{2}{3}$ ⠰⠼⠃⠌⠼⠉⠸

- There are no print equivalents for the opening and closing simple fraction indicators.
- You must ALWAYS close a fraction after you open it!

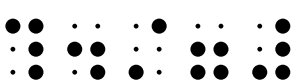
Simple Fractions with a Diagonal Fraction Line

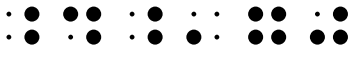
⠸⠌ Diagonal fraction line (dots 4-5-6, 3-4)

$\frac{1}{2}$ ⠼⠁⠸⠌⠼⠃

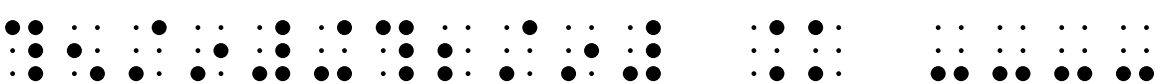
- Follow the print for which fraction line to use.
- Tactile readers need to understand that simple fractions in braille have “lefts” and “rights” not “tops” and “bottoms.”

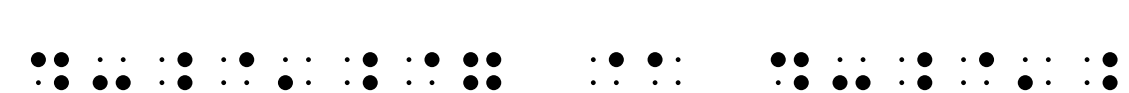
Examples of Simple Fractions and Problems Using Simple Fractions

$\frac{4}{7}$ 

$4/7$ 

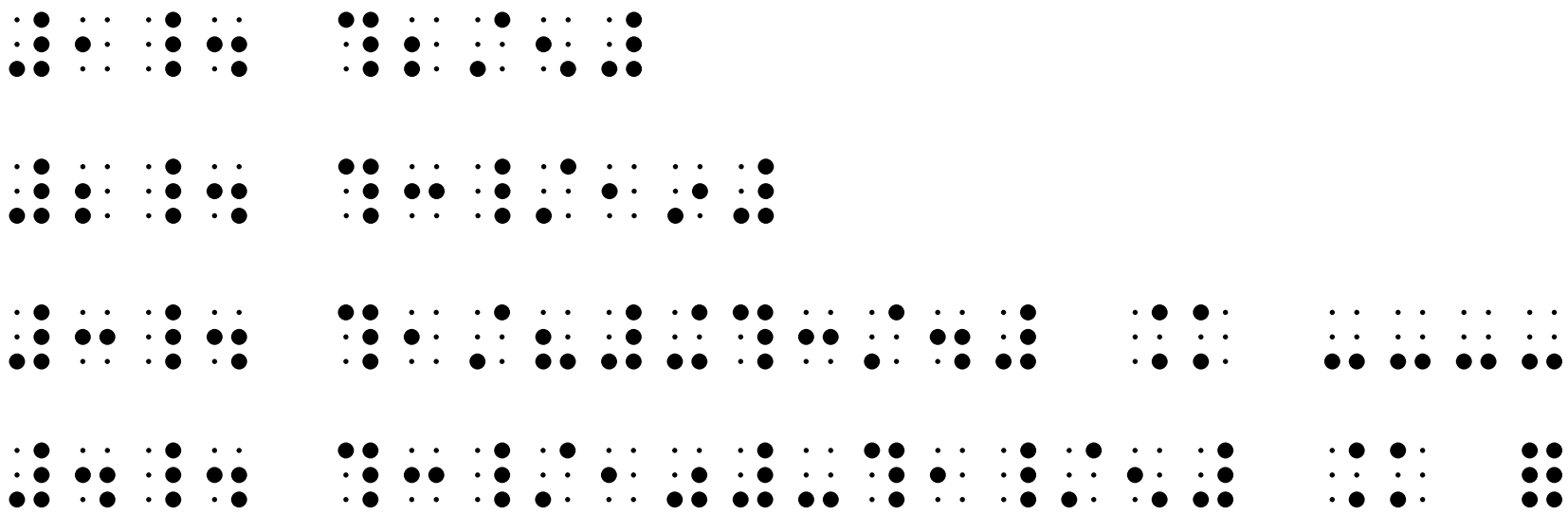
- When fractions occur in math problems, follow the print.

$\frac{5}{9} + \frac{2}{9} = \_\_\_$ 

$3/5 + ? = 4/5$ 

Activity 1A

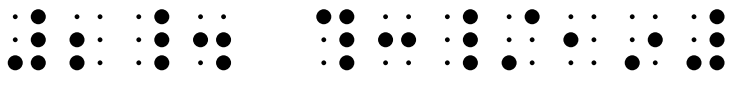
Interline the simple fractions and equations.



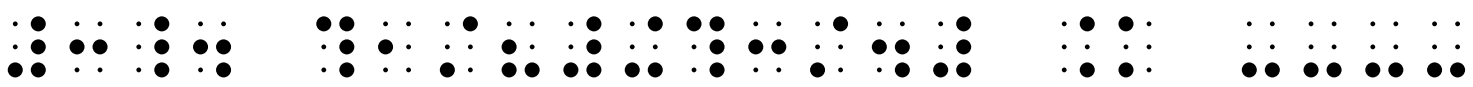
Activity 1A: Answer Key

1. $\frac{2}{5}$

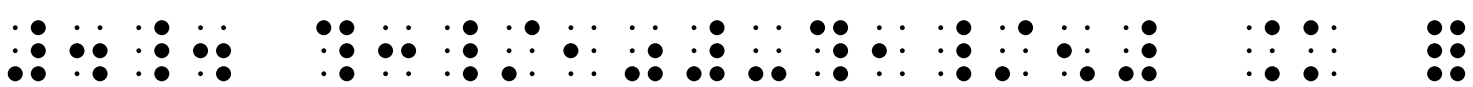
2. $\frac{3}{19}$



3. $\frac{1}{8} + \frac{3}{4} = \underline{\quad}$



4. $\frac{3}{10} - \frac{1}{5} =$



Mixed Numbers

$4\frac{5}{8}$

- Whole number
- Numerator: Top part – number of parts being counted
- Fraction line: (horizontal) – separates the numerator and denominator
- Denominator: Bottom part – the whole (total) parts

$3\ 1/7$

- If the mixed number has a diagonal fraction line, use the Nemeth code diagonal fraction line.

Brailling Mixed Numbers

⠸⠹ Opening mixed number fraction indicator (dots 4-5-6, 1-4-5-6)

⠌ Horizontal fraction line (dots 3-4)

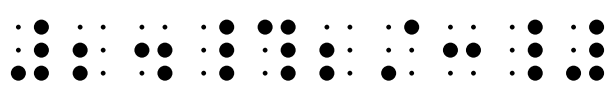
⠸⠌ Diagonal faction line (dots 4-5-6, 3-4)

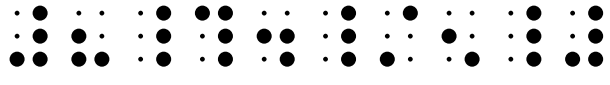
⠸⠼ Closing mixed number fraction indicator (dots 4-5-6, 3-4-5-6)

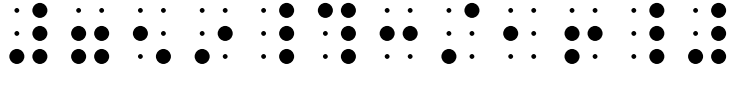
$4\frac{5}{8}$ ⠼⠲⠸⠹⠢⠌⠦⠸⠼

$3\,{}^{1}\!/\!_{7}$ ⠼⠒⠸⠹⠂⠸⠌⠶⠸⠼

Examples of Mixed Numbers

$24\frac{2}{3}$ 

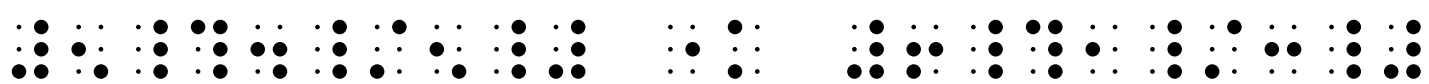
$8\,4\!\!\diagup\!\!5$ 

$759\,\frac{3}{16}$ 

Linear Problems with Mixed Numbers

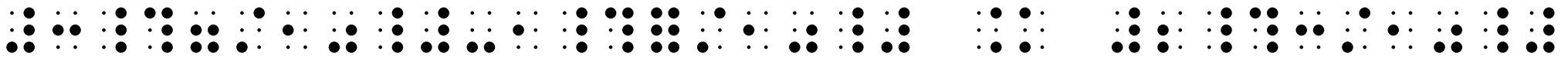
- Follow the print when brailling linear problems with mixed numbers.

$5\ 4/5 < 6\ 1/3$



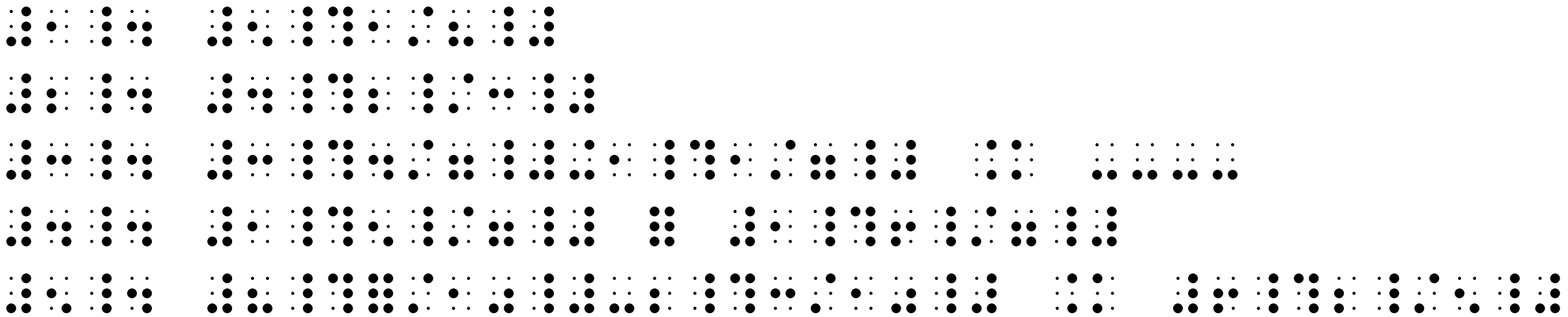
- A mixed number following a sign of operation does not need a numeric indicator.

$3\frac{7}{10} - 1\frac{?}{10} = 2\frac{3}{10}$



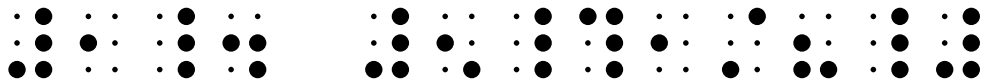
Activity 1B

Interline the mixed numbers and equations.



Activity 1B: Answer Key

1. $5\frac{1}{8}$

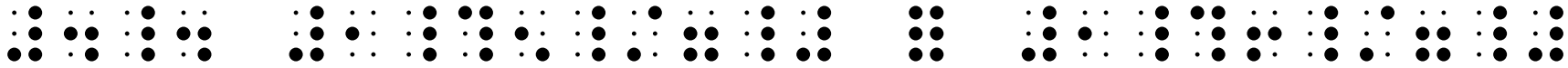


2. $4\frac{2}{3}$

3. $3\frac{4}{7} + 1\frac{1}{7} = \_\_\_\_$

Activity 1B: Answer Key, Continued

4. $1\frac{5}{7}$? $1\frac{6}{7}$



5. $8\frac{?}{10} - 2\frac{3}{10} = 6\frac{2}{5}$

Activity 1C

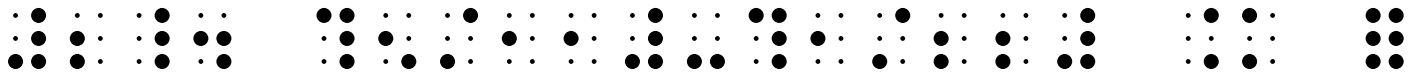
Transcribe the following linear problems.

1. $\frac{2}{3} \times \frac{1}{3} = \underline{\qquad}$
2. $\frac{5}{11} - \frac{1}{22} = ?$
3. $^{4}\!/_{8} = {}^{1}\!/_{2}$
4. $1\frac{7}{8} > 1\frac{5}{8}$
5. $3\ {}^{4}\!/_{9} + 5\ {}^{3}\!/_{9} =$
6. $12\frac{1}{4} \times ? = 12\frac{1}{4}$

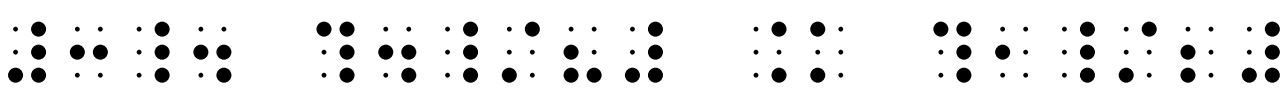
Activity 1C: Answer Key

1. $\frac{2}{3} \times \frac{1}{3} = \_\_\_\_$

2. $\frac{5}{11} - \frac{1}{22} = ?$

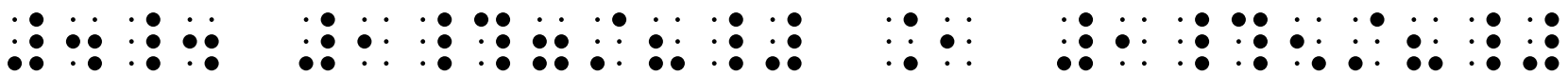


3. $\frac{4}{8} = \frac{1}{2}$

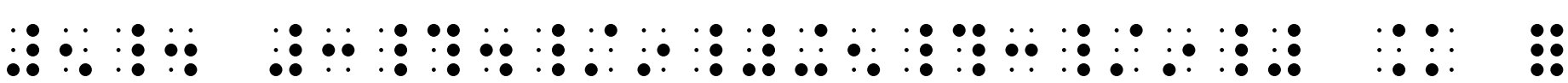


Activity 1C: Answer Key, Continued

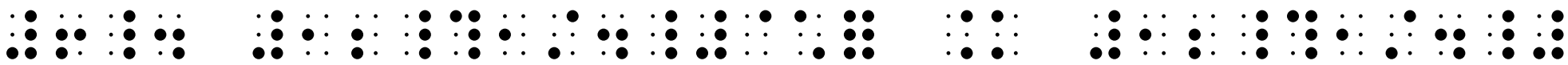
4. $1\frac{7}{8} > 1\frac{5}{8}$



5. $3\,\frac{4}{9} + 5\,\frac{3}{9} =$



6. $12\frac{1}{4} \times ? = 12\frac{1}{4}$

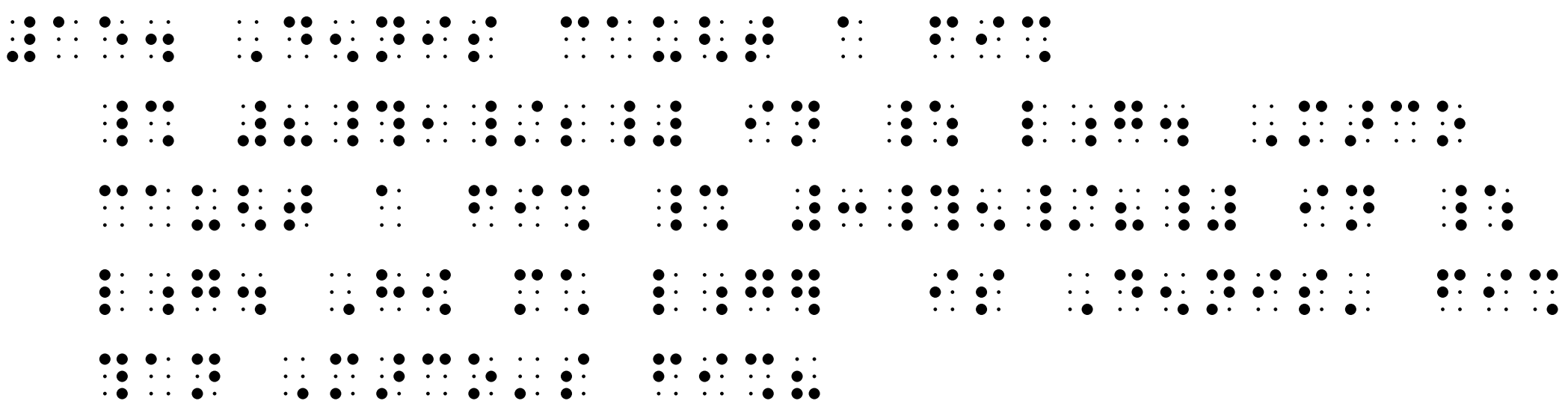


Word Problems that Contain Fractions

- Simple fractions and mixed numbers are in Nemeth code and must be placed within opening and closing Nemeth code indicators.
- You cannot divide a fraction or a mixed number between lines.
- If you must divide an equation, do so at the sign of comparison.
- If there is a measurement unit with the simple fraction or mixed number (e.g., in, km) the measurement unit must be included within the Nemeth code.

Example Word Problems

15. Dennis caught a fish $8\frac{1}{2}$ in long. Marco caught a fish $3\frac{5}{8}$ in long. How much longer is Dennis' fish than Marco's fish?



Example Word Problems, Continued

16. Does $\frac{3}{4} + 5\frac{1}{2} = 5\frac{4}{6}$? Explain why or why not.

⠼⠁⠋⠲ ⠠⠙⠕⠑⠎ ⠸⠩ ⠹⠒⠸⠌⠲⠼⠬⠢⠸⠹⠂⠸⠌⠆⠸⠼
⠨⠅ ⠼⠢⠸⠹⠲⠸⠌⠖⠸⠼ ⠸⠱⠦ ⠠⠑⠭⠏⠇⠁⠔ ⠱⠽ ⠕⠗
⠱⠽ ⠝⠲

Activity 1D

Transcribe the following word problems.

1. Ms. Chaudhry had $4\frac{7}{12}$ boxes of pencils but $2\frac{1}{12}$ boxes of the pencils were broken. After she threw out the broken pencils, how many boxes of pencils were left?
2. There are $^{7}/_{8}$ kilograms of salt in the kitchen. Mr. Weinstein used $^{2}/_{15}$ of the salt when he was preparing dinner. How much salt did he use?

Activity 1D: Answer Key