Sample Pages from

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Shell Education

PRACTICE - ASSESS - DIAGNOSE

Level 3

180 Days of PROBLEM SOLVING for Third Grade

- Think
- Plan
- Solve
- Explain

4 x 6 = 24

TABLE OF CONTENTS

Introduction 3
How to Use this Book 4
Standards Correlations 12
Daily Practice Pages 13
Answer Key 193
Practice Page Rubric 209
Practice Page Item Analysis 210
Student Item Analysis 214
Problem-Solving Framework 215
Problem-Solving Strategies 216
Digital Resources 217

INTRODUCTION

The Need for Practice

To be successful in today's mathematics classrooms, students must deeply understand both concepts and procedures so that they can discuss and demonstrate their understanding during the problem-solving process. Demonstrating understanding is a process that must be continually practiced for students to be successful. Practice is especially important to help students apply their concrete, conceptual understanding during each step of the problem-solving process.

Understanding Assessment

In addition to providing opportunities for frequent practice, teachers must be able to assess students' problem-solving skills. This is important so that teachers can adequately address students' misconceptions, build on their current understandings, and challenge them appropriately. Assessment is a long-term process that involves careful analysis of student responses from discussions, projects, practice pages, or tests. When analyzing the data, it is important for teachers to reflect on how their teaching practices may have influenced students' responses and to identify those areas where additional instruction may be required. In short, the data gathered from assessments should be used to inform instruction: slow down, speed up, or reteach. This type of assessment is called *formative assessment*.

HOW TO USE THIS BOOK *(cont.)*

College-and-Career Readiness Standards

Below is a list of mathematical standards that are addressed throughout this book. Each week students solve problems related to the same mathematical topic.

Week	Standard
1	Use place value understanding to round whole numbers to the nearest 10 or 100.
2	Identify arithmetic patterns (including patterns in the addition table), and explain them using properties of operations.
3	Fluently add within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. Solve one-step addition word problems.
4	Fluently subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. Solve one-step subtraction word problems.
5	Solve two-step word problems using addition and subtraction. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
6	Identify arithmetic patterns (including patterns in the multiplication table), and explain them using properties of operations.
7	Interpret products of whole numbers (e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each).
8	Fluently multiply within 100. By the end of grade 3, know from memory all products of two one-digit numbers.
9	Multiply one-digit whole numbers by multiples of 10 in the range of 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.
10	Interpret whole-number quotients of whole numbers (e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares), or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.
11	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
12	Apply properties of operations as strategies to multiply and divide.
13	Understand division as an unknown-factor problem.

HOW TO USE THIS BOOK *(cont.)*

14	Fluently divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations.
15	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem).
16	Solve two-step word problems using all four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
17	Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{a}{b}$.
18	Represent a fraction $\frac{1}{b}$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.
19	Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line.
20	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
21	Recognize and generate simple equivalent fractions (e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$). Explain why the fractions are equivalent (e.g., by using a visual fraction model).
22	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
23	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions (e.g., by using a visual fraction model).
24	Tell and write time to the nearest minute and measure time intervals in minutes.
25	Solve word problems involving addition and subtraction of time intervals in minutes (e.g., by representing the problem on a number line diagram).
26	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).

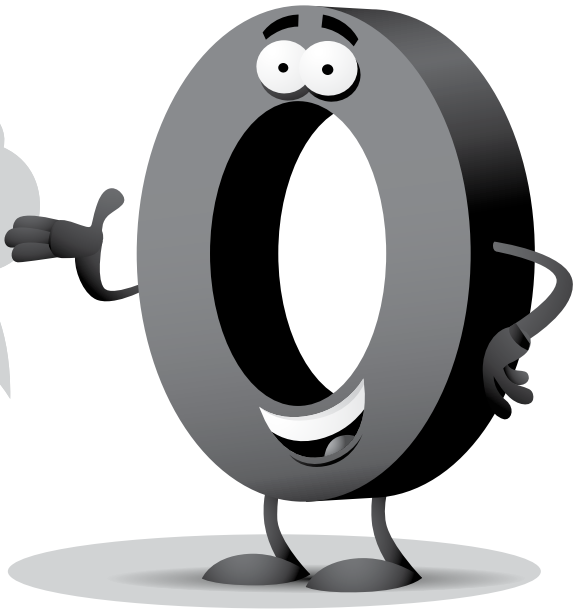
HOW TO USE THIS BOOK *(cont.)*

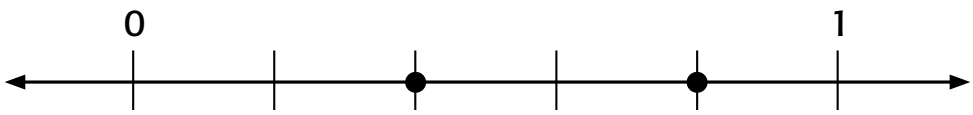
27	Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
28	Draw a scaled picture graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
29	Draw a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
30	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.
31	A plane figure that can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
32	Measure areas by counting unit squares (square cm, square m, square in., square ft., and improvised units).
33	Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
34	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
35	Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
36	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

NAME: _____ **DATE:** _____

DIRECTIONS: Think about the problem. Then, answer the questions.

Write fractions for the points on the number line. Then, circle the fraction that is greater.





1. How do you find the number of equal parts for the number line?

_____

_____

_____

2. How do you know if a fraction is greater?

_____

_____

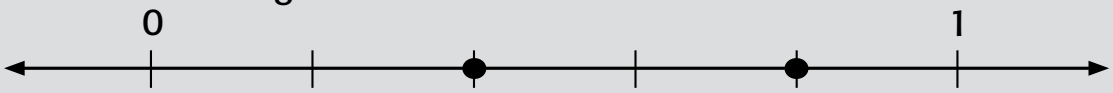
_____

NAME: _____ DATE: _____

DIRECTIONS: Read and solve each problem.

Solve It!

Problem 1: Write fractions for the points on the number line. Then, circle the fraction that is greater.



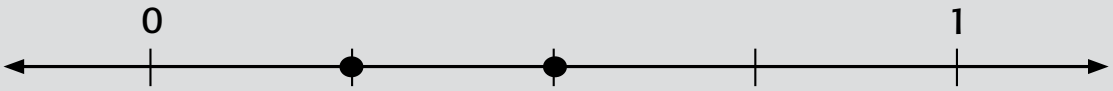
What Do You Know?

What Is Your Plan?

Solve the Problem!

Look Back and Explain!

Problem 2: Write fractions for the points on the number line. Then, circle the fraction that is less.



What Do You Know?

What Is Your Plan?

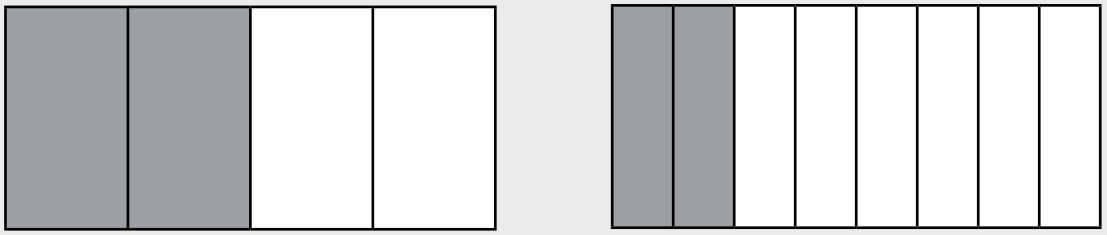
Solve the Problem!

Look Back and Explain!

NAME: _____ DATE: _____

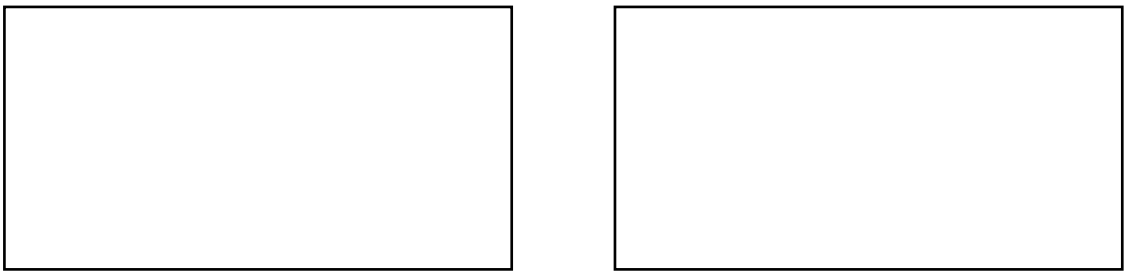
DIRECTIONS: Look at the example. Then, solve the problem.

Example: Compare the fractions using >, <, or =. Draw a model to show your answer.



$\frac{2}{4}$ > $\frac{2}{8}$

Compare the fractions using >, <, or =. Draw a model to show your answer.



$\frac{2}{3}$ ◯ $\frac{4}{6}$

NAME: _____ DATE: _____

DIRECTIONS: Show two ways to solve the problem.

1. Tomás ate $\frac{1}{4}$ of his sandwich. Alejandro's sandwich was the same size, but he ate $\frac{1}{2}$ of his. Who ate more of his sandwich?

Strategy 1

Strategy 2

2. Which strategy do you think is easier? Explain your reasoning.

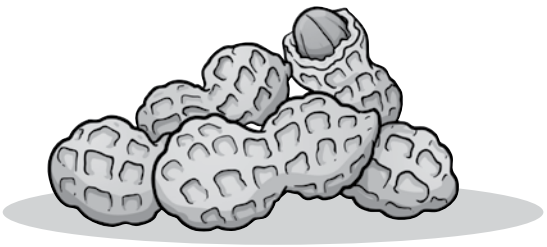
_____

_____

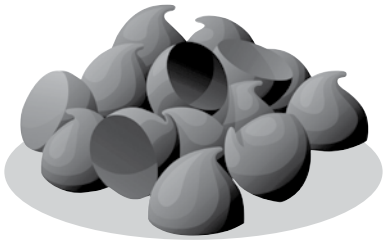
_____

NAME: _____ **DATE:** _____

DIRECTIONS: Read and solve the problem.



Lori is making a bag of trail mix. She uses a recipe to make one serving. Compare the fractions. Then, write them in order from least to greatest.



Trail Mix Recipe

$\frac{3}{4}$ cup of peanuts

$\frac{1}{3}$ cup of chocolate candies

$\frac{1}{2}$ cup of raisins

1. Draw a model to show your answer.

2. Explain how you ordered the fractions from least to greatest.

_____

_____

_____

PROBLEM-SOLVING FRAMEWORK

Use the following problem-solving steps to help you:

1. understand the problem
2. make a plan
3. solve the problem
4. check your answer and explain your thinking

What Do You Know?

- read/reread the problem
- restate the problem in your own words
- visualize the problem
- find the important information in the problem
- understand what the question is asking

What Is Your Plan?

- draw a picture or model
- decide which strategy to use
- choose an operation (+, −, ×, ÷)
- determine if there is one step or multiple steps

Solve the Problem!

- carry out your plan
- check your steps as you are solving the problem
- decide if your strategy is working or choose a new strategy
- find the solution to the problem

Look Back and Explain!

- check that your solution makes sense and is reasonable
- determine if there are other possible solutions
- use words to explain your solution