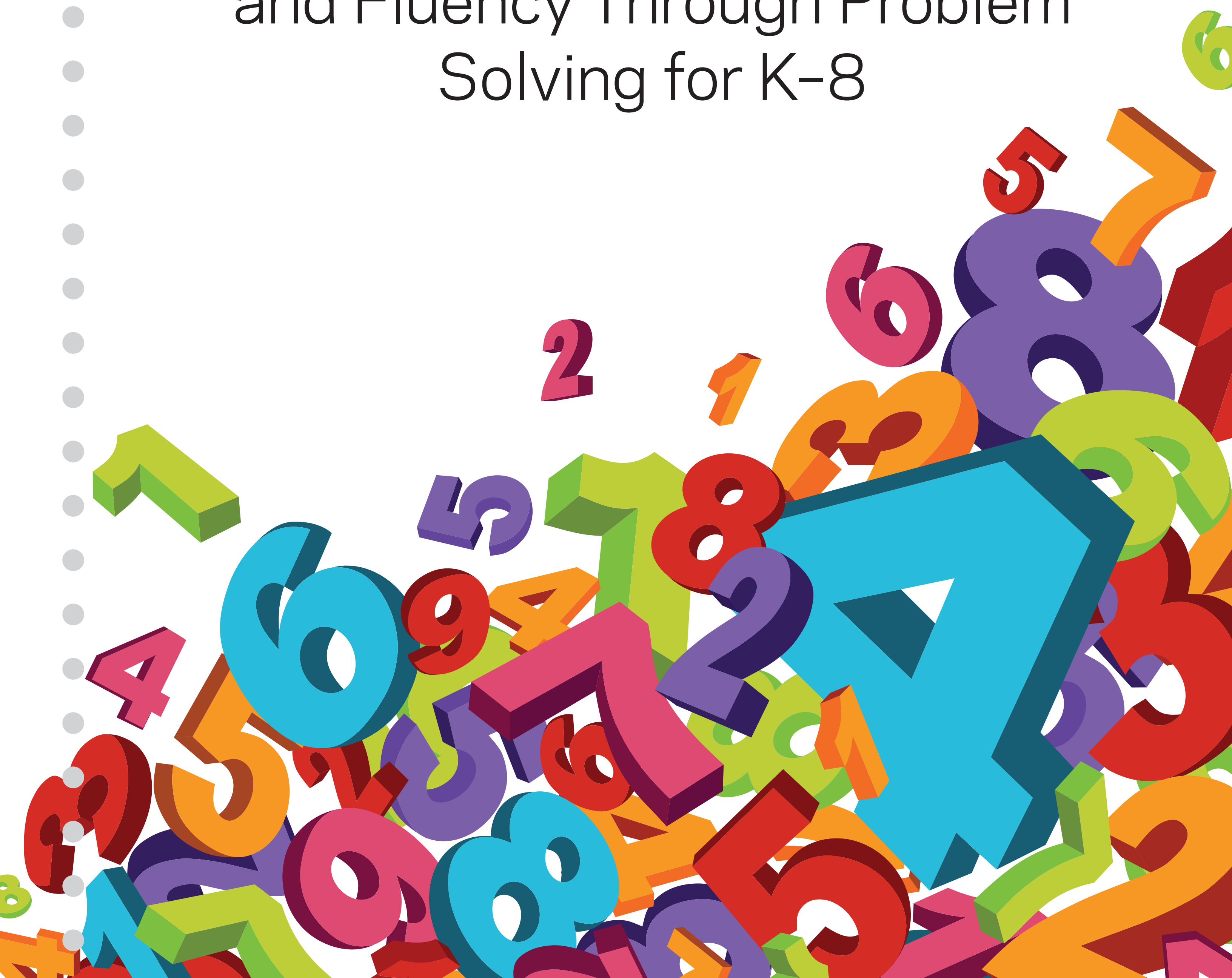
CORE MATH
NUMBER INTELLIGENCE

Spend Some Time with 1 to 9:

Building Number Sense and Fluency Through Problem Solving for K–8



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CORE Mission

CORE serves as a trusted advisor at all levels of preK–12 education, working collaboratively with educators to support literacy and math achievement growth for all students.

Our implementation support services and products help our customers build their own capacity for effective instruction by laying a foundation of research-based knowledge, supporting the use of proven tools, and developing leadership.

As an organization committed to integrity, excellence, and service, we believe that with informed school and district administrators, expert teaching, and well-implemented programs, all students can become proficient academically.

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How Many Ways Can You Make a Sum of 18?

Use different numbers from 1 to 9 to create a sum of 18. For example, 4 + 6 + 8 = 18 is correct because we used three different numbers 4, 6, and 8 to get a sum of 18. However, 5 + 5 + 8 is not correct because we used 5 twice.

1. Create all possible expressions with sums of 18 that use three different numbers from 1 to 9.

2. Create all possible expressions with sums of 18 that use four different numbers from 1 to 9.

3. If possible, create an expression with a sum of 18 that uses five different numbers from 1 to 9.

4. If possible, create an expression with a sum of 18 that uses six different numbers from 1 to 9.

How Many Ways Can You Make a Sum of 18?

CCSSM: 1.OA.6, 2.OA.2

Prompts/Questions/Extensions

- What is the greatest number of numbers that can be added together to get a sum of 18? How do you know?
- Extension: Change the desired sum to something like 15 or 20. This extension is especially useful after students share and discuss strategies with the original problem set and the mathematical connections are made explicit. Then students can try out newly learned strategies on a new set of numbers.

Create Equations with the Digits 1–9

Create as many equations as you can with the following conditions:

- Use the digits 1–9 to create many different equations.
- Use some or all of the digits in each equation.
- Do not use any digit more than once within any single equation.
- Do not use the digit zero.
- You may use any math operation, including exponents.

For example:

$8 \div 4 = 5 - 3$ → uses the digits 3, 5, 4, and 8

$5 + 6 \times 4 = 29 \times 1$ → uses the digits 1, 2, 4, 5, 6, and 9

Create Equations with the Digits 1–9

CCSSM: 3.OA.5, 3.OA.7, 3.NBT.2, 4.NBT.4, 4.NBT.5, 4.NBT.6, 8.EE.1

Prompts/Questions/Extensions

- Each side of an equation is called an expression. Can you change the value of any of your expressions by just adding or changing parentheses? Show this.
- What is the greatest value you can get on each side of an equation?
- What is the least value you can get on each side of an equation?
- Create an equation that uses all nine digits.
- Create an equation that uses as many different math operations as you can.
- Explain any strategies you used to create equations.

Spend a Fraction of Equal Time with 1 to 9

Fill in each box with a digit from 1 to 9 so that equivalent fractions are created.

- No digit may be repeated in the same set of equivalent fractions.

For example:

This is correct because the three fractions are equal and no digit is used more than once.

$$\frac{1}{2} = \frac{5}{3+7} = \frac{4}{8}$$

This is not correct because the digit 2 is used more than once in the set of three fractions.

$$\frac{1}{2} = \frac{5}{8+2} = \frac{3}{6}$$

1. $\frac{1}{3} = \frac{\square}{\square} = \frac{\square}{\square + \square}$

2. $\frac{1}{4} = \frac{\square}{\square} = \frac{\square}{\square + \square}$

3. $\frac{1}{5} = \frac{\square}{\square + \square} = \frac{\square}{\square + \square}$

4. $\frac{1}{5} = \frac{\square}{\square + \square + \square + \square}$

5. $\frac{4}{8} = \frac{\square + \square}{\square} = \frac{\square + \square}{\square + \square}$

6. Create your own equivalent fraction problem.

Spend a Fraction of Equal Time with 1 to 9

CCSSM: 4.NF.1
Prompts/Questions/Extensions • What is the maximum number of equivalent fractions you can create in a set? For example, is it possible to create four fractions that are all equal? Five? Why or why not? • Create an equation that shows a mixed number equal to an improper fraction using the digits 1–9, and without using any digit more than once in the equation.

Put Six in the Mix
Place All Six Digits into Each Inequality Statement to Make It True

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[2] [4] [5] [6] [7] [8]

1. Place **all** six of the digits from the set above into the blank spaces in each inequality shown to the right to make the statement true.

   You must use all six digits in each statement. For example:

   4.[2]3[6] < [4].3[5] < 4.3[7][8]

2. Is there any statement that is impossible to make true? Why?

3. Show at least two possible solutions for any problem that can have more than one solution.

4. What ideas or strategies did you use to help you solve some or all of these problems? Why do your ideas/strategies work?

a. 4.☐3☐ < ☐.3☐ < 4.3☐☐

b. ☐.3☐ < 4.3☐☐ < 4.☐3☐

c. 4.3☐☐ < 4.☐3☐ < ☐.3☐

d. 4.3☐☐ < ☐.3☐ < 4.☐3☐

e. ☐.3☐ < 4.☐3☐ < 4.3☐☐

f. 4.☐3☐ < 4.3☐☐ < ☐.3☐

Put Six in the Mix

CCSSM: 5.NBT.3

Prompts/Questions/Extensions

- What if the number set you had to work with was just {1, 2, 3}, and each number was to be used twice in each inequality? Show how you could complete some or all the inequalities with just these three numbers.
- Extension: Change the given numbers in the inequalities from {2, 4, 5, 6, 7, 8} to {1, 2, 3, 4, 5, 6} and complete the inequalities again. This extension is especially useful after students share and discuss strategies with the original problem set and the mathematical connections are made explicit. Then students can try out newly learned strategies on a new set of numbers.