TEKSING TOWARD STAAR

MATHEMATICS ®

GRADE 4

TEKS/STAAR-BASED

LESSONS

TEACHER GUIDE

Six Weeks 1

TEKSING TOWARD STAAR SCOPE AND SEQUENCE
Grade 4 Mathematics

SIX WEEKS 1

Lesson	TEKS-BASED LESSON CONTENT	STAAR Category Standard	Spiraled Practice	Student (SA) and Hands-On (HO) Activity	Problem Solving	Skills and Concepts Homework
Lesson 1 ____ days	**4.2A**/interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left **4.2B**/represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals	Category 1 Readiness Category 1 Readiness	SP 1 SP 2	HO 1 SA 1 HO 2 HO 3 SA 2 HO 4 SA 3 HO 5	PS 1 PS 2 PS 3	Homework 1 Homework 2 Homework 3
Lesson 2 ____ days	**4.2C**/compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or = **4.2D**/round whole numbers to a given place value through the hundred thousands place	Category 1 Supporting Category 1 Supporting	SP 3 SP 4	SA 1 HO 1	PS 1 PS 2	Homework 1 Homework 2
Lesson 3 ____ days	**4.2E**/represent decimals, including tenths and hundredths, using concrete and visual models and money **4.2F**/compare and order decimals using concrete and visual models to the hundredths	Category 1 Supporting Category 1 Supporting	SP 5 SP 6 SP 7	SA 1 SA 2 HO 1	PS 1 PS 2	Homework 1 Homework 2
Lesson 4 ____ days	**4.2G**/relate decimals to fractions that name tenths and hundredths **4.2H**/determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line **4.3G**/represent fractions and decimals to the tenths or hundredths as distances from zero on a number line	Category 1 Readiness Category 1 Supporting Category 1 Supporting	SP 8 SP 9	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 5 ____ days	**4.4A/**add and subtract whole numbers and decimals to the hundredths place using the standard algorithm **4.4G/**round to the nearest 10, 100, or 1,000 or use compatible numbers to estimate solutions involving whole numbers	Category 2 Readiness Category 2 Supporting	SP 10 SP 11 SP 12	SA 1 SA 2 HO 2 SA 3	PS 1 PS 2 PS 3	Homework 1 Homework 2 Homework 3
Lesson 6 ____ days	**4.5A/**represent multi-step problems involving the four operations (addition and subtraction only in lesson) with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity **4.5B/**represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence (addition and subtraction only in lesson)	Category 2 Readiness Category 2 Readiness	SP 13 SP 14	HO 1 SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 7 ____ days	**4.6A/**identify points, lines, line segments, …and parallel lines	Category 3 Supporting	SP 15 SP 16	SA 1	PS 1	Homework 1

SIX WEEKS 1

Lesson	TEKS-BASED LESSON CONTENT	STAAR Category Standard	Spiraled Practice	Student (SA) and Hands-On (HO) Activity	Problem Solving	Skills and Concepts Homework
Lesson 8 ____ days	**4.9A/**represent data on a frequency table…marked with whole numbers and fractions **4.9B/**solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table…	Category 4 Readiness Category 4 Supporting	SP 17 SP 18	HO 1 SA 1	PS 1	Homework 1
Lesson 9 ____ days	**4.10A/**distinguish between fixed and variable expenses	Category 4 Supporting	SP 19 SP 20	SA 1	PS 1	Homework 1
Review	**Six Weeks 1 Open-Ended Review**					
Assessment	**Six Weeks 1 Assessment**					

TEACHER NOTES:

GRADE 4 MATERIALS LIST - SIX WEEKS 1

LESSON	MATERIALS NEEDED
1	**1. Teacher Notes: Problem-Solving 1** Per pair of students: 1 set of 9 number cards **2. Hands-On Activity 1** Per pair of students: base-10 blocks - 1 large cube, 1 flat, 1 rod, 1 small cube **3. Teacher Notes: Problem-Solving 2** Per pair of students: 1 set of 8 number cards and 1 decimal point card **4. Hands-On Activity 2** Per pair of students: base-10 blocks - 1 flat, 1 rod, 1 small cube **5. Hands-On Activity 3** Per pair of students: 1 set of base-10 blocks - 10 flats, 10 rods, and 10 small cubes; 1 Decimal Place-Value Model Mat (be sure to use master in cardstock folder - copy both parts on cardstock, cut out along dashed lines, tape together, laminate, and cut out); 4 Decimal Digits Record sheets; 1 set of Decimal Cards (copy on blue cardstock, copy *TEKSING TOWARD STAAR* logo on back, laminate, cut out and place in baggie) **6. Hands-On Activity 4** Per student: 1 page of 4 Decimal Expanded Form Strips (copy page on white paper - students will cut out their strips - each page makes 4 strips) **7. Hands-On Activity 5** Per student: 1 Place Value Game Board per student Per group of 4: 1 10-section spinner per group of 4 (copy the spinner on cardstock and laminate), 1 sharp pencil and 1 small paper clip
2	**1. Hands-On Activity 1** Per pair of students**:** 10-section spinner labeled 0-9, pencil and paper clip to make pointer for spinner, 1 set of Rounding Cards (copy on cardstock, copy *TEKSING TOWARD STAAR* logo on back, laminate, cut out and place in a zipper baggie), 1 coin
3	**1. Teacher Notes: Problem-Solving 1** Per pair of students: 1 set of grids **2. Hands-On Activity 1** Per class: Decimal Cards (copy on cardstock so that you will have one class set. Place the decimal cards in one zipper baggie and the blank cards in another zipper baggie.), 15-20 foot length of wide painter's tape for this activity for each class, black permanent marker Per pair of students: 1 dry erase marker
4	**1. Teacher Notes: Problem-Solving 2** Per student: Make 1 copy of this page for each student, then cut along the dashed line.
5	**1. Hands-On Activity 1** Per pair of students**:** computer, printer (copy on paper) - 2 Olympic Problems pages, 2 Olympic Problems - Creator's Solutions pages, and 2 Olympic Problems - Partner's Solutions page

GRADE 4 MATERIALS LIST - SIX WEEKS 1

LESSON	MATERIALS NEEDED
6	**1. Hands-On Activity 1** Per group of 4 students: 1 set of Relationship Cards (copy each page on cardstock – copy the problem cards in one color and the expression/equation cards in a different color, copy the *TEKSING TOWARD STAAR* logo on back of each page, then cut apart), 1 number cube
7	**None**
8	**1. Hands-On Activity 1** Per pair of students: 2 number cubes labeled 1-6
9	**1. Problem-Solving 1** Per pair of students: (Make copies of the Roy Family Expenses for August 2014 - this page makes enough for 3 pairs of students. Cut along dashed lines.) **2. Teacher Resource:** http://economicstexas.org/ - download *free Personal Financial Literacy for Grade 4-6 Classrooms* from the Texas Council on Economic Education **Grade 4 Lesson 1: Not Enough Bucks** pages 2-9

GRADE 4 TEKS-BASED ASSESSMENTS – SIX WEEKS 1
TEKS Correlation and Answer Key for Mini-Assessments

Mini-Assessment And TEKS Assessed	TEKS and Answer Key									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Lesson 1 MA 4.2A/4.2B	D 4.2A	J 4.2A	A 4.2A	G 4.2A	C 4.2A	H 4.2B	C 4.2B	G 4.2B	C 4.2B	J 4.2B
Lesson 2 MA 4.2C/4.2D	D 4.2C	G 4.2D	C 4.2C	J 4.2D	B 4.2C	H 4.2D	A 4.2C	J 4.2D	D 4.2C	F 4.2D
Lesson 3 MA 4.2E/4.2F	B 4.2E	J 4.2F	171 4.2E	H 4.2F	D 4.2E	F 4.2F	C 4.2E	G 4.2F	B 4.2E	F 4.2F
Lesson 4 MA 4.2G/4.2H/4.3G	C 4.2G	H 4.2G	B 4.2G	G 4.2H	D 4.2H	J 4.2H	D 4.2H	H 4.3G	C 4.3G	F 4.3G
Lesson 5 MA 4.4A/4.4G	A 4.4A	J 4.4A	D 4.4A	186 4.4A	C 4.4A	G 4.4G	C 4.4G	F 4.4G	C 4.4G	G 4.4G
Lesson 5 MA 4.5A/4.5B	D 4.5A	F 4.5A	B 4.5A	H 4.5A	B 4.5A	G 4.5B	D 4.5B	F 4.5B	D 4.5B	J 4.5B
Lesson 7 MA 4.6A	C	H	C	F	C	J	C	F	D	H
Lesson 8 MA 4.9A/4.9B	D 4.9A	J 4.9A	C 4.9A	F 4.9A	B 4.9A	G 4.9B	C 4.9B	J 4.9B	B 4.9B	J 4.9B
Lesson 9 MA 4.10A	D	J	C	G	D	G	D	H	D	F

Lesson 1

4.2A/4.2B LESSON & ASSESSMENT

Lesson Focus

For TEKS 4.2A students are expected to interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left.

For TEKS 4.2B students are expected to represent the value of the digit in whole number through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals.

For these TEKS students should be able to apply mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place-value.

For STAAR Category 1 students should be able to demonstrate an understanding of how to represent and manipulate numbers and expressions.

Process Standards Incorporated Into Lesson

4.1.B Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of a solution

4.1.D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate

4.1.E Create and use representations to organize, record, and communicate mathematical ideas

4.1.F Analyze mathematical relationships to connect and communicate mathematical ideas

4.1.G Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

Materials Needed for Lesson

1. **Teacher Notes: Problem-Solving 1**
   Per pair of students: 1 set of 9 number cards
2. **Hands-On Activity 1**
   Per pair of students: base-10 blocks - 1 large cube, 1 flat, 1 rod, 1 small cube
3. **Teacher Notes: Problem-Solving 2**
   Per pair of students: 1 set of 8 number cards and 1 decimal point card
4. **Hands-On Activity 2**
   Per pair of students: base-10 blocks - 1 flat, 1 rod, 1 small cube
5. **Hands-On Activity 3**
   Per pair of students: 1 set of base-10 blocks - 10 flats, 10 rods, and 10 small cubes; 1 Decimal Place-Value Model Mat (be sure to use master in cardstock folder - copy both parts on cardstock, cut out along dashed lines, tape

together, laminate, and cut out); 4 Decimal Digits Record sheets; 1 set of Decimal Cards (copy on blue cardstock, copy *TEKSING TOWARD STAAR* logo on back, laminate, cut out and place in baggie)

6. Hands-On Activity 4

Per student: 1 page of 4 Decimal Expanded Form Strips (copy page on white paper - students will cut out their strips - each page makes 4 strips)

7. Hands-On Activity 5

Per student: 1 Place-Value Game Board per student

Per group of 4: 1 10-section spinner per group of 4 (copy the spinner on cardstock and laminate), 1 sharp pencil and 1 small paper clip

Vocabulary for Lesson

PART I	PART II	PART III
digit	decimal	expanded form
place-value	decimal point	expanded notation
standard form	tenth	
word form	hundredth	
billion		

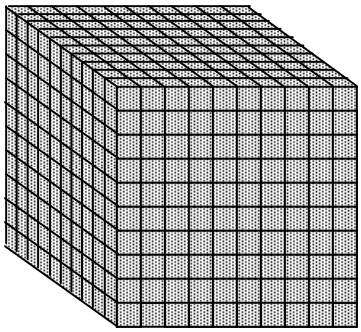
Math Background Part I - Whole Number Place-Value

Every **digit** in a number has a value. Digits are the symbols used to represent whole numbers. The digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The position, or place, a digit is in tells you the value of the digit. This value is called **place-value**.

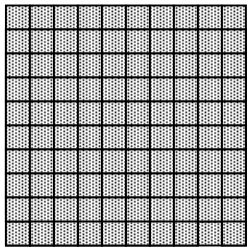
Whole Number Place-Value Patterns

Our number system has patterns that make it easy to use.

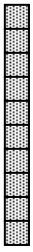
EXAMPLE 1: In our number system, each **place** has ten times the **value** of the place to its right.



1 Thousand
10 times greater than 1 hundred



1 Hundred
10 times greater than 1 ten



1 Ten
10 times greater than 1 one

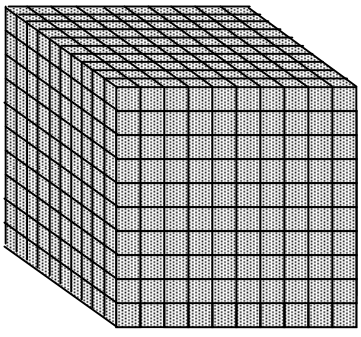
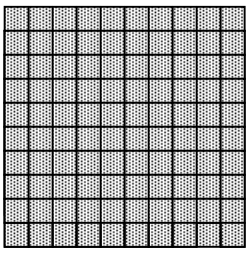
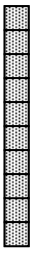
1 One

Whole Number Place-Value Pattern of Tens

Our number system is based on a simple pattern of tens.

- Each place-value position is ten times the position to its right.
- Each place-value position is one-tenth of the value of the position to its left.

EXAMPLE 1: Base-10 blocks can be used to model the pattern of tens relationships among whole number place-value positions.

Value	1,000	100	10	1
Model				
Description	thousand cube	hundred flat	ten rod	one cube

Each place-value position is ten times the value of the position to its right.

- The ten rod is 10 times as much as the unit cube.
- The hundred flat is 10 times as much as the ten rod.
- The thousand cube is 10 times as much as the hundred flat.

Each place-value position is one tenth the value of the position to its left.

• The hundred flat is $\frac{1}{10}$ of the thousand cube.

• The ten rod is $\frac{1}{10}$ of the hundred flat.

• The one cube is $\frac{1}{10}$ of the ten rod.

EXAMPLE 2: Place-value patterns can be used to write numbers that are 10 times as much as or $\frac{1}{10}$ of any given number.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		4,000	400	40	

10 times as much as

$\frac{1}{10}$ of

Each place-value position is ten times the value of the position to its right.

• 4,000 is 10 times as much as 400.

Each place-value position is one tenth the value of the position to its left.

• 400 is $\frac{1}{10}$ of 40.

EXAMPLE 3: A place-value chart can be used to complete a table to record 10 times as much as or $\frac{1}{10}$ of any given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6,000		
20		
50,000		
300		

Step 1: Write the given number in a place-value chart.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		6,000			
				20	
	50,000				
			300		

Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6,000	60,000	
20	200	
50,000	500,000	
300	3,000	

Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6,000	60,000	600
20	200	2
50,000	500,000	5,000
300	3,000	30

Place-Value Patterns to Read and Write Whole Numbers

Our number system arranges numbers into groups of three places called **periods**. The places within the periods repeat (hundreds, tens, ones, hundreds, tens ones, and so on.)

BILLIONS PERIOD			MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		1	0	0	0	0	0	0	0	0	0

In the United States, we usually use commas to separate the periods. The number represented in the place-value chart is 1,000,000,000. This number is read as "one billion."

Fourth grade students are expected to represent the value of whole numbers through 1,000,000,000. Knowing the place and period of a number will help you find the value of digits in any number, as well as read and write numbers.

EXAMPLE: 987,654,321

BILLIONS PERIOD			MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
			9	8	7	6	5	4	3	2	1

The digit **9** is in the *hundred millions* place. The value of the digit is 900,000,000.
The digit **8** is in the *ten millions* place. The value of the digit is 80,000,000.
The digit **7** is in the *one millions* place. The value of the digit is 7,000,000.

The digit **6** is in the *hundred thousands* place. The value of the digit is 600,000.
The digit **5** is in the *ten thousands* place. The value of the digit is 50,000.
The digit **4** is in the *one thousands* place. The value of the digit is 4,000.
The digit **3** is in the *hundreds* place. The value of the digit is 300.
The digit **2** is in the *tens* place. The value of the digit is 20.
The digit **1** is in the *ones* place. The value of the digit is 1.

Standard Form and Word Form of Whole Numbers

- A number written with one digit for each place-value is written in **standard form**. The standard form for the number *three thousand three* is 3,003.
- A number written with words is written in **word form**. The word form for 3,003 is *three thousand three*.

Fourth grade students should be able to read and write numbers in word form, standard form, and expanded form. You will learn about expanded form later in this lesson.

Place-Value to Read and Write Whole Numbers

When you read numbers, always start on the left. Many numbers have more than three digits. The digits in these numbers are arranged in groups of three called **periods**. A comma is used to separate each **period**.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
4	8	5	1	0	2	2	9	9

485,102,299 is shown in the place-value chart.

A comma separates the millions period from the thousands period. 485,102,299

A comma separates the thousands period from the ones period. 485,102,299

EXAMPLE 1: Read and write 45,073 in **word form**.

Look at 45,073 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
				4	5	0	7	3

This is a five-digit number.

To read this number:

- first, say the two-digit number to the left of the comma, ***forty-five***;
- next, say the name of the period, ***thousand*;**
- then, say the three-digit number to the right of the comma, ***seventy-three***.

45,073 is read as ***forty-five thousand, seventy-three***. This is the **word form** of the number.

Whole Number Place-Value

Every **digit** in a number has a value.

Digits are the symbols used to represent whole numbers. The digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

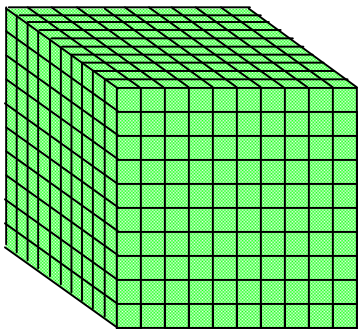
The position, or place, a digit is in tells you the value of the digit. This value is called **place-value**.

Place-Value Patterns

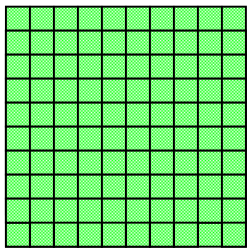
Our number system has patterns that makes it easy to use.

EXAMPLE

In our number system, each **place** has ten times the **value** of the place to its right.



1 Thousand
10 times greater than 1 hundred



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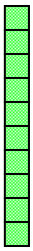
10 times greater than 1 ten



1 Ten
10 times greater than 1 one

1 One

Place-Value Pattern of Tens

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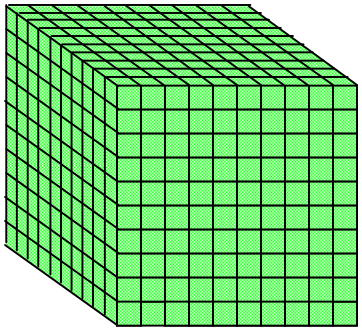
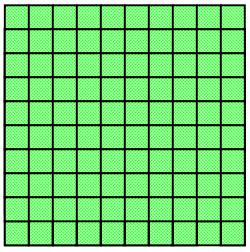
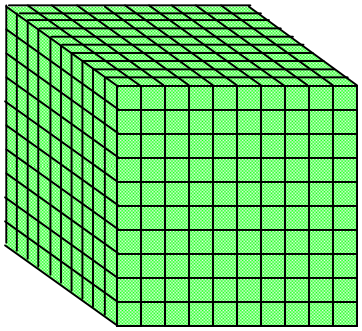
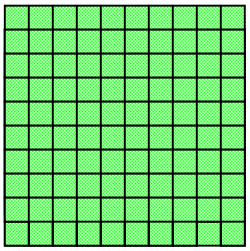
Model				
Description	thousand cube	hundred flat	ten rod	one cube

Value	1,000	100	10	1
Model				
Description	thousand cube	hundred flat	ten rod	one cube

Each place-value position is ten times the value of the position to its right.

- The ten rod is 10 times as much as the unit cube.
- The hundred flat is 10 times as much as the ten rod.
- The thousand cube is 10 times as much as the hundred flat.

Each place-value position is one tenth the value of the position to its left.

- The hundred flat is $\frac{1}{10}$ of the thousand cube.
- The ten rod is $\frac{1}{10}$ of the hundred flat.
- The one cube is $\frac{1}{10}$ of the ten rod.

EXAMPLE 2

Place-value patterns can be used to write numbers that are 10 times as much as or $\frac{1}{10}$ of any given number.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
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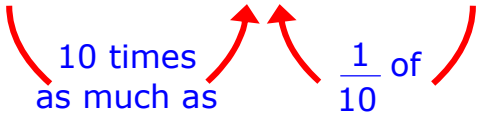

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EXAMPLE 3

A place-value chart can be used to complete a table to record 10 times as much as or $\frac{1}{10}$ of any given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6,000		
20		
50,000		
300		

Step 1: Write the given number in a place-value chart.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		6,000			
				20	
	50,000				
			300		

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		6,000			
				20	
	50,000				
			300		

Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6,000	60,000	
20	200	
50,000	500,000	
300	3,000	

Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6,000	60,000	600
20	200	2
50,000	500,000	5,000
300	3,000	30

Place-Value Patterns to Read and Write Whole Numbers

Our number system arranges numbers into groups of three places called **periods**.

The places within the periods repeat (hundreds, tens, ones, hundreds, tens ones, and so on.)

BILLIONS PERIOD			MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		1	0	0	0	0	0	0	0	0	0

In the United States, we usually use commas to separate the periods.

The number represented in the place-value chart is 1,000,000,000.

This number is read as "one billion."

Fourth grade students are expected to represent the value of whole numbers through 1,000,000,000.

Knowing the place and period of a number will help you find the value of digits in any number, as well as read and write numbers.

EXAMPLE

987,654,321

BILLIONS PERIOD			MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
			9	8	7	6	5	4	3	2	1

The digit **9** is in the *hundred millions* place.
The value of the digit is 900,000,000.

The digit **8** is in the *ten millions* place.
The value of the digit is 80,000,000.

The digit **7** is in the *one millions* place.
The value of the digit is 7,000,000.

The digit **6** is in the *hundred thousands* place.
The value of the digit is 600,000.

The digit **5** is in the *ten thousands* place.
The value of the digit is 50,000.

The digit **4** is in the *one thousands* place.
The value of the digit is 4,000.

The digit **3** is in the *hundreds* place.
The value of the digit is 300.

The digit **2** is in the *tens* place.
The value of the digit is 20.

The digit **1** is in the *ones* place.
The value of the digit is 1.

Standard Form and Word Form of Whole Numbers

- A number written with one digit for each place-value is written in **standard form**.

  The standard form for the number *three thousand three* is 3,003.

- A number written with words is written in **word form**.

  The word form for 3,003 is *three thousand three*.

Fourth grade students should be able to read and write numbers in **word form**, **standard form**, and **expanded form**.

You will learn about expanded form later in this lesson.

Place-Value to Read and Write Whole Numbers

When you read numbers, always start on the left.

Many numbers have more than three digits. The digits in these numbers are arranged in groups of three called **periods**. A comma is used to separate each **period**.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
4	8	5	1	0	2	2	9	9

485,102,299 is shown in the place-value chart.

A comma separates the millions period from the thousands period. 485,102,299

A comma separates the thousands period from the ones period. 485,102,299

EXAMPLE 1

Read and write 45,073 in **word form**.

Look at 45,073 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
			3	0	4	9	2	7

This is a five-digit number.

To read this number:

- first, say the two-digit number to the left of the comma, ***forty-five***;
- next, say the name of the period, ***thousand*;**
- then, say the three-digit number to the right of the comma, ***seventy-three***.

45,073 is read as

forty-five thousand, seventy-three.

This is the **word form** of the number.

Problem-Solving Model

Step	Description of Step
1	**Analyze the given information.** •Summarize the problem in your own words. •Describe the main idea of the problem. •Identify information needed to solve the problem.
2	**Formulate a plan or strategy.** •Draw a picture or a diagram. •Find a pattern. •Guess and check. •Act it out. •Create or use a chart or a table. •Work a simpler problem. •Work backwards. •Make an organized list. •Use logical reasoning. •Brainstorm. •Write a number sentence or an equation.
3	**Determine a solution.** •Estimate the solution to the problem. •Solve the problem.
4	**Justify the solution.** •Explain why your solution solves the problem.
5	**Evaluate the process and the reasonableness of your solution.** •Make sure the solution matches the problem. •Solve the problem in a different way.

Problem-Solving Questions

Directions:

- **Work with a partner.**
- **Write your answers on notebook paper.**
- **Answer questions 1-3.**
- **Complete the solution to the problem.**
- **Answer questions 4-10.**

1. What is the main idea of this problem?
2. What are the supporting details in this problem?
3. What skills, concepts and understanding of math vocabulary are needed to be able to answer this problem?
4. Did this problem involve mathematics arising in everyday life, society, or the work place?
5. What is a good problem solving strategy for this problem?
6. Can you explain how you used any math tools, mental math, estimation or number sense to solve this problem?
7. Did this problem involve using multiple representations (symbols, diagrams, graphs, math language)?
8. Did you use any relationships to solve this problem?
9. How can you justify your solution to the problem?
10. How can you check for reasonableness of your solution to this problem?

Teacher Notes: Problem-Solving 1

(Make copies of this page on colored cardstock, laminate, and cut apart along the dashed line - this page makes 3 sets - each pair of students needs 1 set.)

4	7	1	6

2	5	0	8	3

4	7	1	6

2	5	0	8	3

4	7	1	6

2	5	0	8	3

Problem-Solving 1

Work with a partner. Your teacher will give you and your partner 9 number cards.

1. Create the greatest number possible using all the number cards and placing the 6 card in the ten millions place.
2. Write this number in standard and word form.
3. Read the number out loud to your partner in standard form and in word form.
4. Create the least number possible using all the number cards and placing the 6 card in the ten thousands place.
5. Write this number in standard and word form.
6. Read the standard form and word form out loud to your partner.
7. Create two other 9-digit numbers using all the number cards and placing the 6 card in the tens place or the hundreds place.
8. Write the numbers in standard form and in word form.
9. Read the standard form and word form out loud to your partner.

Teacher Notes: Hands-On Activity 1

Materials: (per pair) base-10 blocks - 1 large cube, 1 flat, 1 rod, 1 small cube

Procedure: Students work with a partner.
- Distribute the materials to each partner pair.
- Students complete Hands-On Activity 1.

Listen for the following as you roam the room during the activity:

- Do the students accurately describe the value of each base-10 block?
- Do the students clearly describe the relationship between place-value positions?
- Do the students clearly describe which direction means that one position in place-value is ten times the value of the position next to it?
- Do the students clearly describe which direction means that one position in place-value is one- tenth of the value of the position next to it?

Look for the following as you roam the room during the activity:

- Do the students demonstrate a good grasp of the number system and place-value?
- Do the students use place-value and patterns in number relationships to write the value of each of the base-10 blocks?
- Can the students identify the values of the different places represented by each of the base-10 blocks?
- Do the students recognize the relative values of the places in a number (each place is ten times greater than the place on its right?)
- Do the students recognize the relative values of the places in a number (each place is one- tenth of the value of the place on its left?)

Hands-On Activity 1

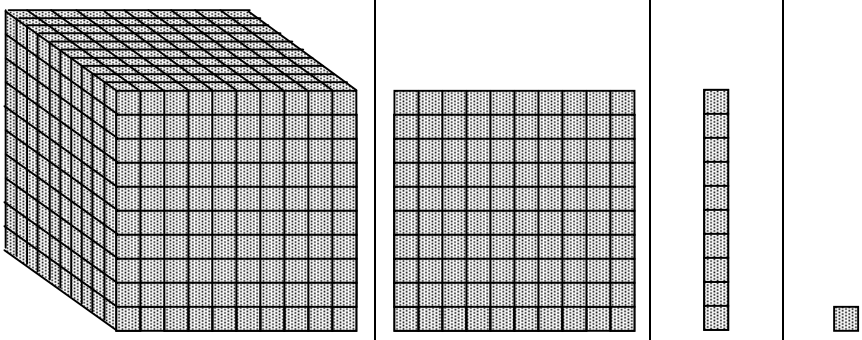
WHOLE NUMBER PLACE-VALUE PATTERNS

Materials: base-10 blocks - 1 large cube, 1 flat, 1 rod, 1 small cube

PART I

Work with a partner. Decide who is Student 1 and who is Student 2.

- Use the base-10 blocks to model place-value positions. Use the large cube to represent 1,000, the flat to represent 100, the rod to represent 10, and the small cube to represent 1.
- Complete the chart. Write the value and a description for each block.

Value				
Model				
Description				

Now use the blocks to compare and describe the relationship from one place-value position to the next place-value position.

- Student 1: Compare the large cube to the flat. The large cube represents _____, and the flat represents _____. The value of the large cube is _____ times as much as the value of the flat.
- Student 2: Compare the flat cube to the rod. The flat represents _____, and the rod represents _____. The value of the flat is _____ times as much as the value of the rod.
- Student 1: Compare the rod to the small cube. The rod represents _____, and the small cube represents _____. The value of the rod is _____ times as much as the value of the small cube.

Each place-value position is _____ times the value of the position to its right.

- Student 2: Compare the flat to the large cube. The flat represents _____, and the large cube represents _____. The value of the flat is _____-_____ of the value of the large cube.
- Student 1: Compare the rod to the flat. The rod represents _____, and the flat represents _____. The value of the rod is _____-_____ of the value of the flat.
- Student 2: Compare the small cube to the rod. The small cube represents _____, and the rod represents _____. The value of the small cube is _____-_____ of the value of the rod.

Each place-value position is _____-_____ of the value of the position to its left.

Student Activity 1

Work with a partner to complete this activity.

PROBLEM 1: Use a place-value chart to complete the table to record 10 times as much as or $\frac{1}{10}$ of the given numbers. Given numbers: 5,000; 30; 70,000; 800

Step 1: Write the given numbers in a place-value chart.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones

Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given numbers.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

Each place-value position is _____ times the value of the position to its right.

Each place-value position is _____-_____ of the value of the position to its left.

PROBLEM 2: Record 304,927 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number.

To read this number:

- first, say the _____-digit number to the _____ of the comma, _____ *hundred four*;
- next, say the name of the period, _____*;*
- then, say the _____-digit number to the _____ of the comma, *nine hundred* _____*-seven.*

The word form of 304,927 is

_____

_____.

PROBLEM 3: Record 6,342,805 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number.

To read this number:

- first, say the _____-digit number to the _____ of the first comma, *six*;
- then, say the name of the period, _____*;*
- next, say the _____-digit number to the _____ of the first comma, *three hundred* _____-_____;
- then, say the name of the period, _____*;*
- next, say the _____-digit number to the _____ of the second comma, *eight* _____ *five.*

The word form of 6,342,805 is

_____

_____.

PROBLEM 4: Record 96,231,074 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number. To read this number:

- first, say the _____-digit number to the _____of the first comma,

  ninety-_____;
- then, say the name of the period, _____*;*
- next, say the _____-digit number to the _____ of the first comma,

  two hundred _____-_____;
- then, say the name of the period, _____*;*
- next, say the _____-digit number to the _____ of the second comma,

  _____-_____.

The word form of 96,231,074 is

_____

_____.

PROBLEM 5: Record 485,102,296 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number.
To read this number:

- first, say the _____-digit number to the _____ of the first comma, _____

  hundred _____-_____;
- then, say the name of the period, _____*;*
- next, say the _____-digit number to the _____ of the first comma, _____ *hundred two*;
- then, say the name of the period, _____*;*
- next, say the _____-digit number to the _____ of the second comma, *two*

  hundred _____-_____.

The word form of 485,102,296 is

_____

_____.

NAME_____ DATE_____ SCORE ___/5

4.2A/4.2B Skills and Concepts Homework 1

1. Use a place-value chart to complete the table to record 10 times as much as or $\frac{1}{10}$ of the given numbers. Given numbers: 8,000; 90; 30,000; 200

   Step 1: Write the given numbers in a place-value chart.

Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones

   Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given numbers.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

   Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

   Each place-value position is _____ times the value of the position to its right.

   Each place-value position is _____-_____ of the value of the position to its left.

2. Record 405,816 in the place-value chart.

MILLIONS PERIOD			**THOUSANDS PERIOD**			**ONES PERIOD**		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

   This is a _____-digit number.

The word form of 405,816 is

_____

_____.

3. Record 5,231,704 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number.

The word form of 5,231,704 is

_____

_____.

4. Record 85,120,963 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number.

The word form of 85,120,963 is

_____

_____.

5. Record 374,091,185 in the place-value chart.

MILLIONS PERIOD			THOUSANDS PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

This is a _____-digit number.

The word form of 374,091,185 is

_____

_____.

Math Background Part II - Decimal Place-Value

Every **digit** in a number has a value. After the ones period in place-value there is a "dot" called a **decimal point**. The decimal point is used to separate the whole number part from the part less than one. The numbers to the right of the **decimal point** are called **decimals**.

The value of the number **before** the decimal point is **1** or **greater**.

4.71

The value of the number **after** the decimal point is **less** than **1**.

The **decimal point** divides the **whole number** part from the part **less than** 1.

Dollar symbols and **decimal points** are used to write money amounts. One dollar represents 1 whole.

The value of the number **before** the decimal point is **1 dollar** or **greater**.

$4.71

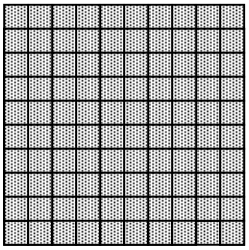
The value of the number **after** the decimal point is **less** than **1 dollar**.

The **decimal point** divides the **whole dollar** part from the part **less** than **1 dollar**.

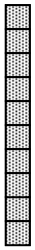
Decimal Place-Value Patterns

Decimals follow the same place-value pattern as whole numbers.

EXAMPLE: Each **place** continues to have the **value** of the place to its right.



1 One
10 times greater than 1 tenth



1 Tenth
10 times greater than 1 hundredth

1 Hundredth

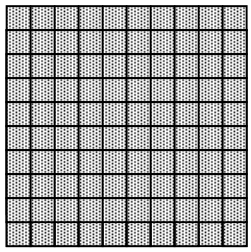
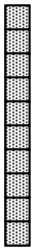
Decimal Place-Value Pattern of Tens

Decimal values are based on the same simple pattern of tens as whole numbers.

- Each place-value position is ten times the position to its right.
- Each place-value position is one-tenth of the value of the position to its left.

EXAMPLE 1: Base-10 blocks can be used to model the pattern of tens relationships among decimal place-value positions. The base-10 blocks used to represent decimal place-value positions are some of the same blocks used to represent whole numbers, but their value and description is different for decimals.

• The flat now represents 1 whole, the rod now represents $\frac{1}{10}$, and the small cube now represents $\frac{1}{100}$.

Value	1	$\frac{1}{10}$	$\frac{1}{100}$
Model			
Description	one flat	tenth rod	hundredth cube

Each place-value position is ten times the value of the position to its right.

• The one flat is 10 times as much as the tenth rod.

• The tenth rod is 10 times as much as the hundredth cube.

Each place-value position is one tenth of the value of the position to its left.

• The tenth rod is $\frac{1}{10}$ of the one flat.

• The hundredth cube is $\frac{1}{10}$ of the tenth rod.

EXAMPLE 2: Money can be used to model the pattern of tens relationships among decimal place-value positions.

A dollar bill represents 1 whole, a dime represents $\frac{1}{10}$, and a penny represents $\frac{1}{100}$.

$1.11 is represented in the table.

Value	$1.00	$0.10	$0.01
Model			
Description	dollar	dime	penny

Each place-value position is ten times the value of the position to its right.

• The dollar is 10 times as much as the value of the dime.

• The dime is 10 times as much as the value of the penny.

Each place-value position is one tenth of the value of the position to its left.

• The dime is $\frac{1}{10}$ of the value of the dollar.

• The penny is $\frac{1}{10}$ of the value of the dime.

EXAMPLE 3: Decimal place-value patterns can be used to write numbers that are 10 times as much as or $\frac{1}{10}$ of any given number.

Tens	Ones	.	Tenths	Hundredths
	4	.	4	4

10 times as much as

$\frac{1}{10}$ of

Each place-value position is ten times the value of the position to its right.

• 4 is 10 times as much as 0.4

• 0.4 is 10 times as much as 0.04

Each place-value position is one tenth value of the position to its left.

• 0.04 is $\frac{1}{10}$ of 0.4

• 0.4 is $\frac{1}{10}$ of 4

EXAMPLE 4: A place-value chart can be used to complete a table to record 10 times as much as or $\frac{1}{10}$ of any given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6.0		
0.7		
8.0		
0.9		

Step 1: Write the given number in a place-value chart.

Tens	Ones	.	Tenths	Hundredths
	6	.	0	
	0	.	7	
	8	.	0	
	0	.	9	

Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6.0	60	
0.7	7.0	
8.0	80	
0.9	9.0	

Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6.0	60	0.6
0.7	7.0	0.07
8.0	80	0.8
0.9	9.0	0.09

Place-Value Patterns to Read and Write Decimal Numbers

The decimal place-values begin after the ones place and a decimal point. The first position after the decimal point is the tenths place followed by the next position, the hundredths place.

Tens	Ones	.	Tenths	Hundredths
	1	.	1	1

A decimal point is used to separate the numbers 1 or greater from the numbers less than one. The number represented in the place-value chart is 1.11. When you read a decimal number, the decimal point is said as "***and***". This number is read as "*one **and** eleven hundredths*."

Fourth grade students are expected to represent the value of decimals through hundredths. Knowing the place will help you find the value of digits in any number, as well as read and write decimal numbers.

EXAMPLE 1: Write 0.6 on a place-value chart. (Since this number is less than one, there is a zero in the ones place.)

Tens	Ones	.	Tenths	Hundredths
	0	.	6	

The digit **0** is in the *ones* place. The value of the digit is 0.0
The digit **6** is in the *tenths* place. The value of the digit is 0.6 (less than 1)

EXAMPLE 2: Write 0.58 on a place-value chart.

Tens	Ones	.	Tenths	Hundredths
	0	.	5	8

The digit **0** is in the *ones* place. The value of the digit is 0.0
The digit **5** is in the *tenths* place. The value of the digit is 0.5 (less than 1).
The digit **8** is in the *hundredths* place. The value of the digit is 0.08 (less than 1).

EXAMPLE 3: Write 9.47 on a place-value chart.

Tens	Ones	.	Tenths	Hundredths
	9	.	4	7

The digit **9** is in the *ones* place. The value of the digit is 9.0
The digit **4** is in the *tenths* place. The value of the digit is 0.4 (less than 1).
The digit **7** is in the *hundredths* place. The value of the digit is 0.07 (less than 1).

EXAMPLE 4: Write 27.3 on a place-value chart.

Tens	Ones	.	Tenths	Hundredths
2	7	.	3	

The digit **2** is in the *tens* place. The value of the digit is 20.0
The digit **7** is in the *ones* place. The value of the digit is 9.0
The digit **3** is in the *tenths* place. The value of the digit is 0.3 (less than 1)

Standard Form and Word Form of Decimal Numbers

- A number written with one digit for each place-value is in **standard form**.
  The standard form for the number *six tenths* is 0.06.
  The standard form for the number *fifty-eight hundredths* is 0.58
  The standard form for the number *nine and forty-seven hundredths* is 9.47
  The standard form for the number *twenty-seven and three hundredths* is 27.3

- A number written in words is in **word form**.
  The word form for 0.06 is *six tenths*.
  The word form for 0.58 is *fifty-eight hundredths*.
  The word form for 9.47 is *nine and forty-seven hundredths*.
  The word form for 27.3 is *twenty-seven and three hundredths*.

Fourth grade students should be able to read and write decimal numbers in word form, standard form, and expanded form. You will learn about expanded form later in this lesson.

Place-Value to Read and Write Decimal Numbers

When you read numbers, always start on the left.

The number 38.65 is shown in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
3	8	.	6	5

A decimal point separates the part of the number that is greater than 1 from the part of the number that is less than 1. 38.65 is the **standard form**.

The word form of 38.65 is written and said as *thirty-eight and sixty-five hundredths*. (When you write or say a decimal number, the decimal point is written and said as "**and**".)

EXAMPLE 1: Read and write 0.73 in **word form**.
Look at 0.73 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
	0	.	7	3

To read this number:

- first, say the two-digit number to the right of the decimal point ***seventy-three***;
- then, say the name of the last place to the right, ***hundredths***.

0.73 is read as ***seventy-three hundredths***. This is the **word form** of the number.

EXAMPLE 2: Read and write 6.07 in **word form**.
Look at 6.07 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
	6	.	0	7

To read this number:

- first, say the one-digit number to the left of the decimal point ***six***;
- then, say ***and***;
- next, say the two-digit number to the right of the decimal point ***seven***;
- then, say the name of the last place to the right, ***hundredths***.

6.07 is read as ***six and seven hundredths***. This is the **word form** of the number.

EXAMPLE 3: Read and write 13.48 in **word form**.
Look at 13.48 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
1	3	.	4	8

To read this number:

- first, say the two-digit number to the left of the decimal point ***thirteen***;
- then, say ***and***;
- next, say the two-digit number to the right of the decimal point ***forty-eight***;
- then, say the name of the last place to the right, ***hundredths***.

13.48 is read as ***thirteen and forty-eight hundredths***. This is the **word form** of the number.

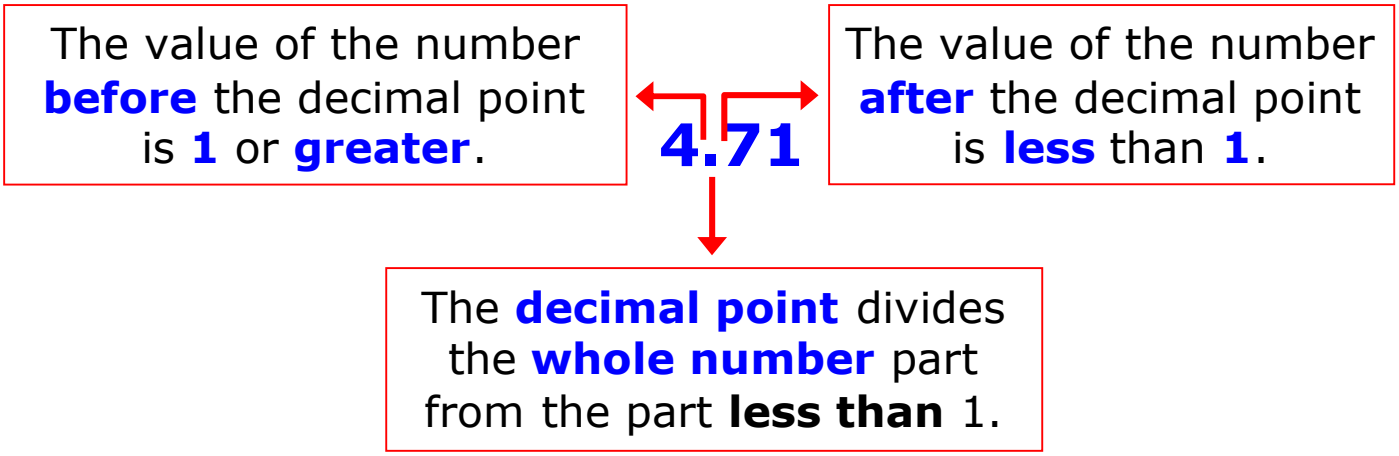
Decimal Place-Value

Every **digit** in a number has a value.

After the ones period in place-value there is a "dot" called a **decimal point**.

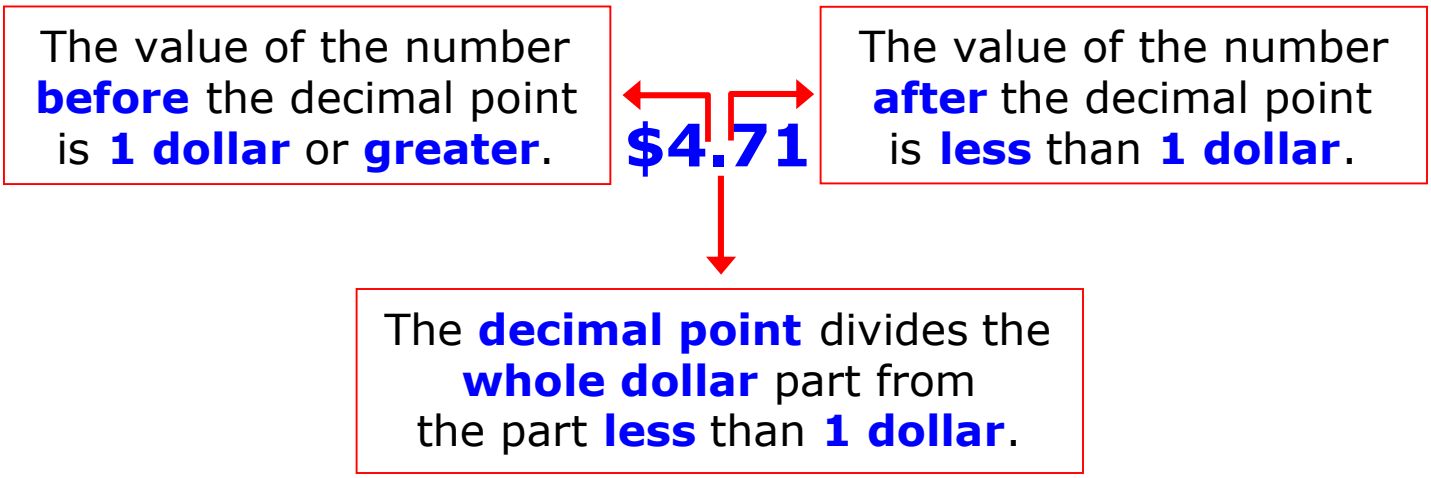
The decimal point is used to separate the whole number part from the part less than one.

The numbers to the right of the **decimal point** are called **decimals**.



Dollar symbols and **decimal points** are used to write money amounts.

One dollar represents 1 whole.

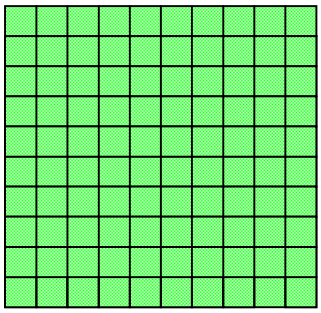


Decimal Place-Value Patterns

Decimals follow the same place-value pattern as whole numbers.

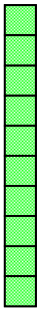
EXAMPLE

Each **place** continues to have the **value** of the place to its right.



1 One

10 times greater than 1 tenth



1 Tenth

10 times greater than 1 hundredth

1 Hundredth

Decimal Place-Value Pattern of Tens

Decimal values are based on the same simple pattern of tens as whole numbers.

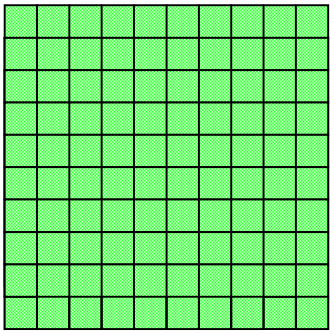
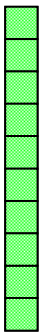
- Each place-value position is ten times the position to its right.
- Each place-value position is one-tenth of the value of the position to its left.

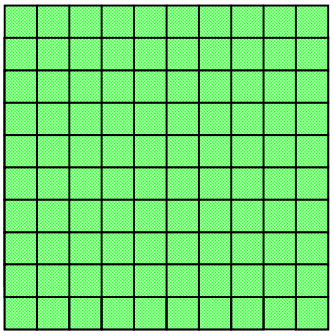
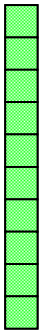
EXAMPLE 1

Base-10 blocks can be used to model the pattern of tens relationships among decimal place-value positions.

The base-10 blocks used to represent decimal place-value positions are some of the same blocks used to represent whole numbers, but their value and description is different for decimals.

- The flat now represents 1 whole, the rod now represents $\frac{1}{10}$, and the small cube now represents $\frac{1}{100}$.

Value	1	$\frac{1}{10}$	$\frac{1}{100}$
Model			
Description	one flat	tenth rod	hundredth cube

Value	1	$\frac{1}{10}$	$\frac{1}{100}$
Model			
Description	one flat	tenth rod	hundredth cube

Each place-value position is ten times the value of the position to its right.

- The one flat is 10 times as much as the tenth rod.
- The tenth rod is 10 times as much as the hundredth cube.

Each place-value position is one tenth of the value of the position to its left.

- The tenth rod is $\frac{1}{10}$ of the one flat.
- The hundredth cube is $\frac{1}{10}$ of the tenth rod.

EXAMPLE 2

Money can be used to model the pattern of tens relationships among decimal place-value positions. A dollar bill represents 1 whole, a dime represents $\frac{1}{10}$, a penny represents $\frac{1}{100}$.

$1.11 is represented in the table.

Value	$1.00	$0.10	$0.01
Model			
Description	dollar	dime	penny

Each place-value position is ten times the value of the position to its right.

- The dollar is 10 times as much as the value of the dime.
- The dime is 10 times as much as the value of the penny.

Each place-value position is one tenth of the value of the position to its left.

- The dime is $\frac{1}{10}$ of the value of the dollar.
- The penny is $\frac{1}{10}$ of the value of the dime.

EXAMPLE 3

Decimal place-value patterns can be used to write numbers that are 10 times as much as or $\frac{1}{10}$ of any given number.

Tens	Ones	.	Tenths	Hundredths
	4	.	4	4

10 times as much as

$\frac{1}{10}$ of

Each place-value position is ten times the value of the position to its right.

- 4 is 10 times as much as 0.4
- 0.4 is 10 times as much as 0.04

Each place-value position is one tenth value of the position to its left.

- 0.04 is $\frac{1}{10}$ of 0.4
- 0.4 is $\frac{1}{10}$ of 4

EXAMPLE 4

A place-value chart can be used to complete a table to record 10 times as much as or $\frac{1}{10}$ of any given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6.0		
0.7		
8.0		
0.9		

Step 1

Write the given numbers in a place value chart.

Tens	Ones	.	Tenths	Hundredths
	6	.	0	
	0	.	7	
	8	.	0	
	0	.	9	

Step 2

Tens	Ones	.	Tenths	Hundredths
	6	.	0	
	0	.	7	
	8	.	0	
	0	.	9	

Use the place-value chart to write a number in the table that is 10 times as much as the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6.0	60	
0.7	7.0	
8.0	80	
0.9	9.0	

Step 3

Tens	Ones	.	Tenths	Hundredths
	6	.	0	
	0	.	7	
	8	.	0	
	0	.	9	

Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number
6.0	60	0.6
0.7	7.0	0.07
8.0	80	0.8
0.9	9.0	0.09

Place-Value Patterns to Read and Write Decimal Numbers

The decimal place-values begin after the ones place and a decimal point.

The first position after the decimal point is the tenths place followed by the next position, the hundredths place.

Tens	Ones	.	Tenths	Hundredths
	1	.	1	1

A decimal point is used to separate the numbers 1 or greater from the numbers less than one.

The number represented in the place-value chart is 1.11.

When you read a decimal number, the decimal point is said as "***and***". This number is read as "*one **and** eleven hundredths*."

Fourth grade students are expected to represent the value of decimals through hundredths. Knowing the place will help you find the value of digits in any number, as well as read and write decimal numbers.

EXAMPLE 1

Write 0.6 on a place-value chart.

(Since this number is less than one, there is a zero in the ones place.)

Tens	Ones	.	Tenths	Hundredths
	0	.	6	

The digit **0** is in the *ones* place. The value of the digit is 0.0.

The digit **6** is in the *tenths* place. The value of the digit is 0.6 (less than 1).

EXAMPLE 2

Write 0.58 on a place-value chart.

Tens	Ones	.	Tenths	Hundredths
	0	.	5	8

The digit **0** is in the *ones* place.
The value of the digit is 0.0.

The digit **5** is in the *tenths* place.
The value of the digit is 0.5 (less than 1).

The digit **8** is in the *hundredths* place.
The value of the digit is 0.08 (less than 1).

EXAMPLE 3

Write 9.47 on a place-value chart.

Tens	Ones	.	Tenths	Hundredths
	9	.	4	7

The digit **9** is in the *ones* place.
The value of the digit is 9.0.

The digit **4** is in the *tenths* place.
The value of the digit is 0.4 (less than 1).

The digit **7** is in the *hundredths* place.
The value of the digit is 0.07 (less than 1).

EXAMPLE 4

Write 29.3 on a place-value chart.

Tens	Ones	.	Tenths	Hundredths
2	9	.	3	

The digit **2** is in the *tens* place.
The value of the digit is 20.0.

The digit **9** is in the *ones* place.
The value of the digit is 9.0.

The digit **3** is in the *tenths* place.
The value of the digit is 0.3 (less than 1).

Standard Form and Word Form of Decimal Numbers

- A number written with one digit for each place-value is in **standard form**.

  The standard form for the number *six tenths* is 0.6.

  The standard form for the number *fifty-eight hundredths* is 0.58.

  The standard form for the number *nine and forty-seven hundredths* is 9.47.

  The standard form for the number *twenty-seven and three hundredths* is 27.03.

- A number written in words is in **word form**.

  The word form for 0.6 is *six tenths*.

  The word form for 0.58 is *fifty-eight hundredths*.

  The word form for 9.47 is *nine and forty-seven hundredths*.

  The word form for 27.03 is *twenty-seven and three hundredths*.

Fourth grade students should be able to read and write decimal numbers in word form, standard form, and expanded form. You will learn about expanded form later in this lesson.

Place-Value to Read and Write Decimal Numbers

When you read numbers, always start on the left.

The number 38.65 is shown in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
3	8	.	6	5

A decimal point separates the part of the number that is greater than 1 from the part of the number that is less than 1.

38.65 is the **standard form**.

The word form of 38.65 is written and said as *thirty-eight and sixty-five hundredths*.

(When you write or say a decimal number, the decimal point is written and said as "**and**".)

EXAMPLE 1

Read and write 0.73 in **word form**.

Look at 0.73 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
	0	.	7	3

To read this number:

- first, say the two-digit number to the right of the decimal point ***seventy-three***;
- then, say the name of the last place to the right, ***hundredths***.

0.73 is read as ***seventy-three hundredths***.

This is the **word form** of the number.

EXAMPLE 2

Read and write 6.07 in **word form**.

Look at 6.07 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
	6	.	0	7

To read this number:

- first, say the one-digit number to the left of the decimal point ***six***;
- then, say ***and***;
- next, say the two-digit number to the right of the decimal point ***seven***;
- then, say the name of the last place to the right, ***hundredths***.

6.07 is read as ***six and seven hundredths***.

This is the **word form** of the number.

EXAMPLE 3

Read and write 13.48 in **word form**.

Look at 13.48 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
1	3	.	4	8

To read this number:

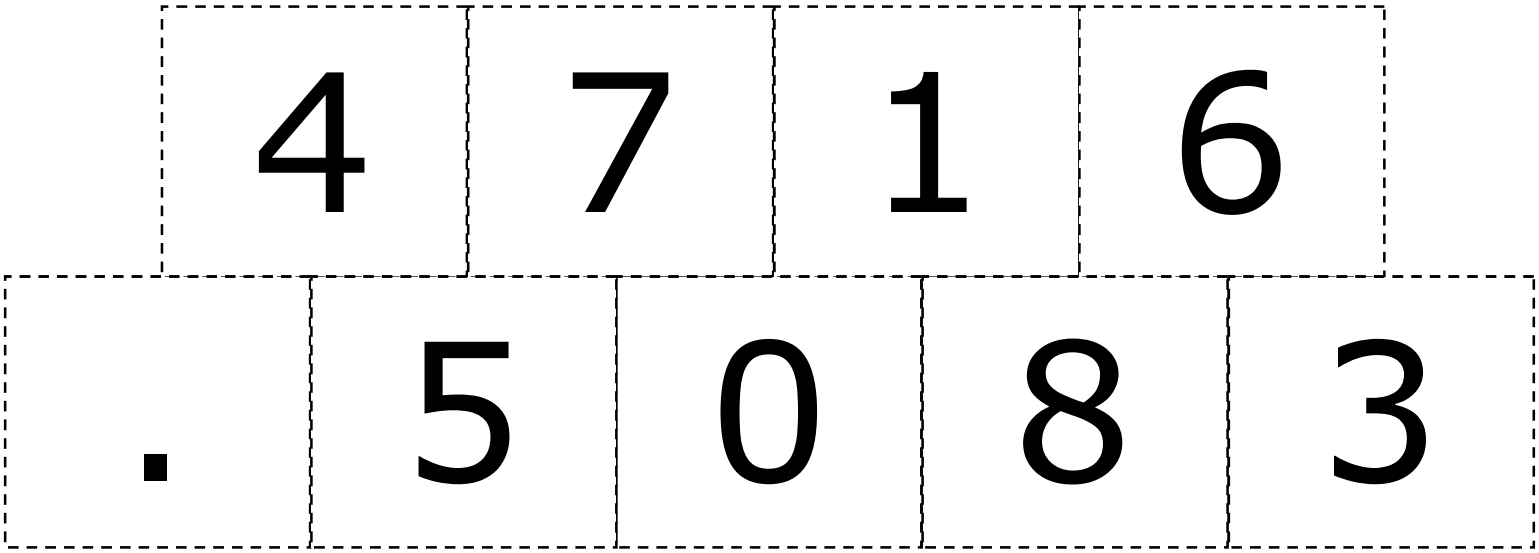
- first, say the two-digit number to the left of the decimal point ***thirteen***;
- then, say ***and***;
- next, say the two-digit number to the right of the decimal point ***forty-eight***;
- then, say the name of the last place to the right, ***hundredths***.

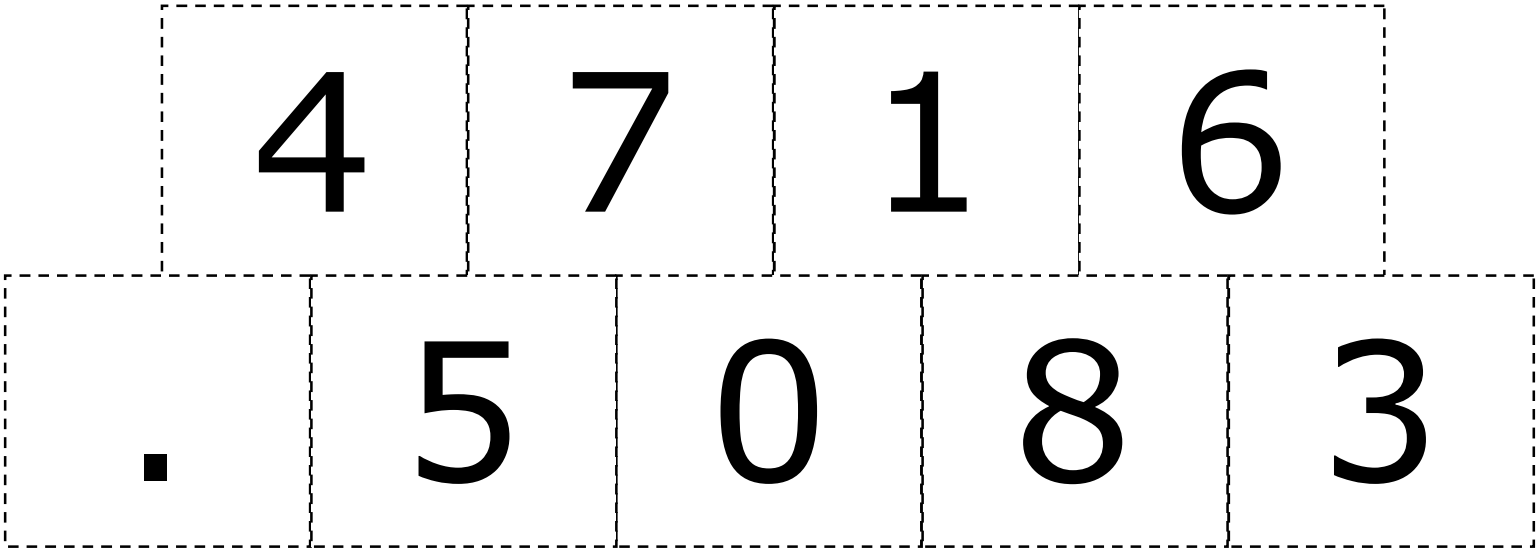
13.48 is read as ***thirteen and forty-eight hundredths***.

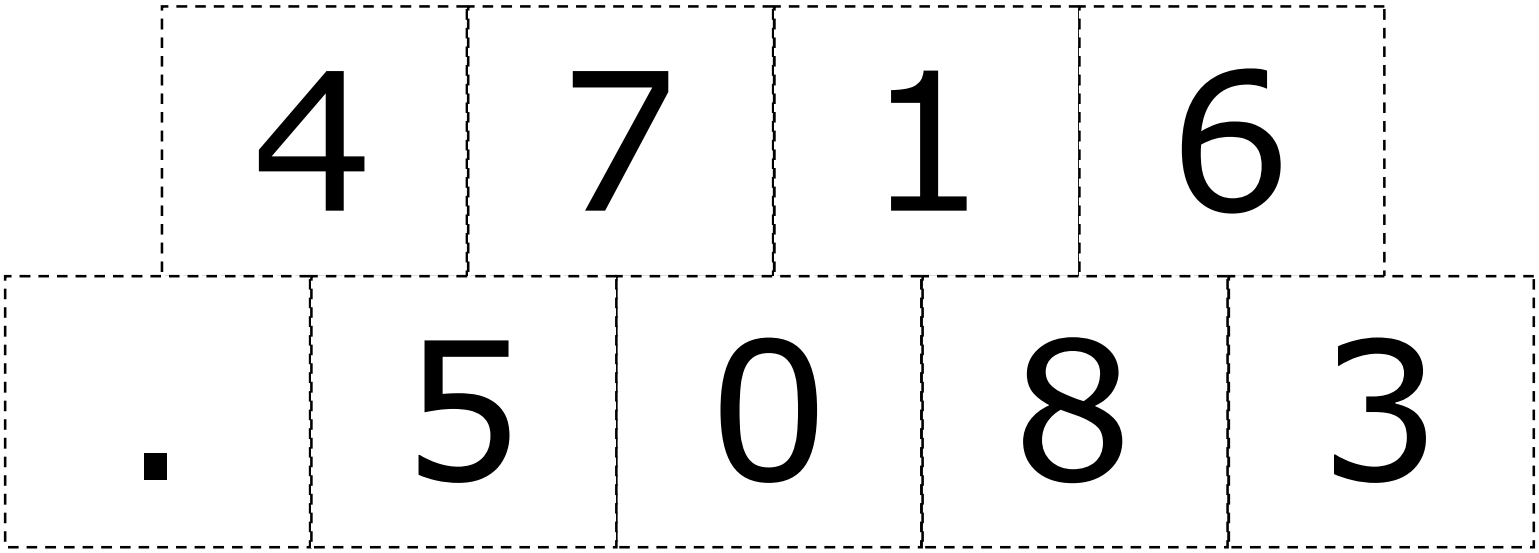
This is the word form **of the number.**

Teacher Notes: Problem-Solving 2

(Make copies of this page on colored cardstock, laminate, and cut apart along the dashed line - this page makes 3 sets - each pair of students needs 1 set.)







Problem-Solving 2

Work with a partner. Your teacher will give you and your partner 8 number cards and a decimal point card.

1. Create the largest number possible using four number cards, placing the decimal point card after a 2-digit whole number, and placing the 3 card in the tens place.
2. Write and read this number in standard and word form.
3. Create the smallest number possible using four number cards, placing the decimal point after a two-digit whole number, and placing the 3 card in the hundredths place.
4. Write and read this number in standard and word form.
5. Write two numbers using 5 of the number cards, the decimal point after a three-digit whole number, and the 0 card in the tenths or hundredths place.
6. Write and read the numbers in standard form and in word form.

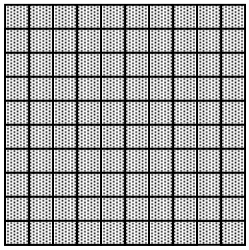
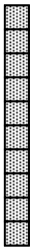
Hands-On Activity 2

DECIMAL NUMBER PLACE-VALUE PATTERNS

Materials: base-10 blocks - 1 flat, 1 rod, 1 small cube

Procedure: Work with a partner. Decide who is Student 1 and who is Student 2.

- Use the base-10 blocks to model place-value positions. Use the flat to represent 1, the rod to represent 0.1, and the small cube to represent 0.01.
- Complete the chart. Write the value and a description for each block.

Value			
Model			
Description			

Now use the blocks to compare and describe the relationship from one place-value position to the next place-value position.

- Student 1: Compare the flat cube to the rod. The flat represents _____, and the rod represents _____. The value of the flat is _____ times as much as the value of the rod.
- Student 2: Compare the rod to the small cube. The rod represents _____, and the small cube represents _____. The value of the rod is _____ times as much as the value of the small cube.

Each place-value position is _____ times the value of the position to its right.

- Student 1: Compare the rod to the flat. The rod represents _____, and the flat represents _____. The value of the rod is _____-_____ of the value of the flat.
- Student 2: Compare the small cube to the rod. The small cube represents _____, and the rod represents _____. The value of the small cube is _____-_____ of the value of the rod.

Each place-value position is _____-_____ of the value of the position to its left.

Teacher Notes: Hands-On Activity 3

Materials: (per pair of students) 1 set of base-10 blocks - 10 flats, 10 rods, and 10 small cubes; 1 Decimal Place-Value Model Mat (be sure to use master in cardstock folder - copy both parts on cardstock, cut out along dashed lines, tape together, laminate, and cut out); 4 Decimal Digits Record sheets; 1 set of Decimal Cards (copy on blue cardstock, copy *TEKSING TOWARD STAAR* logo on back, laminate, cut out and place in baggie)

Procedure:

- Distribute materials to each pair of students.
- Project Decimal Place-Value Models to show how to use base-ten blocks to model the place-value of decimals.
- Project the Decimal Model Mat to show a model for 2.37 and a model for 1.09.

During the activity, roam the room and listen for the following:

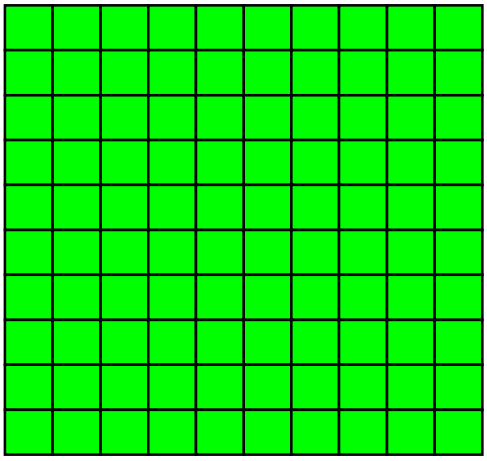
- Do the students read the decimals correctly?
- Can the students clearly describe the strategy used to create their models?
- Can the students identify place-value of decimals through hundredths?
- Can the students explain and give reasons for the decimal models they built?
- Do the students use appropriate mathematical language to indicate an understanding of place-value?

During the activity, roam the room and look for the following:

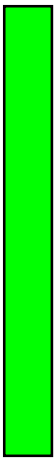
- Can the students use base-ten blocks to model decimals involving tenths and hundredths?
- Do the students demonstrate a grasp of the number system and place-value for decimals?
- Can the students read and model decimals when at least one of the digits is 0?
- Can the students identify the values in the different places in a decimal?

Decimal Place-Value Models

- Base-ten blocks can be used to model decimal place-value.
- The flat represents 1.



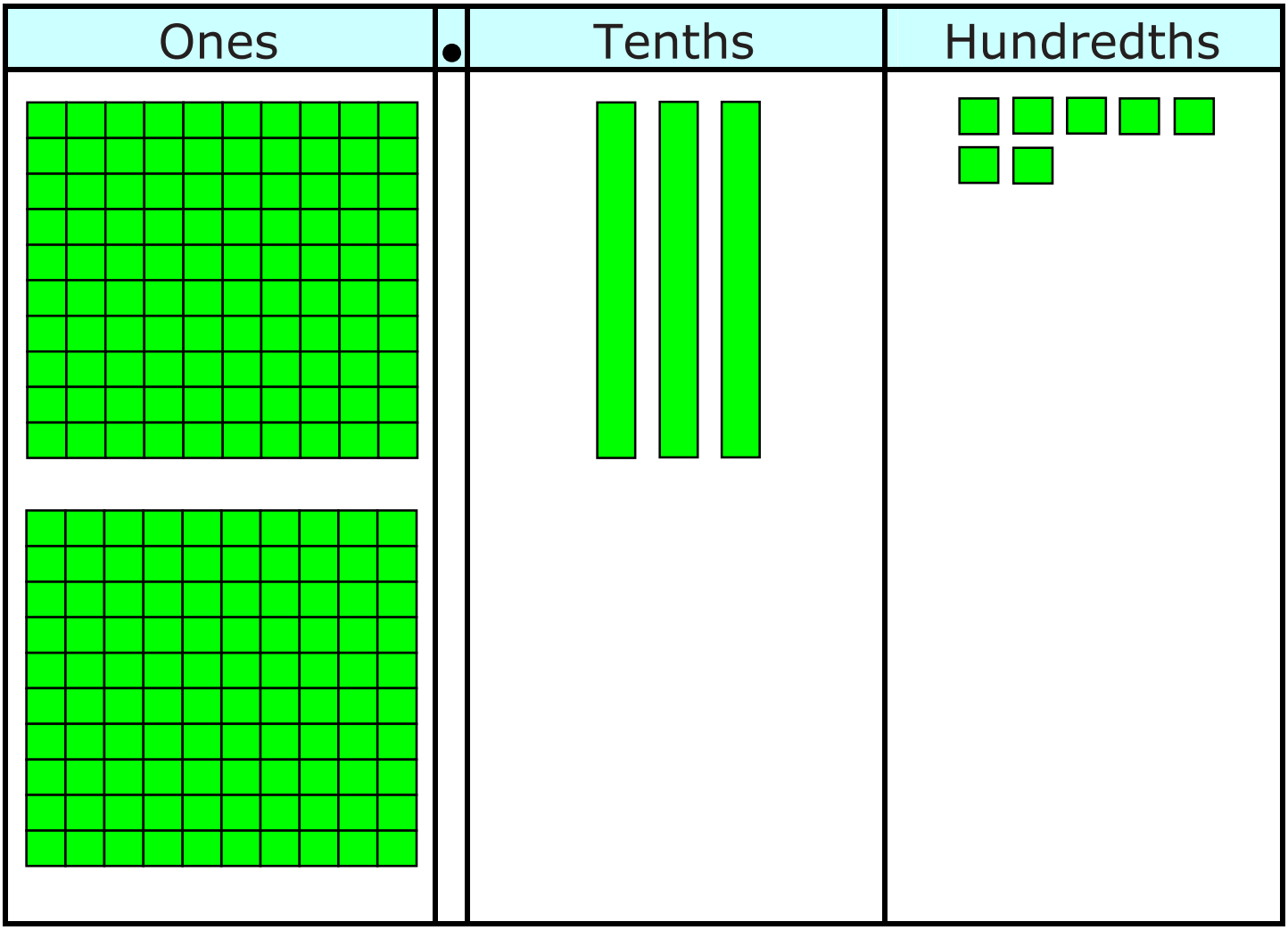
- The rod represents 1 tenth or 0.1.



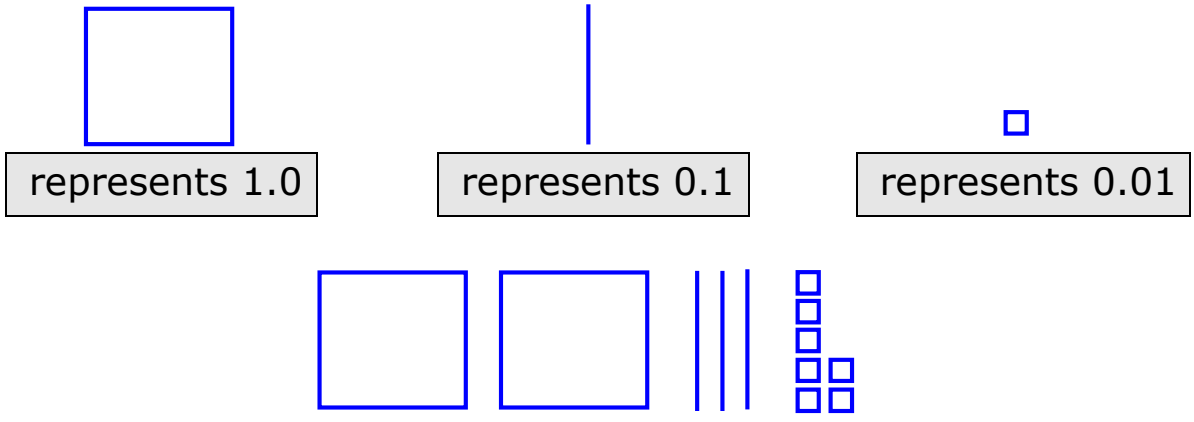
- The small cube represents 1 hundredth or 0.01.

Decimal Place-Value Model Mat

Use base-10 blocks to model 2.37.



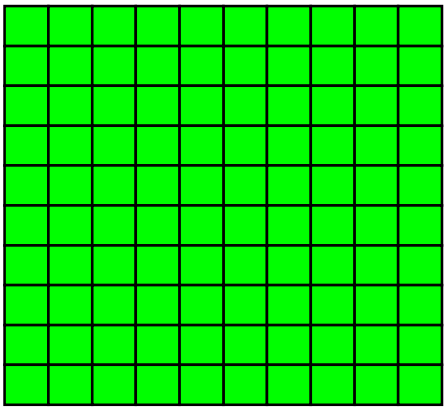
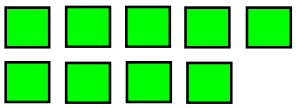
Use symbols to make a quick sketch of the model.



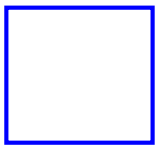
The model shows 2.37 in standard form and *two and thirty-seven hundredths* in word form.

Decimal Place-Value Model Mat

Use base-10 blocks to model 1.09

Ones	.	Tenths	Hundredths
			

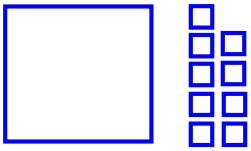
Use symbols to make a quick sketch of the model.



represents 1.0

represents 0.1

represents 0.01

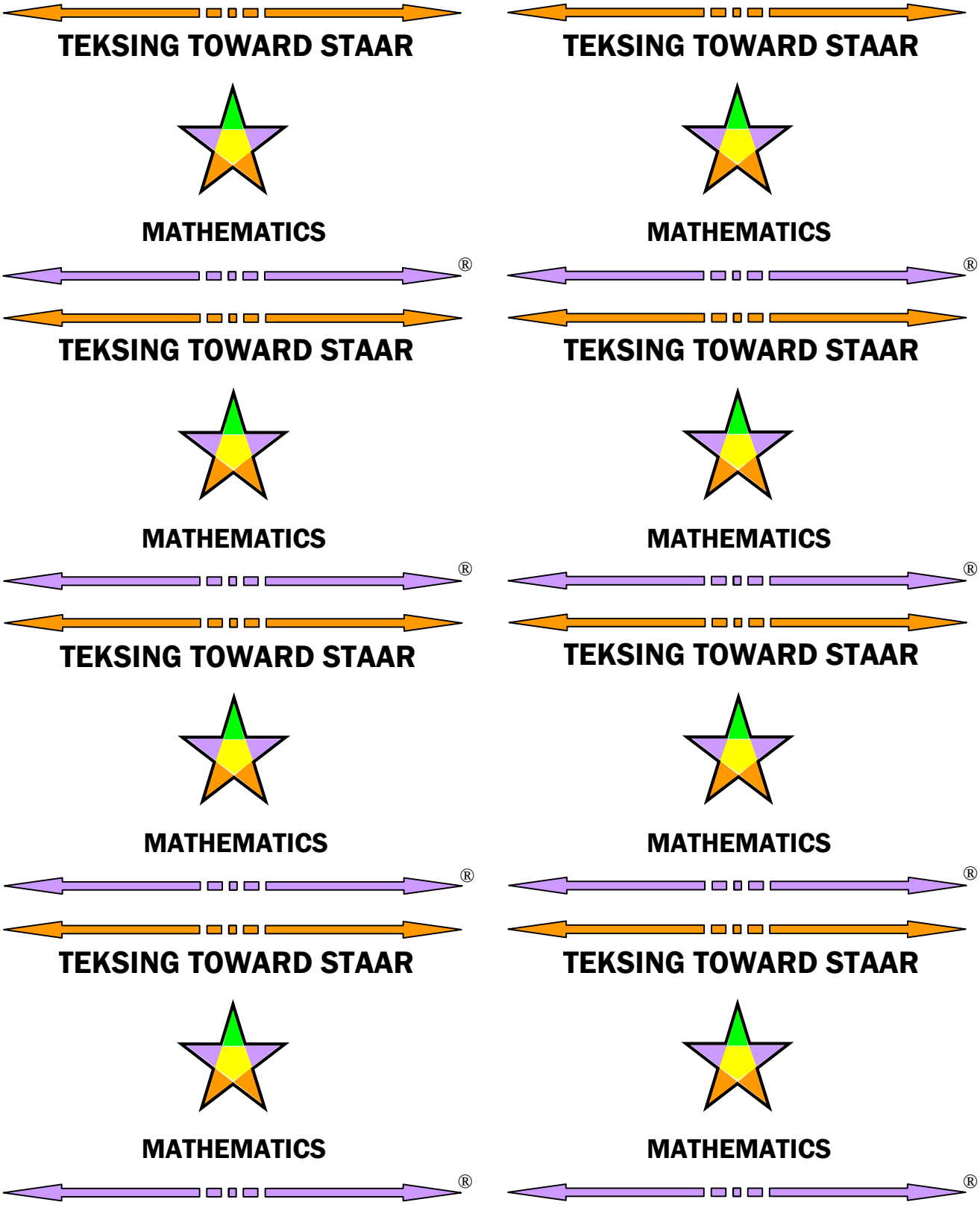


The model shows 1.09 in standard form and *one and nine hundredths* in word form.

DECIMAL CARDS

1.74	3.46
4.07	5.29
0.69	0.09
0.8	0.7

(Copy on back of decimal cards)



Decimal Digits Record

Number on Card _______	Value of Each Place		
Sketch of Model	**Ones**	**Tenths**	**Hundredths**
	Number in Words		

Number on Card _______	Value of Each Place		
Sketch of Model	**Ones**	**Tenths**	**Hundredths**
	Number in Words		

Number on Card _______	Value of Each Place		
Sketch of Model	**Ones**	**Tenths**	**Hundredths**
	Number in Words		

Number on Card _______	Value of Each Place		
Sketch of Model	**Ones**	**Tenths**	**Hundredths**
	Number in Words		

Hands-On Activity 3

Decimal Place-Value Digits

Materials: 1 set of base-ten blocks, 1 Decimal Place-Value Digits Record per student, 1 set of Decimal Cards per pair

Procedure: Work with a partner.

PART I

- Decide who is Student 1 and who is Student 2.
- Student 1 organizes the base-ten blocks in the center of the work area.
- Student 2 places Decimal Cards face down in a stack in the work area.
- Student 1 takes a Decimal Card from the top of the stack and shows the number to Student 2.
- Student 1 and Student 2 record the number on the Decimal Place-Value Digits Record.
- Student 2 uses the Decimal Place-Value Model Mat and base-ten blocks to model the decimal on the card.
- Student 1 decides if the model is correct, then both students sketch the model on the Decimal Place-Value Digits Record.
- Both students record the value of each place on the Decimal Place-Value Digits Record. **Example:** for 1.29 record you would record the following:

Ones	Tenths	Hundredths
1.0	0.2	0.09

- Both students record the number in words on the Decimal Place-Value Digits Record.
- Student 2 returns the base-ten blocks to the center of the work area and Student 2 places the Decimal Card in a discard stack.
- Student 2 takes a Decimal Card from the top of the stack and shows the number to Student 1.
- Student 1 and Student 2 record the number on the Decimal Place-Value Digits Record.
- Student 1 uses the Decimal Place-Value Model Mat and base-ten blocks to model the decimal on the card.
- Student 2 decides if the model is correct, then both students sketch the model on the Decimal Place-Value Digits Record.
- Both students record the value of each place on the Decimal Place-Value Digits Record.
- Both students record the number in words on the Decimal Place-Value Digits Record.
- Student 1 returns the base-ten blocks to the center of the work area and Student 1 places the Decimal Card in a discard stack.
- Repeat Part I until all the Decimal Cards have been drawn and the Decimal Digits Record is completed for all 8 cards.

PART II

Work with a partner to answer the following questions.

- How did you and your partner decide which blocks to use to model your numbers?

- Could you use two different collections of base-ten blocks to model any of the numbers on the decimal cards? _____ Which numbers? _____ Explain your answer.

- Which of the models you recorded used the fewest number of blocks? _____ Why?

- How did you and your partner decide how to record the value of each place of a number on the Decimal Digits Place-Value Record?

- How did you and your partner decide how to write the decimal numbers in word?

- What did you learn from this activity?

Student Activity 2

Work with a partner to complete Student Activity 2.

PROBLEM 1: Use a place-value chart to complete the table to record 10 times as much as or $\frac{1}{10}$ of the given numbers. Given numbers: 5.0, 0.3, 8.0, 0.4

Step 1: Write the given number in a place-value chart.

Tens	Ones	.	Tenths	Hundredths
		.		
		.		
		.		
		.		

Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

Each place-value position is _____ times the value of the position to its right.

Each place-value position is _____-_____ of the value of the position to its left.

PROBLEM 2: Decimals follow the same place-value pattern as _____ numbers. No matter what place you are look at, its value is _____ times the value of the place to its right.

The number _____._____ is shown in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
3	6	.	4	5

- The tens place is _____ times the _____ place.
- The value of the 3 in the tens place is _____ .
- The _____ place is _____ times the tenths place.
- The value of the 6 in the ones place is _____.
- The tenths place is _____ times the _____ place.
- The value of the _____ in the tenths place is _____.
- The value of the 5 in the _____ place is 0.05.

PROBLEM 3: Look at the decimal below:

0.3

- The decimal point separates the _____ part of the number from the _____ part of the number.
- There is a _____ to the left of the decimal point, so there are _____ wholes.
- There is a _____ to the right of the decimal point. This means _____ out of _____ parts.

The number 0.3 is read: _____ *tenths*.

NAME_____ DATE_____ SCORE ___/5

4.2A/4.2B Skills and Concepts Homework 2

1. Use a place-value chart to complete the table to record 10 times as much as or $\frac{1}{10}$ of the given numbers. Given numbers: 7.0, 0.2, 3.0, 0.4

   Step 1: Write the given number in a place-value chart.

Tens	Ones	.	Tenths	Hundredths
		.		
		.		
		.		
		.		

   Step 2: Use the place-value chart to write a number in the table that is 10 times as much as the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

   Step 3: Use the place-value chart to write a number in the table that is $\frac{1}{10}$ of the given number.

Given Number	10 times as much as given number	$\frac{1}{10}$ of given number

   Each place-value position is _____ times the value of the position to its right.

   Each place-value position is _____-_____ of the value of the position to its left.

2. What is the place-value position of the digit 8 in 0.98? _____
   Explain how you know your answer is correct.

3. Look at the decimal below:

0.71

- The decimal point separates the _____ part of the number from the

  _____ part of the number.

- There is a _____ to the left of the decimal point, so there are _____ wholes.

- There is a _____ to the right of the decimal point. This means _____ out of _____ parts.

The number 0.71 is read: _____-_____ *hundredths*.

4. A fourth grade student finished a race on Field Day in 9.84 seconds.

   What is the value of the 4 in 9.84? _____

   Explain how you know your answer is correct.

5. What is the value of 9 in 42.96? _____

   Explain how you know your answer is correct.

Math Background Part III - Writing Numbers in Expanded Notation

Understanding how to write numbers in **expanded form**, or **expanded notation**, is another way to help you understand place-value. Expanded form or expanded notation is a way to write numbers to show the value of each digit.

EXAMPLE 1: Write 904,586 in expanded notation.

Look at 904,586 in the place-value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	0	4	5	8	6

$9 \times 100{,}000 + 0 \times 10{,}000 + 4 \times 1{,}000 + 5 \times 100 + 8 \times 10 + 6 \times 1$

- The digit 9 is in the hundred thousands place so it represents 9 hundred thousands and has a value of 900,000.
- The digit 0 is in the ten thousands place so it represents 0 ten thousands and has a value of 0.
- The digit 4 is in the thousands place so it represents 4 thousands and has a value of 4,000.
- The digit 5 is in the hundreds place so it represents 5 hundreds and has a value of 500.
- The digit 8 is in the tens place so it represents 8 tens and has a value of 80.
- The digit 6 is in the ones place so it represents 6 ones and has a value of 6.

The value of the number 904,586 is 900,000 + 0 + 4,000 + 500 + 80 + 6.

EXAMPLE 2: Write 94.56 in expanded notation.

Look at 94.56 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
9	4		5	6

$9 \times 10 + 4 \times 1 + 5 \times 0.1 + 6 \times 0.01$

The place-value chart shows the value of each digit.

- The digit 9 is in the tens place so it represents 9 tens and has a value of 90.
- The digit 4 is in the ones place so it represents 4 ones and has a value of 4.
- The digit 5 is in the tenths place so it represents 5 tenths and has a value of 0.05
- The digit 6 is in the hundredths place so it represents 6 hundredths and has a value of 0.06

The value of the number 94.56 is 90 + 4 + 0.5 + 0.06

Writing Numbers in Expanded Notation

Writing numbers in **expanded form**, or **expanded notation**, is another way to help you understand place-value.

Expanded form or expanded notation is a way to write numbers to show the value of each digit.

EXAMPLE 1

Write 904,586 in expanded notation.

Look at 904,586 in the place-value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	0	4	5	8	6

$9 \times 100{,}000 + 0 \times 10{,}000 + 4 \times 1{,}000 + 5 \times 400 + 8 \times 10 + 6 \times 1$

The chart shows the value of each digit.

- The digit 9 is in the hundred thousands place so it represents 9 hundred thousand and has a value of 900,000.
- The digit 0 is in the ten thousands place so it represents 0 ten thousands and has a value of 0.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	0	4	5	8	6

$9 \times 100{,}000 + 0 \times 10{,}000 + 4 \times 1{,}000 + 5 \times 400 + 8 \times 10 + 6 \times 1$

- The digit 4 is in the thousands place so it represents 4 thousands and has a value of 4,000.
- The digit 5 is in the hundreds place so it represents 5 hundreds and has a value of 500.
- The digit 8 is in the tens place so it represents 8 tens and has a value of 80.
- The digit 6 is in the ones place so it represents 6 ones and has a value of 6.

The value of the number 904,586 is

900,000 + 0 + 4,000 + 500 + 80 + 6

EXAMPLE 2

Write the number 94.56 in expanded notation.

Look at 94.56 in the place-value chart.

Tens	Ones	.	Tenths	Hundredths
9	4	.	5	6

$9 \times 10 + 4 \times 1 + 5 \times 0.1 + 6 \times 0.01$

The place-value chart shows the value of each digit.

- The digit 9 is in the tens place so it represents 9 tens and has a value of 90.
- The digit 4 is in the ones place so it represents 4 ones and has a value of 4.
- The digit 5 is in the tenths place so it represents 5 tenths and has a value of 0.05
- The digit 6 is in the hundredths place so it represents 6 hundredths and has a value of 0.06

The value of the number 94.56 is

$$90 + 4 + 0.5 + 0.06$$

Problem-Solving 3

The table below shows the lengths of several different types of sharks a marine biology class measured off the shore in Galveston, Texas.

Type of Shark	Length
Bonnethead	0.9 meters
Blackfin	1.78 meters
Sandbar	1.5 meters
Blacknose	0.83 meters

1. What is the expanded notation for the length of the bonnethead shark?

2. What is the expanded notation for the length of the blackfin shark?

3. What is the expanded notation for the length of the sandbar shark?

4. What is the expanded notation for the length of the blacknose shark?

5. What is the word form for the length of the bonnethead shark?

6. What is the word form for the length of the blackfin shark?

Type of Shark	Length
Bonnethead	0.9 meters
Blackfin	1.78 meters
Sandbar	1.5 meters
Blacknose	0.83 meters

7. What is the word form for the length of the sandbar shark?

8. What is the word form for the length of the blacknose shark?

9. What is the value of the digit 8 in the length of the blackfin shark?

10. What is the value of the digit 3 in the length of the blacknose shark?

11. What is the value of the digit 1 in the length of the sandbar shark?

12. What is the value of the digit 9 in the length of the bonnethead shark?

Teacher Notes: Hands-On Activity 4

Materials: (per student) 1 page of 4 Decimal Expanded Form Strips (copy page on white paper - students will cut out their strips - each page makes 4 strips)

Procedure:

- Distribute materials to each pair of students.
- Project Decimal Expanded Form Strips Instructions for this activity.

During the activity, roam the room and listen for the following:

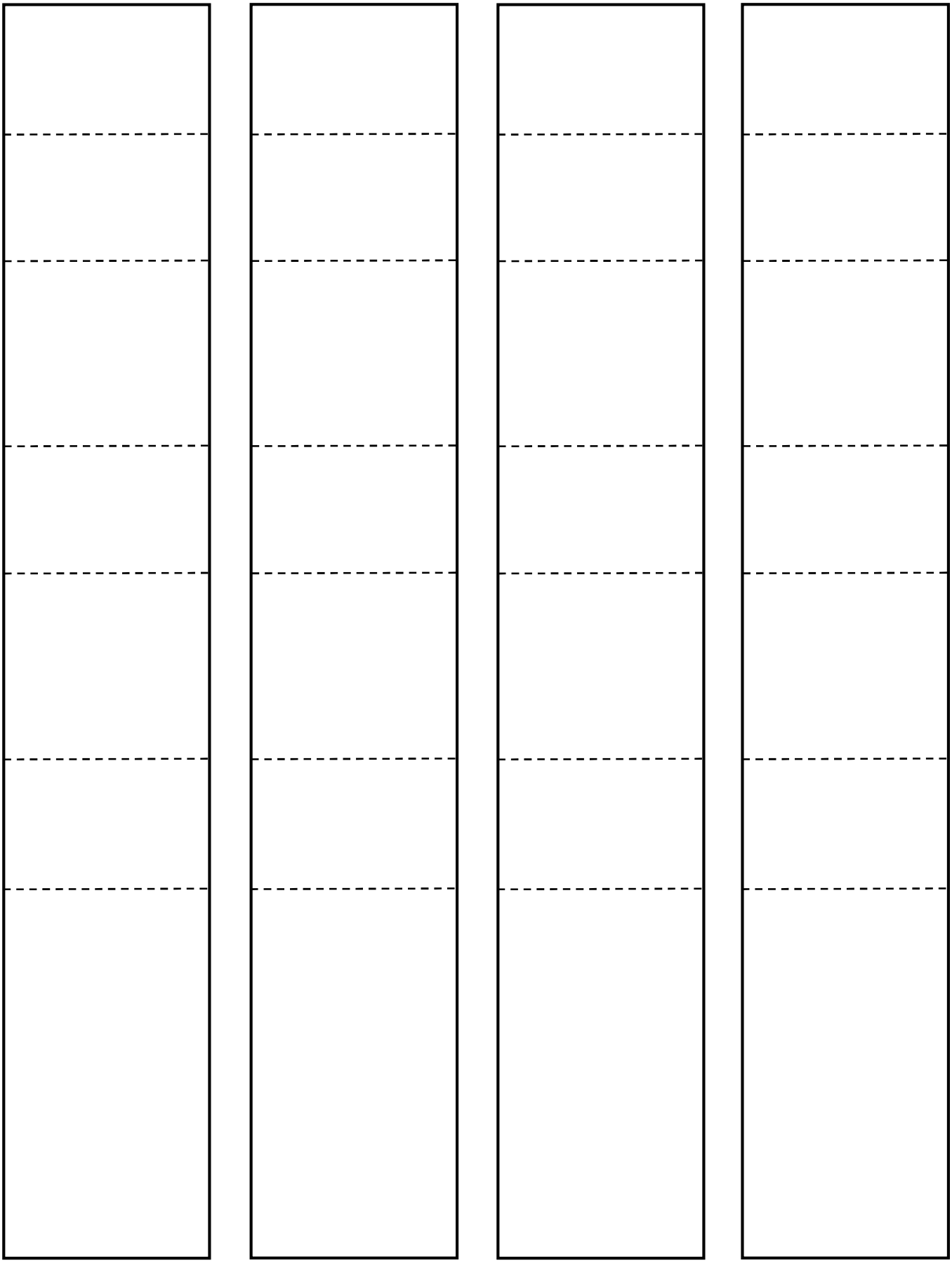
- Do the students understand how to find the place-value of a digit using its place-value position?
- Can the students describe the expanded form of decimals through hundredths?
- Can the students identify place-value of decimals through hundredths?
- Can the students explain and give reasons for the value of each place?
- Do the students use appropriate mathematical language to indicate understanding of place-value?

During the activity, roam the room and look for the following:

- Can the students use Decimal Expanded Form Strips to model decimals involving tenths and hundredths?
- Do the students demonstrate a grasp of the number system and place-value for decimals?
- Can the students read and model decimals when at least one of the digits is 0?
- Can the students identify the values in the different places in a decimal?

Decimal Expanded Form Strips

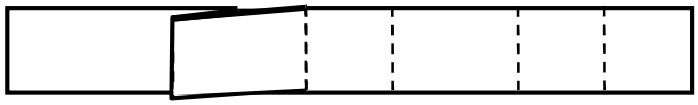
(Copy 1 page on colored paper for each student - students will cut strips along dark lines to make 4 separate strips)



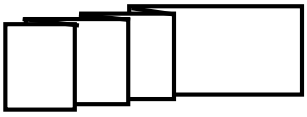
Decimal Expanded Form Strips Instructions

- Cut out each of the 4 strips on the page. Cut along the dark lines only.
- Place 1 strip in front of you on your work area. Place the largest rectangle to the left.

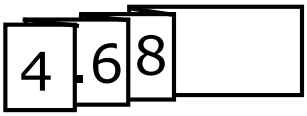
- Fold along the first two dashed lines on the left. Keep the largest rectangle to the left.



- Continue folding along the dashed lines, then turn the strip around so that the largest rectangle on the right.



- Write 4, 6 and 5 on the strip, writing one digit in each place as shown. Place a decimal point before the 6.



- Unfold your strip. Use numbers and symbols to write 4 + 0.6 + 0.08 as shown. Your strip represents the expanded form of 4.68

4	+	0.6	+	0.08	=	4.68

- Use your last 3 strips to represent the expanded form of: 9.57 5.53 2.09

Student Activity 3

Work with a partner to complete Student Activity 3.

PROBLEM 1: Write 250,497 in expanded notation.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

__ × _____ + __ × _____ + __ × _____ + __ × _____ + __ × ____ + __ × __

The place-value chart shows the value of each digit.

- The digit ___ is in the hundred thousands place so it represents ___ hundred thousands and has a value of _____.
- The digit ___ is in the ten thousands place so it represents ___ ten thousands and has a value of _____.
- The digit ___ is in the thousands place so it represents ___ thousands and has a value of _____.
- The digit ___ is in the hundreds place so it represents ___ hundreds and has a value of _____.
- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.

The value of 250,497 is _____ + _____ + _____ + _____ + ___ + __.

PROBLEM 1: Write 83,208 in expanded form.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

__ × _____ + __ × _____ + __ × _____ + __ × ____ + __ × __

The place-value chart shows the value of each digit.

- The digit ___ is in the ten thousands place so it represents ___ ten thousands and has a value of _____.
- The digit ___ is in the thousands place so it represents ___ thousands and has a value of _____.
- The digit ___ is in the hundreds place so it represents ___ hundreds and has a value of _____.
- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.

The value of 83,208 is _____ + _____ + _____ + _____ + ___ + __.

EXAMPLE 3: Write 30.75 in expanded notation.

Tens	Ones	.	Tenths	Hundredths

__ × ___ + __ × __ + __ × ____ + __ × _____

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____

The value of 30.75 is _____ + __ + _____ + _____

EXAMPLE 4: Write 8.07 in expanded form.

Tens	Ones	.	Tenths	Hundredths

__ × __ + __ × ____ + __ × _____

The place-value chart shows the value of each digit.

- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____

The value of 8.07 is _____ + __ + _____ + _____

EXAMPLE 5: Write 9.33 in expanded notation.

Tens	Ones	.	Tenths	Hundredths

__ × __ + __ × ____ + __ × _____

The place-value chart shows the value of each digit.

- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____

• The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____

The value of 9.33 is _____ + __ + _____ + _____

EXAMPLE 6: Write 73.08 in expanded notation.

Tens	Ones	.	Tenths	Hundredths

__ × ___ + __ × __ + __ × ____ + __ × _____

The place-value chart shows the value of each digit.

• The digit ___ is in the tens place so it represents ___ tens and has a value of _____.

• The digit ___ is in the ones place so it represents ___ ones and has a value of ___.

• The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____

• The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____

The value of 73.08 is _____ + __ + _____ + _____

EXAMPLE 7: Write 50.05 in expanded notation.

Tens	Ones	.	Tenths	Hundredths

__ × ___ + __ × __ + __ × ____ + __ × _____

The place-value chart shows the value of each digit.

• The digit ___ is in the tens place so it represents ___ tens and has a value of _____.

• The digit ___ is in the ones place so it represents ___ ones and has a value of ___.

• The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____

• The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____

The value of 50.05 is _____ + __ + _____ + _____

NAME_____ DATE_____ SCORE ___/5

4.2A/4.2B Skills and Concepts Homework 3

1. Write seventy-four thousand, two hundred forty-three in standard form. _____
   Write this number in expanded form.

   Explain why you know your answer is correct.

2. Write a number in standard form that has the same value as 50 + 3.0 + 0.4 + 0.01
   _____ Explain why you know your answer is correct.

3. Write seventy-three and eight hundredths in standard form. _____
   Write this number in expanded form.

   Explain why you know your answer is correct.

4. Write 763,456 in expanded notation.

   Explain why you know your answer is correct.

5. Write a number in standard form that has the same value as 40 + 6.0 + 0.08
   _____ Explain why you know your answer is correct.

Teacher Notes: Hands-On Activity 5

Materials: 1 Place-Value Game Board per student, 1 10-section spinner per group of 4 (copy the spinner on cardstock and laminate), 1 sharp pencil and 1 small paper clip for each group to make the pointer for the spinner

Procedure: Students work in groups of 4.

- Distribute a 10-section spinner to each group of 4 students. The students will use a sharp pencil and a paper clip formed as shown on the spinner page to make the pointer for the spinner.
- Students complete Hands-On Activity 4.

Ask the following question before the students begin working on the activity:

How can you make the greatest number and win the Place-Value Game?

Listen for the following as you roam the room during the activity:

- Do the students accurately read the 6-digit numbers? Do they use the appropriate number naming patterns? (**NOTE:** Students should use "and" only to indicate a decimal point, so they should not be using "and" when they read a number in this game.)
- Do the students clearly describe the strategy used to create large numbers?
- Do the students use ideas of place-value to explain and justify his or her strategies and responses?

Look for the following as you roam the room during the activity:

- Do the students demonstrate a good grasp of the number system and place-value?
- Do the students use place-value and patterns in number relationships to compare and order 6-digit numbers?
- Do the students demonstrate an understanding of place-value in strategies for the game?
- Can the students identify the different values of the different places in a number?
- Do the students recognize the relative values of the places in a number (e.g., each place is ten times greater than the place on its right?

PLACE-VALUE GAME BOARD

ROUND 1

_____ _____ _____, _____ _____ _____

ROUND 2

_____ _____ . _____

ROUND 3

_____ _____ . _____ _____

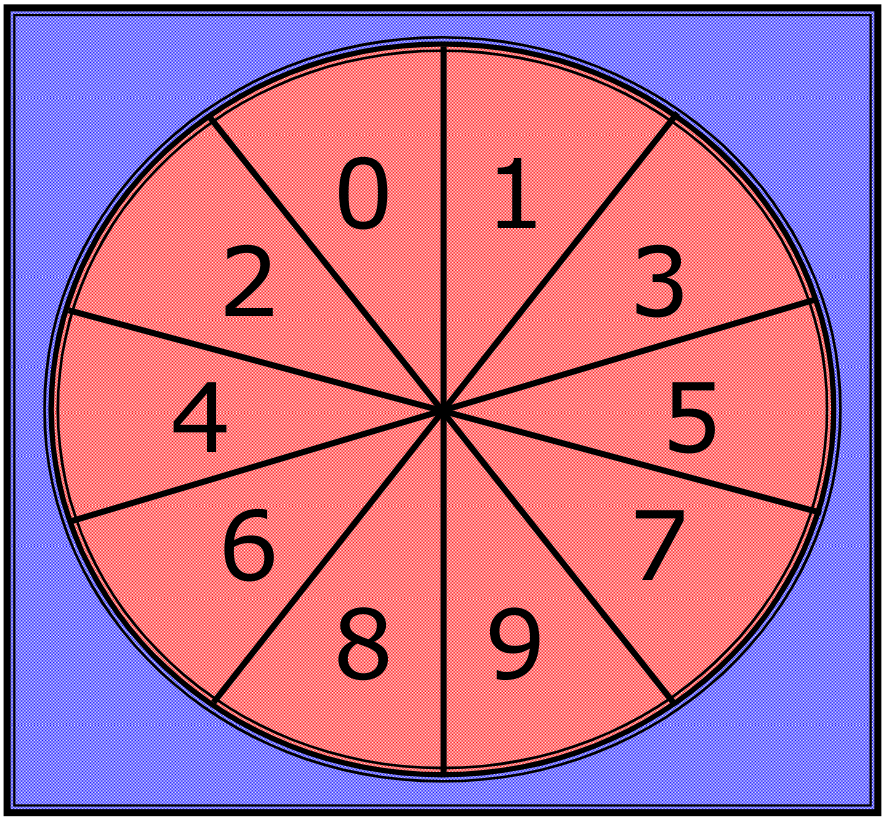
ROUND 4

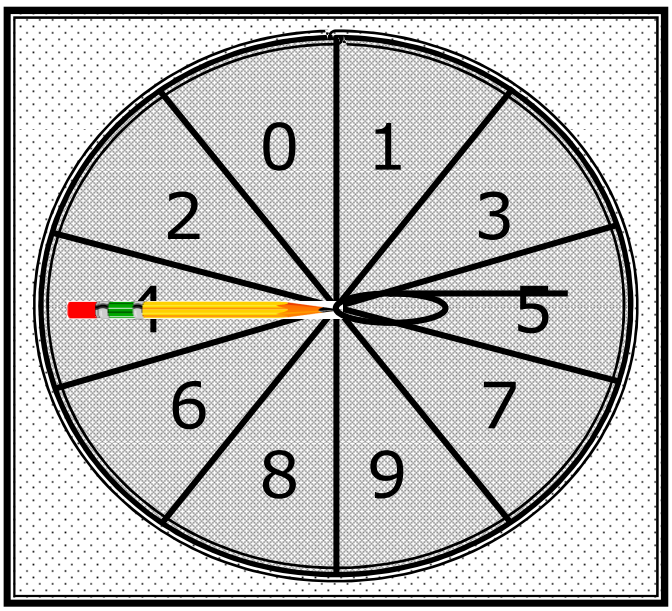
_____ _____, _____ _____ _____

ROUND 5

_____ . _____ _____ _____

PLACE-VALUE GAME SPINNER





Shape a paper clip to form the pointer.

Place the point of a pencil in the center of the pointer and in the center of the spinner.

Spin the paper clip around the pencil point.

Hands-On Activity 5

Place-Value Game

Materials: Place=Value Game Board per student, 10-section spinner per group of 4

Procedure – Round 1

- Work in groups of 4. Your teacher will give you 1 spinner for your group. Each student in the group will record on their own Place-Value Game Board.
- Each student will spin the spinner. The student that spins the lowest number is Student 1. The student that spins the next lowest number is Student 2. The student that spins the highest number is Student 3. The student that spins the next highest number is Student 4.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.

  EXAMPLE: Student 1 rolls a 7. Each student writes a 7 in one of the places on their Place-Value Game Board - ROUND 1.

  ___ **7** ___, ___ ___ ___

- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 2

- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 3

- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 4

- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 5

- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place-Value Game Board. Once the digit is written, it cannot be erased or moved.

Place-Value Game Questions - Part 1

Answer the following questions about your Place-Value Game Board.

- Write the number you wrote for Round 1 in expanded form in the space below.

- Write the number you wrote for Round 2 in expanded form in the space below.

- Write the number you wrote for Round 3 in expanded form in the space below.

- Write the number you wrote for Round 4 in expanded form in the space below.

- Write the number you wrote for Round 5 in expanded form in the space below.

- Rearrange the digits in your number with the least value to make the number with the greatest possible value.

  _____

  Explain how you know this is the number with the greatest value.

- Rearrange the digits in your number with the greatest value to make the number with the least possible value.

  _____

  Explain how you know this is the number with the least possible value.

Place-Value Game Questions - Part 2

Work with your group of 4 to answer the following questions.

- Which Student in your group wrote the number with the greatest value in Round 1?

  _____ How do you know this is the number with the greatest value?

- Which Student in your group wrote the number with the greatest value in Round 3?

  _____ How do you know this is the number with the greatest value?

- Which Student in your group wrote the number with the least value in Round 2?

  _____ How do you know this is the number with the least value?

- Which Student in your group wrote the number with the least value in Round 4?

  _____ How do you know this is the number with the least value?

NAME_____ DATE_____ SCORE ___/10

4.2A/4.2B Mini-Assessment

1. Which number has a 9 in the place-value position that is $\frac{1}{10}$ of the value of the ten millions place?

   A 291,807,623

   B 98,531,044

   C 928,784,312

   D 89,162,751

---

2. Lance had 4 one-dollar bills. He went to the bank and exchanged the 4 one-dollar bills for 40 dimes. What is the relationship between the value of 1 dollar and the value of 1 dime?

   F The 1 in \$1.00 is one place to the left of the 1 in \$0.10, so the 1 in \$1.00 represents $\frac{1}{10}$ of the value of the 1 in \$0.10.

   G The 1 in \$1.00 is one place to the right of the 1 in \$0.10, so the 1 in \$1.00 represents 10 times the value of the 1 in \$0.10.

   H The 1 in \$1.00 is one place to the left of the 1 in \$0.10, so the 1 in \$1.00 represents $\frac{1}{100}$ of the value of the 1 in \$0.10.

   J The 1 in \$1.00 is one place to the left of the 1 in \$0.10, so the 1 in \$1.00 represents 10 times the value of the 1 in \$0.10.

---

3. The number 430 is $\frac{1}{10}$ of what number?

   A 4,300

   B 43

   C 4

   D 43,000

4. A runner finished a race in 9.83 seconds. What is the value of the digit 3 in 9.83?

   F 3 tenths

   G 3 hundredths

   H 3 ones

   J 3 tens

---

5. Denton received 3.25 inches of snow and DeSoto received 1.25 inches of snow during a winter storm in 2014. Which of the following is true about 3.25 and 1.25?

   A The value of the 2 in both numbers is 2 hundredths.

   B The value of the 1 in both numbers is 1 hundred.

   C The value of the 2 in both numbers is 2 tenths.

   D The value of the 5 in both numbers is 5 tens.

---

6. Which of the following shows 37.9 written in expanded notation?

   F 30 + 7 + 0.09

   G 37 + 0.9

   H 30 + 7 + 0.9

   J 3 + 0.7 + 0.09

---

7. What is the value of the 5 in the number 356,048?

   A (5 x 100,000)

   B (5 x 1,000)

   C (5 x 10,000)

   D (5 x 10)

8. The city of Chicago received 13.4 inches of snow during a snow storm in 2014. Which of the following shows 13.4 written in expanded notation?

   F 10 + 3 + 0.04

   G 10 + 3 + 0.4

   H 10 + 0.3 + 0.04

   J 10 + 3 + 4

---

9. What is the value of the 2 in the number 346,578.29?

   A (2 x 100)

   B (2 x 10)

   C (2 x 0.1)

   D (2 x 0.01)

---

10. Which of the following is the number 30.41 written in expanded form?

    F 3 + 0.4 + 0.01

    G 30 + 4 + 0.1

    H 3 + 4 + 0.1

    J 30 + 0.4 + 0.01

Lesson 6

4.5A/4.5B LESSON & ASSESSMENT

Lesson Focus

For TEKS 4.5A students are expected to represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity. The focus for this lesson is addition and subtraction with whole numbers.

For TEKS 4.5B students are expected to represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence. The focus for this lesson is addition and subtraction number pattern rules.

For these TEKS students should be able to apply mathematical process standards to develop concepts of expressions and equations.

For STAAR Category 2 students should be able to demonstrate an understanding of how to perform operations and represent algebraic relationships.

Process Standards Incorporated Into Lesson

4.1.A Apply mathematics to problems arising in everyday life, society, and the workplace.

4.1.C Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.

4.1.D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

4.1.E Create and use representations to organize, record, and communicate mathematical ideas.

4.1.F Analyze mathematical relationships to connect and communicate mathematical ideas.

Materials Needed for Lesson

1. Hands-On Activity 1

Per group of 4 students: 1 set of Relationship Cards (copy each page on cardstock – copy the problem cards in one color and the expression/equation cards in a different color, copy the *TEKSING TOWARD STAAR* logo on back of each page, then cut apart), 1 number cube

Vocabulary for Lesson

PART I	PART I	PART II	PART II	PART II
symbol	strip diagram	number pattern	rule	relationship
variable		term	sequence	
expression		position	input-output table	
equation		value	function	

Math Background Part I - Describing Addition and Subtraction Relationships

Relationships can be described mathematically by replacing words and sentences with numbers, symbols, expressions, and equations. Describing relationships with numbers, symbols, expressions, and equations can help to solve problems.

Symbols, Variables, and Expressions

- A **symbol** is something that represents something else in mathematics.
  The symbol **+** means add. The symbol **–** means subtract.
- If something varies, that means it changes. Most things, like your height and weight, do not stay the same. In mathematics, to describe things that change, or vary, letters are used instead of numbers. When a letter is used this way, it is called a **variable**. Any letter in the alphabet can be used as a **variable**.

  EXAMPLES :
  n (number of inches tall you are)
  t (amount of time you spend on homework)
  c (number of cents in your pocket)
- In language, an expression can be a short way to describe an idea or feeling.

  In mathematics, an **expression** is a short way to describe an amount.

  An **expression** is a **variable** or combination of variables, numbers, and symbols that represents a mathematical relationship.

  Sometimes an expression is just a number, like 6.

  Sometimes an expression is just a variable, like *w*.

  Sometimes an expression is a combination of numbers, variables, and operations, like $6 + 3$ or $n - 3$.

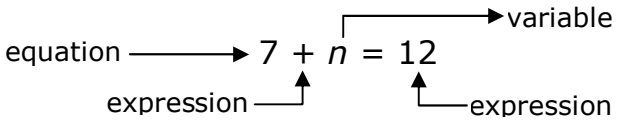
Writing Addition and Subtraction Expressions

To write an expression that describes what is going on in a word problem, think about the problem in words. Use numbers when you know what they are. Use variables when you do not know the numbers.

Problem	Expression in Words	Expression
A fourth grade class has 3 more boys than girls. Write an **expression** to represent how many boys are in the class.	The number of boys is three more than the number of girls. g = number of girls	$g + 3$
A school bus carrying 9 students is at a bus stop. No more students got on, but some of the students got off. Write an **expression** to represent the number of students left on the bus.	The number of students left on the bus is 9 minus the number of students who got off. n = number of students who got off	$9 - n$

Writing Addition and Subtraction Equations

An **equation** is a mathematical sentence that tells you that two expressions are equal.



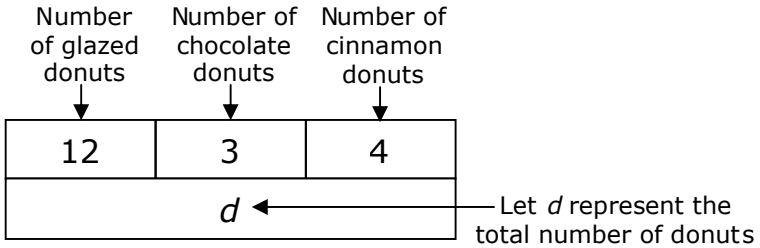
To write an equation, think about which two amounts are equal in a problem. Then write an expression for each amount.

Problem	Equal Expressions in Words	Equation
A gift box weighs 6 ounces when empty. When the gift is placed in the inside, the box weighs 28 ounces. Write an equation to represent the weight of the gift.	6 ounces + weight of gift = 28 ounces	$6 + w = 28$
Elliott gave away 7 of her stuffed animals. She has 35 animals left. Write an equation to represent the number of stuffed animals Elliott has before she gave 7 away.	total animals − 7 animals = 35 animals	$a - 7 = 35$

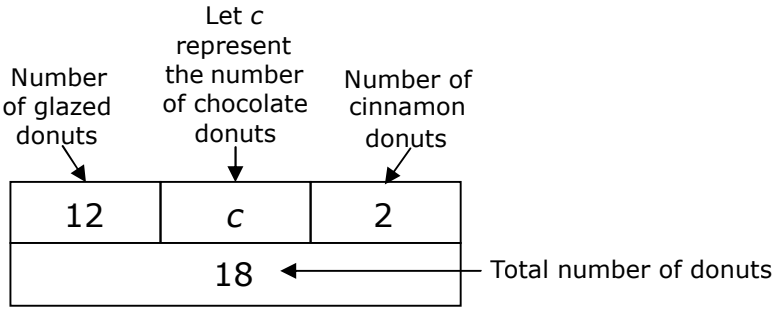
Strip Diagrams

A strip diagram can be used to represent addition or subtraction problem situations.

EXAMPLE 1: Michelle has one dozen glazed donuts, 3 chocolate covered donuts, and 4 cinnamon covered donuts. How many donuts does Michelle have?

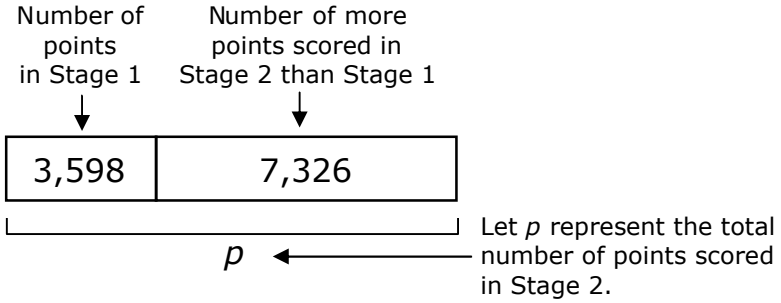


EXAMPLE 2: Miguel has 18 donuts. He has one dozen glazed donuts, some chocolate donuts, and 2 cinnamon donuts. How many chocolate donuts does he have?



EXAMPLE 3: Jackson scored 3,598 points in Stage 1 of a new computer game. He scored 7,326 more points in Stage 2 than he scored in the Stage 1. How many total points did Jackson score in the game?

- Find how many points Jackson scored in Stage 2.
  Use a strip diagram to represent the number of points Jackson scored in Stage 2.



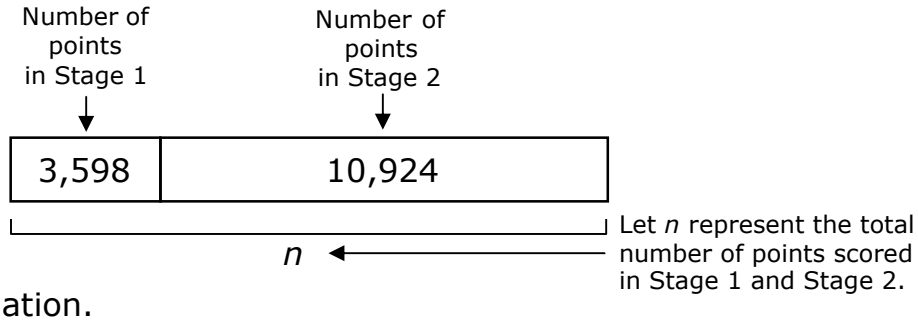
Write an equation.

$$3{,}598 + 7{,}326 = p$$

Solve the equation.

$$10{,}924 = p$$

- Find how many total points Jackson scored in the game.
  Use a strip diagram to represent the total points Jackson scored in the game.



Write an equation.

$$3{,}598 + 10{,}924 = n$$

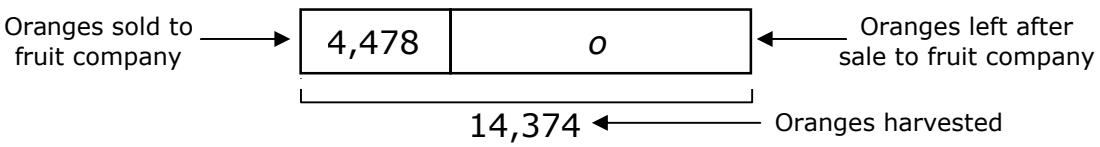
Solve the equation.

$$14{,}522 = n$$

So, Jackson scored 14,522 points in the game.

EXAMPLE 4: During the citrus harvest in the Texas Valley, 14,374 oranges were picked on a citrus farm. First, he sold 4,478 oranges to a fruit company. Then he sold 3,224 oranges in his fruit stands. How many oranges are left to sell from this harvest?

- Find how many oranges were left to sell.
  Use a strip diagram to represent the number of oranges left after the sale to the fruit company.



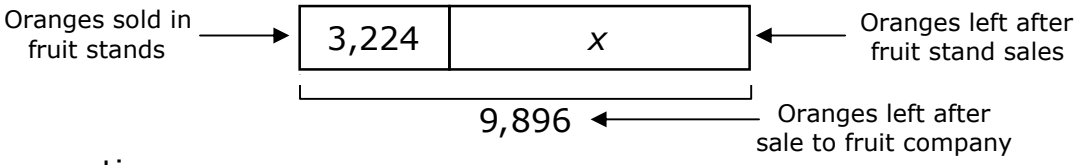
Write an equation.

$$14{,}347 - 4{,}478 = o$$

Solve the equation.

$$9{,}896 = o$$

- Find how many oranges were left after the sale to the fruit company.
  Use a strip diagram to represent the number of oranges left after the fruit stand sales.



Write an equation.

$$9{,}896 - 3{,}224 = x$$

Solve the equation.

$$6{,}672 = x$$

So, 6,672 oranges are left to sell from this harvest.

Describing Relationships

Relationships can be described mathematically by replacing words and sentences with numbers, symbols, expressions, and equations. Describing relationships with numbers, symbols, expressions, and equations can help to solve problems.

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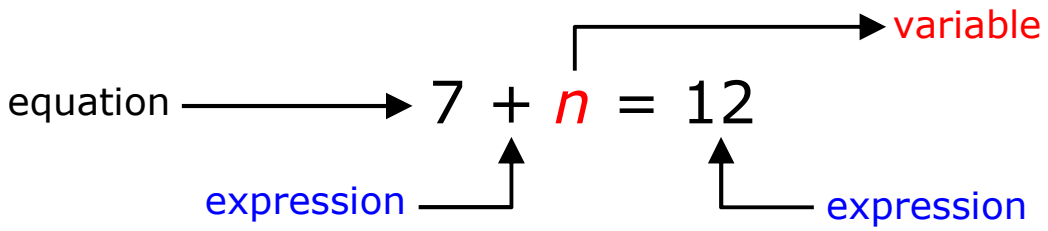
Writing Equations

An **equation** is a mathematical sentence that tells you that two expressions are equal.



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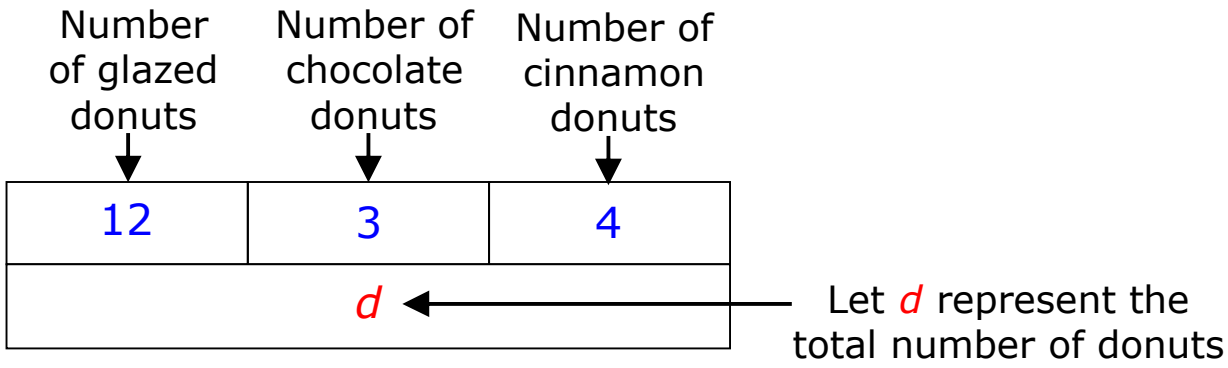
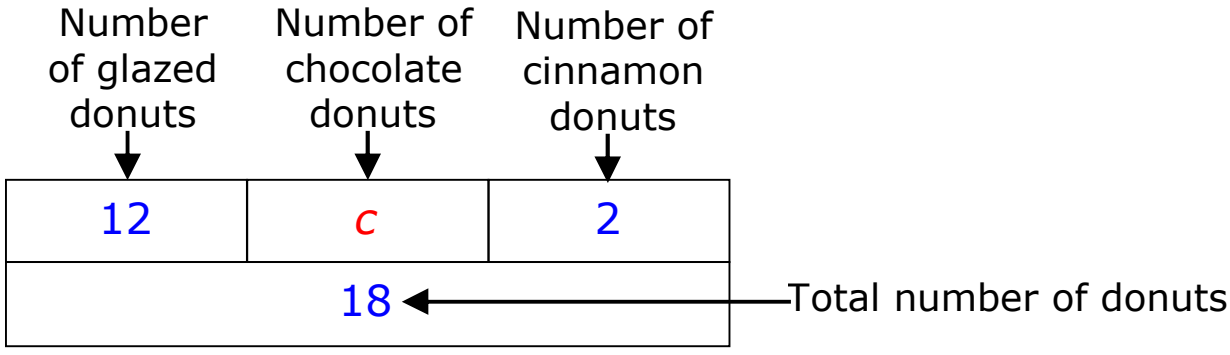
Michelle has one dozen glazed donuts, 3 chocolate covered donuts, and 4 cinnamon covered donuts. How many donuts does Michelle have?



EXAMPLE 2

Miguel has 18 donuts. He has one dozen glazed donuts, some chocolate donuts, and 2 cinnamon donuts. How many chocolate donuts does he have?



EXAMPLE 3

Jackson scored 3,598 points in Stage 1 of a new computer game. He scored 7,326 more points in Stage 2 than he scored in the Stage 1. How many total points did Jackson score in the game?

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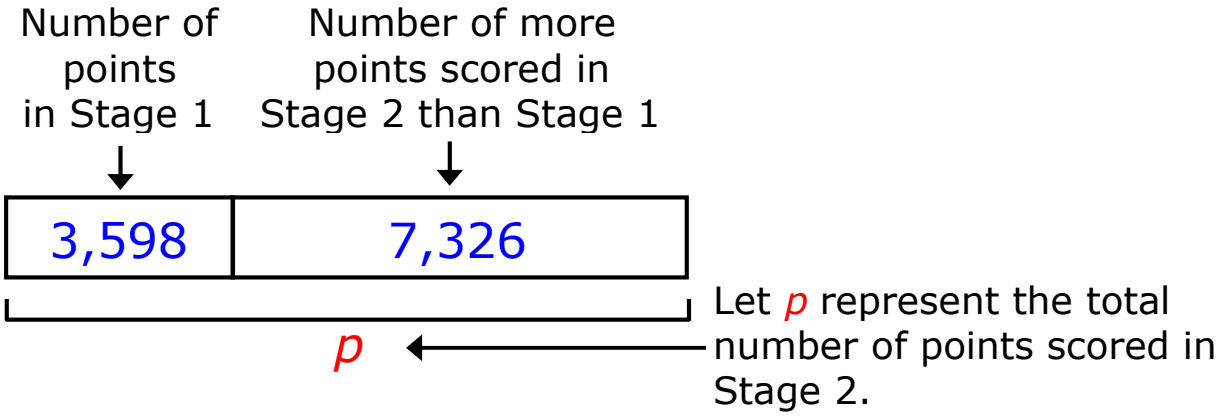


Write an equation.

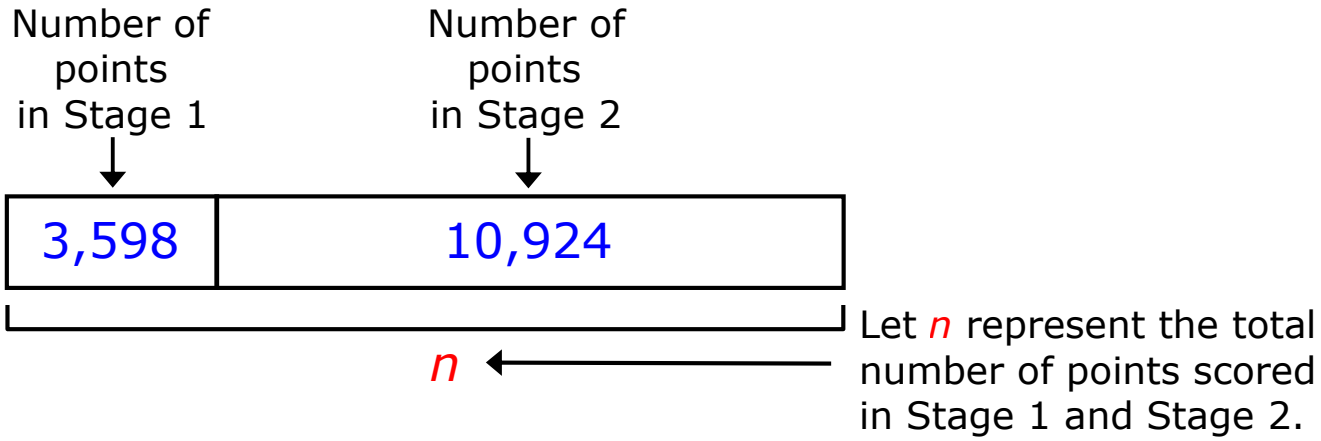
$$3{,}598 + 7{,}326 = p$$

Solve the equation.

$$10{,}924 = p$$

- Find how many total points Jackson scored in the game.

  Use a strip diagram to represent the total points Jackson scored in the game.



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Solve the equation.

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During the citrus harvest in the Texas Valley, 14,374 oranges were picked on a citrus farm. First, he sold 4,478 oranges to a fruit company. Then he sold 3,224 oranges in his fruit stands. How many oranges are left to sell from this harvest?

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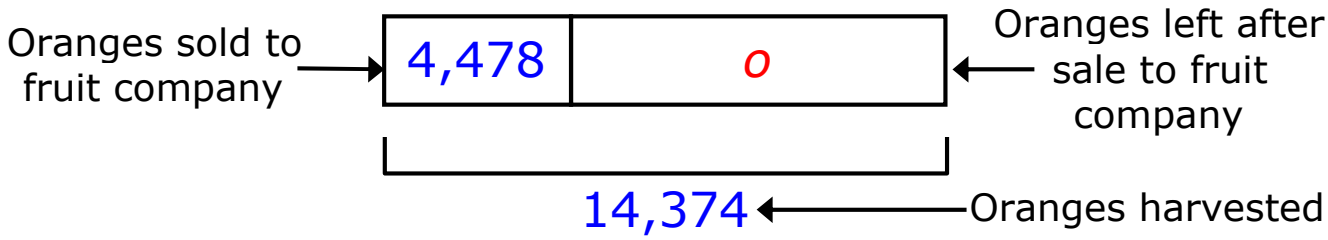

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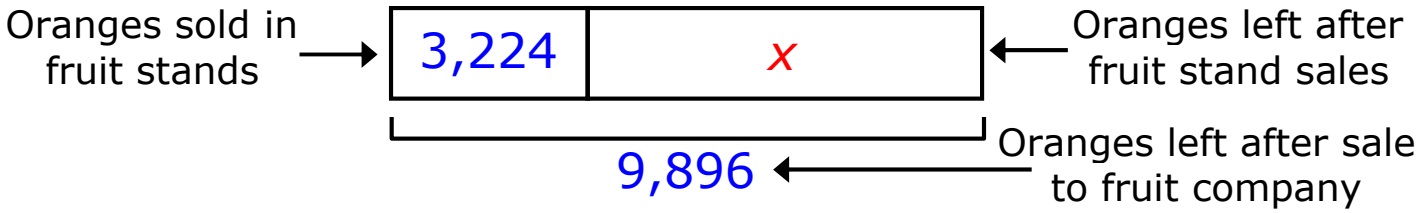


Write an equation.

$$9{,}896 - 3{,}224 = x$$

Solve the equation.

$$6{,}672 = x$$

So, 6,672 oranges are left to sell from this harvest.

Problem-Solving 1

PROBLEM 1

Bertie had 48 yards of fabric. She used 12 yards when she made a quilt. Then she used 28 yards when she made some curtains.

1. Make a strip diagram to represent how much fabric Bertie has left.

2. Write an equation to represent how much fabric Bertie has left.

PROBLEM 2

Carlos has 19 baseball cards, and Dan has 11 more baseball cards than Carlos. Tommy has 8 less baseball cards than Dan has.

1. Make a strip diagram to represent the number of baseball cards that Tommy has.

2. Write an equation to represent the number of baseball cards that Tommy has.

Teacher Notes: Hands-On Activity 1

Materials: 1 set of Relationship Cards per group of 4 students (copy each page on cardstock – copy the problem cards in one color and the expression/equation cards in a different color, then cut apart), 1 number cube per group of 4 students

Procedure:

- Organize students into groups of 4.
- Give each group of 4 one set of Relationship Cards and a number cube.
- Students place the set of cards facedown in a stack in the center of their work area.
- Students play Relationship Rally as outlined in Hands-On Activity 1.

Ask these questions after you have distributed the Relationship Cards and before students begin playing the game:

- What are some different ways to represent a problem situation?

Listen for the following as you roam the room during the activity:

- Do students clearly describe and justify the different representations that fit the problem situation?
- Do students use appropriate mathematical language to describe the expressions and equations?

Look for the following as you roam the room during the activity:

- Do the students correctly match diagrams, expressions, equations, and verbal descriptions for each problem situation?

Answers to these questions can be used to support decisions related to further whole class instruction or group and individual student instruction during tutorial settings.

RELATIONSHIP CARDS - 1

(Copy on cardstock, copy *TEKSING TOWARD STAAR* logo on back, then cut apart along the dashed lines. Copy the problem situation cards on one color and the expression/equation cards on a different color.)

Rene is 3 years younger than Cindy. Cindy is 11 years old. How old is Rene?	Six students get off the school bus. How many students are left on the bus? Let ***s*** represent the number of students on the bus before the six students got off
Chris is 5 inches taller than Sean. Sean is 44 inches tall. How tall is Chris?	Roberta is 6 years older than Dana. Dana is 10 years old. How old is Roberta?
Wendy paid $14 for a tape and a CD. The CD cost $9. How much did the tape cost? Let ***c*** represent the cost of the tape	Lauren had a full bag of 24 marbles until she lost 7 marbles. How many marbles does Lauren have now?
There are 4 more girls than boys in the class. How many girls are in the class? Let ***b*** represent the number of boys	Maria is two years younger than Bill. How old is Maria? Let ***b*** represent Bill's age
Sandy is 4 years older than Max. Sandy is 9 years old. How old is Max? Let ***m*** represent Max's age	Samantha is 2 inches shorter than Ben. Samantha is 48 inches tall. What is Ben's height?

RELATIONSHIP CARDS - 2

(Copy on cardstock, copy *TEKSING TOWARD STAAR* logo on back, then cut apart along the dashed lines. Copy the problem situation cards on one color and the expression/equation cards on a different color.)

Together a notebook and a pen cost $6. The pen cost $2. What is the cost of the notebook?	24 people are seated on a bus. Five people stand up. How many people are seated now?
Number *m* is increased by 4. What is the number?	A number is 8 less than number *g*. What is the number?
Pete bought 1 dozen eggs, but 5 eggs were broken when he got home. How many eggs did he have left?	Twelve is subtracted from a number. The new number is 29. What is the original number? Let ***n*** represent the original number
A number is added to 9. The sum of the numbers is 23. What number was added to 9? Let ***n*** represent the number added to 9	Gina bought 36 cookies. She took 28 cookies to a party. How many cookies does she have left?
Nigel had 12 tennis balls. He bought 9 more tennis balls. How many tennis balls does he have now?	Jana has one full bag of marbles and 6 extra marbles. How many marbles does Jana have? Let ***f*** represent a full bag of marbles

RELATIONSHIP CARDS - 3

(Copy on cardstock, copy *TEKSING TOWARD STAAR* logo on back, then cut apart along the dashed lines. Copy the problem situation cards on one color and the expression/equation cards on a different color.)

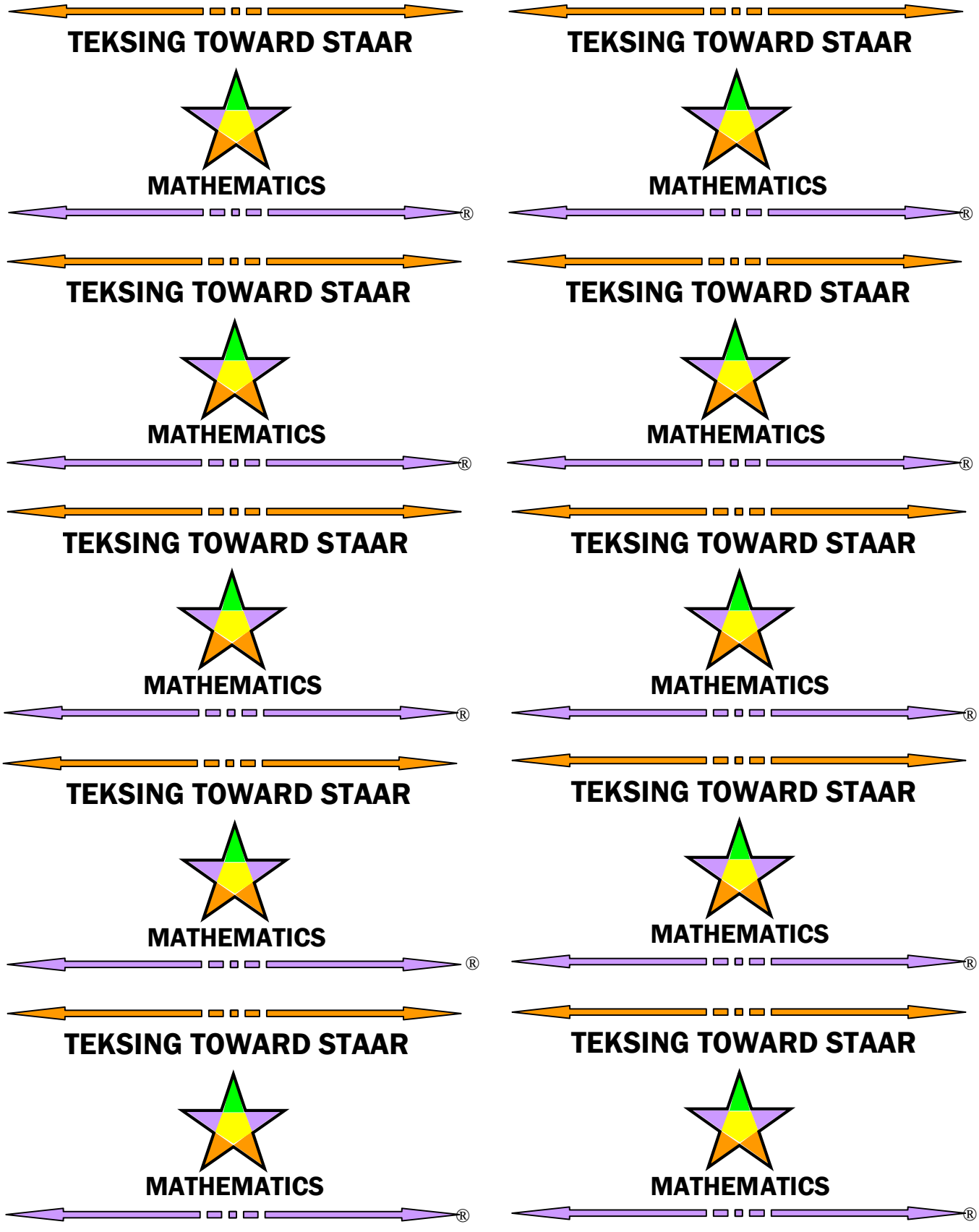
$11 - 3$	$44 + 5$
$24 - 7$	$10 + 6$
$b - 2$	$b + 4$
$s - 6$	$48 + 2$
$14 - 9 = c$	$f + 6$

RELATIONSHIP CARDS - 4

(Copy on cardstock, copy *TEKSING TOWARD STAAR* logo on back, then cut apart along the dashed lines. Copy the problem situation cards on one color and the expression/equation cards on a different color.)

$m = 9 - 4$	$m + 4$
$24 - 5$	$9 + n = 23$
$6 - 2$	$12 + 9$
$g - 8$	$12 - 5$
$n - 12 = 29$	$36 - 28$

Copy logo on back of each page of the Relationship Cards.



Hands-On Activity 1

Relationship Rally

Problems: Can you match a problem situation with an expression or an equation?
Can up justify the match?
Can you draw a strip diagram to represent the problem situation?

Materials: 1 set of Relationship Cards, 1 number cube

Procedure: Work in groups of 4 for this activity.

- Place the situation cards face down in one stack in the center of the group work area.
- Place the expression/equation cards face down in a different stack in the center of the group work area.
- Roll the number cube to decide which student goes first. The student with the lowest number goes first. Students play in order to the right of the student who goes first.

Part 1

- The student who goes first gives each player 4 cards from the situation cards stack and four cards from the expression/equation stack. Be sure the cards are kept face down as they are handed out. Each player picks up their cards and puts them in their hand, being careful not to let any other player see their cards.
- Player 1 looks at his/her hand to see if any of the situation cards match any of the expression/equation cards. If any of the cards match, Player 1 lays the match on the table, reads the situation card, and explains why the cards match.
- Player 1 asks the other players if they agree with the match.
- If they agree, Player 1 lays the cards face up in a match set in front of his/her playing area, then picks a new situation card and a new expression/equation card from the top of the stacks in the middle of the table.
- If any player disagrees, the group discusses the match and decides if it is a match or not – if the group decides it is not a match, Player 1 puts the cards back into his/her hand.
- Player 2 looks at his/her hand to see if any of the situation cards match any of the expression/equation cards. If any of the cards match, Player 2 lays the match on the table, reads the situation card, and explains why the cards match.
- Player 2 asks the other players if they agree with the match.
- If they agree, Player 2 lays the cards face up in a match set in front of his/her playing area, then picks a new situation card and a new expression/equation card from the top of the stacks in the middle of the table.
- If any player disagrees, the group discusses the match and decides if it is a match or not – if the group decides it is not a match, Player 2 puts the cards back into his/her hand.
- Player 3 looks at his/her hand to see if any of the situation cards match any of the expression/equation cards. If any of the cards match, Player 3 lays the match on the table, reads the situation card, and explains why the cards match.
- Player 3 asks the other players if they agree with the match.

- If they agree, Player 3 lays the cards face up in a match set in front of his/her playing area, then picks a new situation card and a new expression/equation card from the top of the stacks in the middle of the table.
- If any player disagrees, the group discusses the match and decides if it is a match or not – if the group decides it is not a match, Player 3 puts the cards back into his/her hand.
- Player 4 looks at his/her hand to see if any of the situation cards match any of the expression/equation cards. If any of the cards match, Player 4 lays the match on the table, reads the situation card, and explains why the cards match.
- Player 4 asks the other players if they agree with the match.
- If they agree, Player 4 lays the cards face up in a match set in front of his/her playing area, then picks a new situation card and a new expression/equation card from the top of the stacks in the middle of the table.
- If any player disagrees, the group discusses the match and decides if it is a match or not – if the group decides it is not a match, Player 4 puts the cards back into his/her hand.
- When all cards have been taken from the situation and expression/equation card stacks, Part 2 begins.

Part 2

- The next player looks at the cards in his/her hand and chooses either a situation card or an expression/equation card. The player reads the card and asks the group if anyone has a card that matches.
- If a player has a card that matches, he/she says "MATCH", then explains why the cards match. If all players agree the cards match, the player who said "MATCH" gets both cards and lays the cards face up in a match set in front of his/her playing area.
- If no player has a card that matches, the player chooses and reads another card until a player calls "MATCH".
- The player who made the match looks at the cards in his/her hand and chooses either a situation card or an expression/equation card.
- If a player has a card that matches, he/she says "MATCH", then explains why the cards match. If all players agree the cards match, the player who yelled "MATCH" gets both cards and lays the cards face up in a match set in front of his/her playing area.
- If no player has a card that matches, the player chooses and reads another card until a player calls "MATCH".
- Play continues until all cards have a match. The player with the largest number of matches wins the game.

Part 3

Answer the following question:

- How did you decide if a situation and an expression/equation card were a match?

Part 4

As a group, select one of the situation cards and prepare a short skit to act out the situation.

Part 5

- How did your group decide which situation to choose for your skit?

- Describe your skit.

Part 6

- Each group will present their skit.
- After each group presents their skit, the other groups find the situation and expression/equation cards in their set that match the skit.
- The group that presented the skit reads the situation card they chose for their skit.
- The group that presented the skit chooses 1 group to read the expression/equation card they chose to match the situation.
- The class has a discussion about the match. If different cards were chosen by any group, the class decides if the group made a correct choice and why the choice is or is not correct.

Part 7

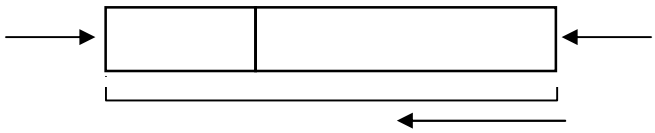
- What did you learn from this activity?

Student Activity 1

Work with a partner to complete Student Activity 1.

PROBLEM 1: William B. Travis Elementary School has 838 students in grade 3 through grade 5. The number of students in the third grade is 242 and the number of students in the fourth grade is 312. What is the number of students in the fifth grade?

- Complete the strip diagram to represent the number of students that are not in the third grade. Be sure to label the strip diagram. Let *s* represent the number of students that are not in the third grade.



Write an equation to represent the number of students that are not in the third grade.

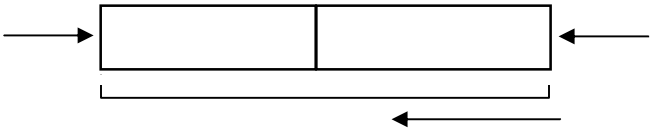
_____ – _____ = _____

Solve the equation.

_____ = _____

The number of students that are not in the third grade is _____.

- Complete the strip diagram to represent the number of students in the fifth grade. Let *f* represent the number of students in the fifth grade.



Write an equation to represent the number of students in the fifth grade.

_____ – _____ = _____

Solve the equation.

_____ = _____

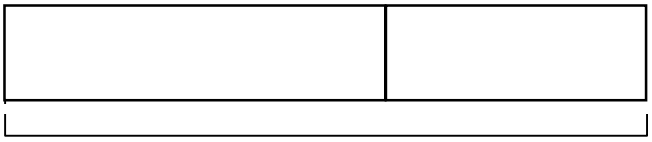
So, the number of students in the fifth grade is _____.

Explain how you know your solution to this problem is correct.

Describe another way you could solve this problem.

PROBLEM 2: Kevitt has 440 baseball trading cards. Jimmy has 280 more trading cards than Kevitt has. How many baseball cards do they have all together?

- Complete the strip diagram to represent the number of baseball cards that Jimmy has. Let *j* represent the number of cards Jimmy has.



Write an equation to represent the number of baseball cards that Jimmy has.

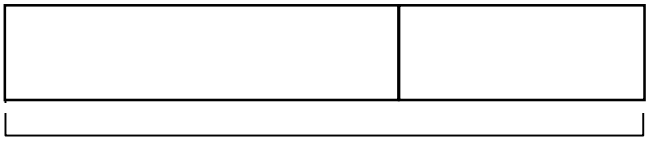
_____ + _____ = _____

Solve the equation.

_____ = _____

The number of baseball cards that Jimmy has is _____.

- Complete the strip diagram to represent the number of baseball cards Kevitt and Jimmy have altogether. Let *b* represent the number the number of baseball cards Kevitt and Jimmy have altogether.



Write an equation.

_____ + _____ = _____

Solve the equation.

_____ = _____

So, the number of baseball cards Kevitt and Jimmy have altogether is _____.

Explain how you know your solution to this problem is correct.

Describe another way you could solve this problem.

PROBLEM 3: There were 456 cell phones sold at a store in January and 798 cell phones sold in February. By the end of March, a total of 2,197 cell phones had been sold during the three months. How many cell phones did the store sell in March?

- Complete the strip diagram to represent the number of cell phones sold in January and February altogether. Be sure to label the strip diagram. Let *c* represent the number of cell phones sold in January and February altogether.

Write an equation to represent the number of cell phones sold in January and February together.

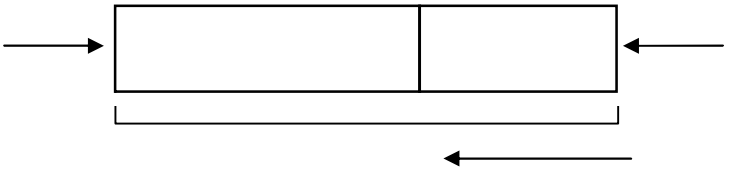
_____ + _____ = ___

Solve the equation.

_____ = ___

The number of cell phones sold in January and February together is _____.

- Complete the strip diagram to represent the number of cell phones sold in March. Let *m* represent the number of cell phones sold in March. Be sure to label the strip diagram.



Write an equation to represent the number of cell phones sold in March.

_____ – _____ = ___

Solve the equation.

_____ = ___

So, the number of cell phones sold in March is _____.

Explain how you know your solution to this problem is correct.

Describe another way you could solve this problem.

PROBLEM 4: A hiking trail on Guadalupe Peak in Texas has a length of 44,352 feet. Elliott and Stella began at the start of the trail and hiked 12,864 feet before they decided to take a water break. After the break, they continued to hike another 14,913 feet before they stopped to eat lunch. What is the distance Elliott and Stella still have to hike before they reach the end of the trail?

- Sketch a strip diagram to represent the distance they had left to hike after they took their water break.

Write an equation to represent distance they had left to hike after they took their water break.

Solve the equation. Show your work.

The distance they had left to hike after they took their water break is

_____ feet.

- Sketch a strip diagram to represent the distance they had left to hike after they finished their lunch.

Write an equation to represent the distance they had left to hike after they finished their lunch.

Solve the equation.

So, the distance Elliott and Stella had left to hike after they finished lunch is

_____ feet.

Explain how you know your solution to this problem is correct.

PROBLEM 5: A theater sold 8,716 tickets during the first week of a release of a new holiday movie. During the second week, the same theater sold 1,316 fewer tickets. How many tickets were sold during these two weeks?

- Sketch a strip diagram to represent the number of tickets sold during the second week.

Write an equation to represent the number of tickets sold during the second week.

Solve the equation. Show your work.

The number of tickets sold during the second week is _____.

- Sketch a strip diagram to represent the number of tickets sold during these two weeks.

Write an equation to represent the number of tickets sold during these two weeks.

Solve the equation.

So, the number of tickets sold during these two weeks is _____.

Explain how you know your solution to this problem is correct.

Describe another way you could solve this problem.

NAME_____ DATE_____ SCORE ___/5

4.5A/4.5B Skills and Concepts Homework 1

Use strip diagrams and equations to solve each of these problems. Show your work on notebook paper.

1. The city library has 10,132 fiction books and 11,768 nonfiction books. An additional 3,729 books have been ordered. How many books will the library have when the new books arrive?

   The library will have _____ books when the new books arrive.
   Explain how you know your answer is correct.

2. A warehouse had an inventory of 365,567 video games at the end of November. They shipped 118,891 video games in December and 211,164 video games in January. How many video games does the warehouse have left?

   The warehouse will has _____ video games left.
   Explain how you know your answer is correct.

3. A pro basketball team scored 1,097 points in the first ten games of the season. They scored 1,013 points in their next ten games, and then they scored 1,193 points in the ten games after that. How many points did the team score in these thirty games?

   The team scored _____ points in these thirty games.
   Explain how you know your answer is correct.

4. Alicia scored 582 points in a district math contest. Violet scored 42 more points than Alicia. If Evan scored 103 fewer points than Violet, how many points did he score?

   Evan scored _____ points.
   Explain how you know your answer is correct.

5. Ms. Besser has three bank accounts. She has $2,689 in one account and $5,901 in a second account. She has a total of $13,954 in all three accounts. What is the amount in her third account?

   Mrs. Besser has $_____ in her third account.
   Explain how you know your answer is correct.

Math Background Part II - Number Patterns

A **number pattern** is set of numbers that is related to each other by a specific rule. Each number in the pattern is called a **term**. Each term in the pattern has a **position** and each term has a **value**. The pattern can be described by a specific **rule**.

A number pattern can be represented by a **sequence** of numbers.

EXAMPLE 1: 5, 10, 15, 20, 25, 30, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

  5, 10, 15, 20, 25, 30, …

  Each number in this pattern is greater than the number before it.

- Record the difference between the numbers in the pattern.

  $\overset{5\quad 5\quad 5\quad 5\quad 5}{\frown}$
  5, 10, 15, 20, 25, 30, …

  The difference between the numbers in this pattern is 5.

- Decide the rule for the pattern.

  The rule for this pattern is *add* 5.

  $\overset{+5\quad +5\quad +5\quad +5\quad +5}{\frown}$
  5, 10, 15, 20, 25, 30, …

  The first term in this pattern is 5. The sixth term in this pattern is 30. To find the next term, or the seventh term in this pattern, *add* 5. The next term in this pattern is 30 + 5, so the next term is 35.

EXAMPLE 2: 100, 90, 80, 70, 60, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

  100, 90, 80, 70, 60, …

  Each number in this pattern is less than the number before it.

- Decide the difference between the numbers in the pattern.

  $\overset{10\quad 10\quad 10\quad 10}{\frown}$
  100, 90, 80, 70, 60, …

  The difference between the numbers in this pattern is 10.

- Decide the rule for the pattern.

  The rule for this pattern is *subtract* 10.

  $\overset{-10\ -10\quad -10\ -10}{\frown}$
  100, 90, 80, 70, 60, …

  The first term in this pattern is 100. The fifth term in this pattern is 60. To find the next term, or the sixth term in this pattern, *subtract* 10. The next term in this pattern is $60 - 10$, so the next term is 50.

EXAMPLE 3: 10, 6, 12, 8, 14, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

10, 6, 12, 8, 14, …

The second number in this pattern is less than the number before it. The third number in this pattern is greater than the number before it.

- Decide the difference between the numbers in the pattern.

$\overset{4 \quad 6 \quad 4}{\frown}$
10, 6, 12, 8, 14, …

The difference between the numbers in this pattern is 4, 6, 4, 6.

- Decide the rule for the pattern.

The rule for this pattern is *subtract* 4, *add* 6.

$\overset{-4 \ +6 \ -4 \ +6}{\frown}$
10, 6, 12, 8, 14, …

The first term in this pattern is 10. The fifth term in this pattern is 14.

To find the next term, or the sixth term in this pattern, *subtract* 4. The sixth term in this pattern is 14 − 4, so the sixth term is 10.

To find the next term, or the seventh term in this pattern, *add* 6. The seventh term in this pattern is 10 + 6, so the seventh term is 16.

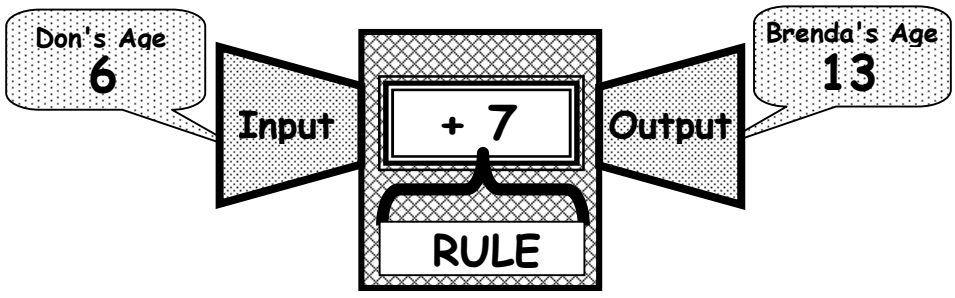
Generating a Number Pattern

An **input-output table** can be used to generate a pattern. A pattern is called a **function** when one quantity depends on the other. An input-output table shows the **relationship** between the inputs and outputs of a function. A **rule** can be written to describe this relationship. The rule can be an expression or an equation.

EXAMPLE 1: Brenda's brother Don was born on her seventh birthday. She is exactly 7 years older than Don. Her age will change and his age will change, but Brenda will always be 7 years older than Don. The **relationship** between their ages will not change.

This relationship is called a **function** because Don's age is a function of Brenda's age. There are several ways a function can be shown.

- A function can be represented with a diagram. A function is like a machine. When the input changes, the output will also change.



For this machine, the rule for the relationship between Don's age and Brenda's age is + 7. When the input changes, the output will also change. But for any input there will only be one possible output. When Don's age is 9, Brenda's age is 9 + 7, so Brenda's age is 16.

- A function can be shown using an equation. This is the rule for the function.

Don's age ← → Brenda's age

$$d + 7 = b$$

- A function can be shown using an input-output table. The input is the **position** in the sequence of numbers in the pattern. The input is also called the **term**. The output is the **value** of each position in the sequence. The output is also called the **value** of the **term**.

Input, Position	Function Rule	Output, Value
d	***d + 7***	***b***
0	0 + 7	7
1	1 + 7	8
2	2 + 7	9
3	3 + 7	10
4	4 + 7	11
5	5 + 7	12

Don's age → (Input, Position) ← Brenda's age (Output, Value)

First term → 0 ← Value of term

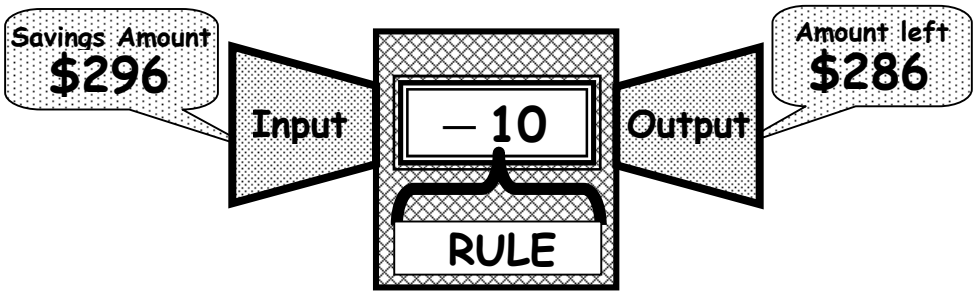
Second term → 1 ← Value of term

The **Input** is Don's age. The **Output** is Brenda's age.
For any input position, there is only **one** possible output value.

The **first term** in the pattern is 0. The **value** of the **first term** is 7.
For any **term**, there is only **one** possible **value**.

EXAMPLE 2: Paul saved $296 this summer from mowing lawns. When school begins he plans to spend $10 of his savings each week. How much of his savings will Paul have left at the end of the first six weeks of school?

- This problem can be represented with a function machine diagram.



For this machine, the rule for the relationship between amount of savings and amount of savings left is — 10. When savings is $296, the savings left is 296 — 10, so the savings left is $286.

- This problem can be represented by a rule.

Savings ← $s - 10 = x$ → Savings left

- This problem can be represented by an input-output table.

	Input, Position	Function Rule	Output, Value	
Savings →	***s***	***s* − 10**	***x***	← Savings left
First week →	296	296 − 10	286	← Savings left
Second week →	286	286 − 10	276	← Savings left
	276	276 − 10	266	
	266	266 − 10	256	
	256	256 − 10	246	
	246	246 − 10	236	

The **Input** is the amount of savings. The **Output** is the amount of savings left.
The **first term** in the pattern is 296. The **value** of the **first term** is 286.

The **sixth term** in the pattern represents the sixth week, so Paul will have $236 of his savings left at the end of the sixth week of school.

Number Patterns

A **number pattern** is set of numbers that is related to each other by a specific rule.

Each number in the pattern is called a **term**.

Each term in the pattern has a **position** and each term has a **value**.

The pattern can be described by a specific **rule**.

A number pattern can be represented by a **sequence** of numbers.

EXAMPLE 1

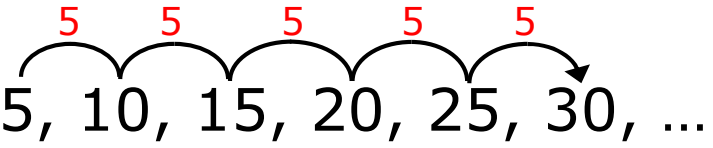
5, 10, 15, 20, 25, 30, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

5, 10, 15, 20, 25, 30, …

Each number in this pattern is greater than the number before it.

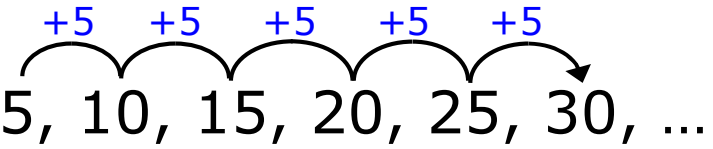
- Record the difference between the numbers in the pattern.

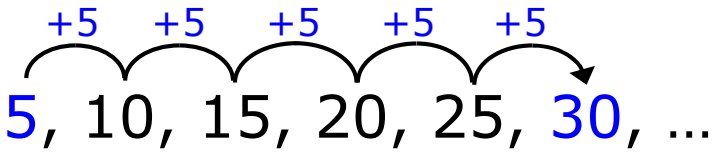


The difference between the numbers in this pattern is 5.

- Decide the rule for the pattern.

The rule for this pattern is *add* 5.





The first term in this pattern is 5.

The sixth term in this pattern is 30.

To find the next term, or the seventh term in this pattern, *add* 5.

The next term in this pattern is 30 + 5, so the next term is 35.

EXAMPLE 2

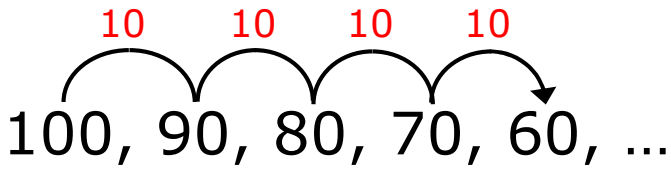
100, 90, 80, 70, 60, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

  100, 90, 80, 70, 60, …

  Each number in this pattern is less than the number before it.

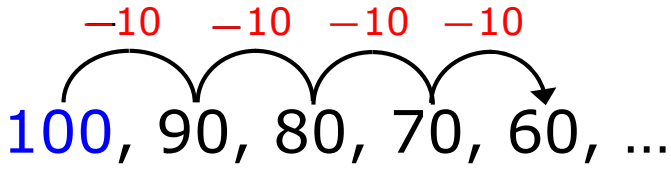
- Decide the difference between the numbers in the pattern.



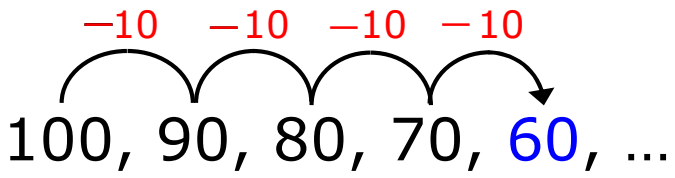
  The difference between the numbers in this pattern is 10.

- Decide the rule for the pattern.

  The rule for this pattern is *subtract* 10.



  The first term in this pattern is 100.



The fifth term in this pattern is 60.

To find the next term, or the sixth term in this pattern, *subtract* 10.

The next term in this pattern is 60 − 10, so the next term is 50.

EXAMPLE 3

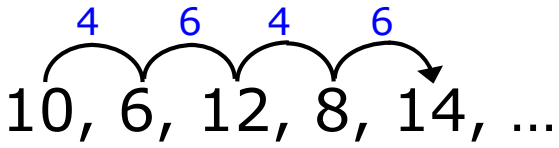
10, 6, 12, 8, 14, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

10, 6, 12, 8, 14, …

The second number in this pattern is less than the number before it. The third number in this pattern is greater than the number before it.

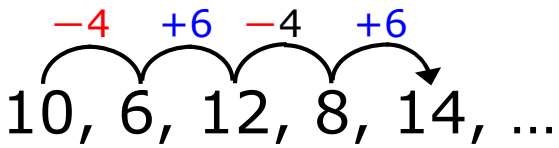
- Decide the difference between the numbers in the pattern.

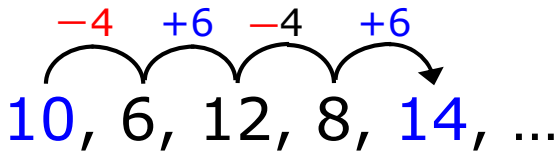


The difference between the numbers in this pattern is 4, 6, 4, 6.

- Decide the rule for the pattern.

The rule for this pattern is *subtract* 4, *add* 6.





The first term in this pattern is 10.

The fifth term in this pattern is 14.

To find the next term, or the sixth term in this pattern, *subtract* 4.

The sixth term in this pattern is 14 − 4, so the sixth term is 10.

To find the next term, or the seventh term in this pattern, *add* 6.

The seventh term in this pattern is 10 + 6, so the seventh term is 16.

Generating a Number Pattern

An **input-output table** can be used to generate a pattern.

A pattern is called a **function** when one quantity depends on the other.

An input-output table shows the **relationship** between the inputs and outputs of a function.

A **rule** can be written to describe this relationship.

The rule can be an expression or an equation.

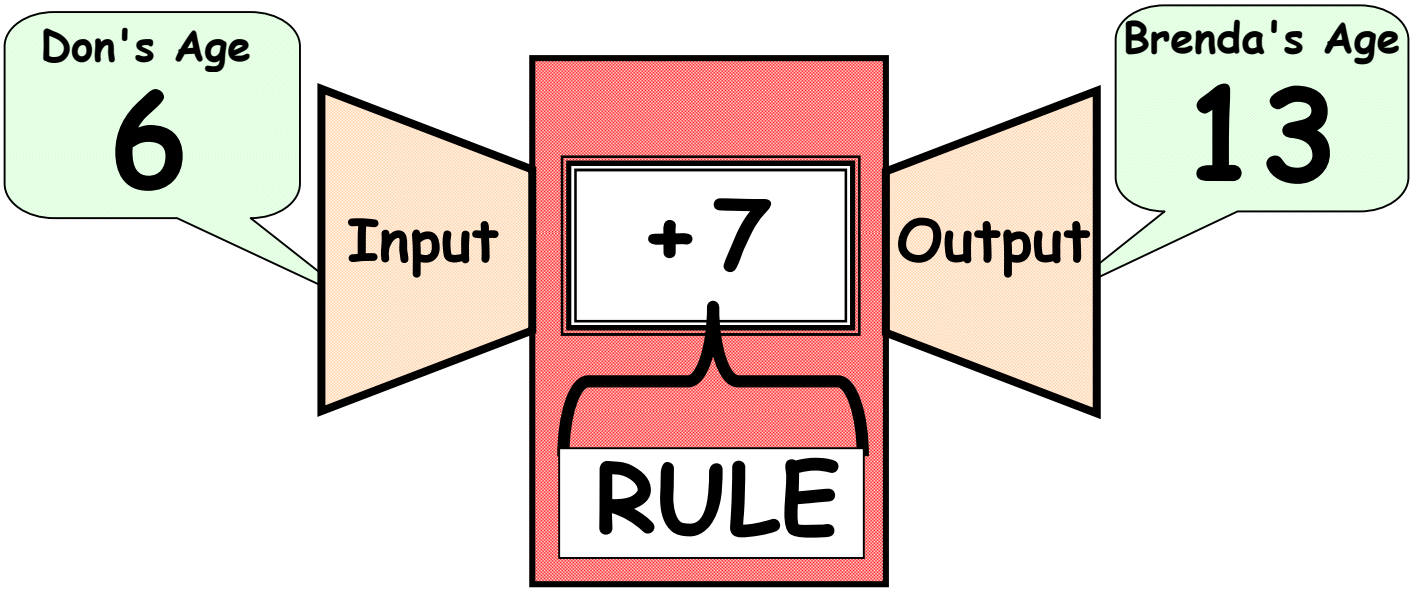
EXAMPLE 1

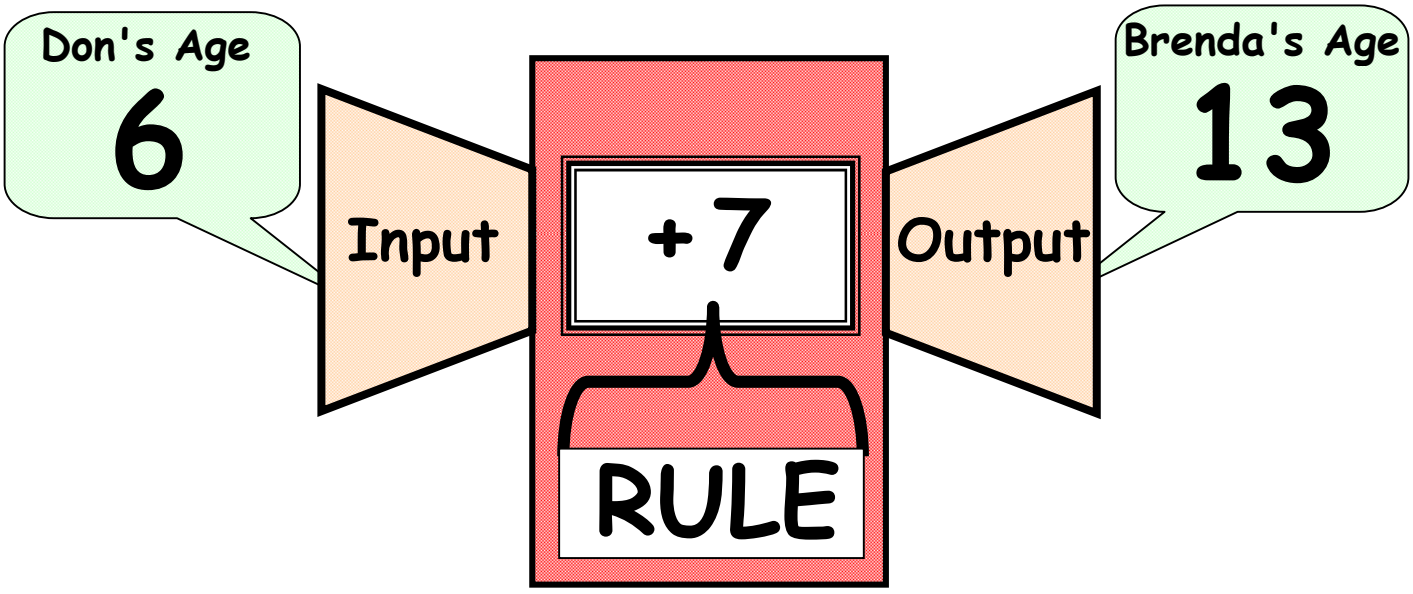
Brenda's brother Don was born on her seventh birthday. She is exactly 7 years older than Don. Her age will change and his age will change, but Brenda will always be 7 years older than Don. The **relationship** between their ages will not change.

This relationship is called a **function** because Don's age is a function of Brenda's age. There are several ways a function can be shown.

- A function can be represented with a diagram.

  A function is like a machine. When the input changes, the output will also change.





For this machine, the rule for the relationship between Don's age and Brenda's age is + 7.

When the input changes, the output will also change. But for any input there will only be one possible output.

When Don's age is 9, Brenda's age is 9 + 7, so Brenda's age is 16.

- A function can be shown using an equation. This is the rule for the function.

Don's age ← $d + 7 = b$ → Brenda's age

- A function can be shown using an input-output table.

  The **input** is the **position** in the sequence of numbers in the pattern. The input is also called the **term**.

  The **output** is the **value** of each position in the sequence. The output is also called the **value** of the **term**.

Don's age → Input, Position | Function Rule | Output, Value ← Brenda's age

d	***d* + 7**	***b***
0 ← First term	0 + 7	7 ← Value of term
1 ← Second term	1 + 7	8 ← Value of term
2	2 + 7	9
3	3 + 7	10
4	4 + 7	11
5	5 + 7	12

Input is Don's age. **Output** is Brenda's age.

For any input position, there is only **one** possible output value.

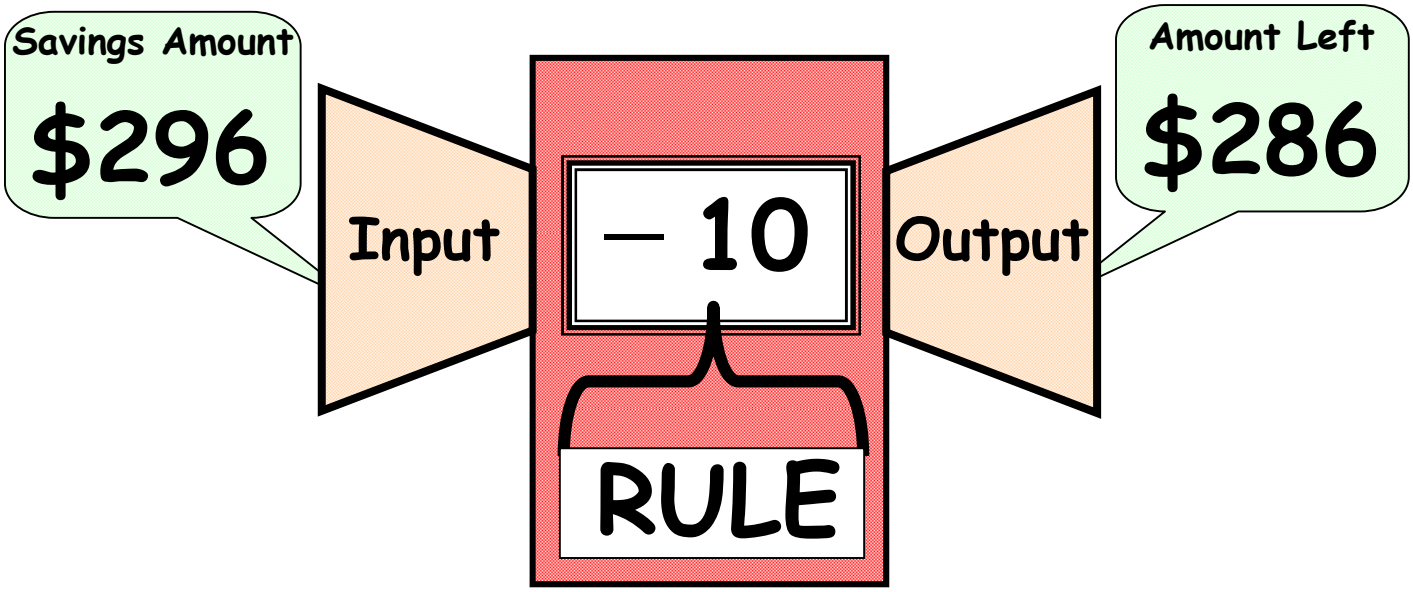
The **first term** in the pattern is 0.
The **value** of the **first term** is 7.

For any **term**, there is only **one** possible **value**.

EXAMPLE 2

Paul saved $296 this summer from mowing lawns. When school begins he plans to spend $10 of his savings each week. How much of his savings will Paul have left at the end of the first six weeks of school?

- This problem can be represented with a function machine diagram.



For this machine, the rule for the relationship between amount of savings and amount of savings left is — 10.

When savings is $296, the savings left is 296 — 10, so the savings left is $286.

- This problem can be represented by a rule.

Savings ← $s - 10 = x$ → Savings left

- This problem can be represented by an input-output table.

Input, Position	Function Rule	Output, Value
s	***s* – 10**	***x***
296	296 – 10	286
286	286 – 10	276
276	276 – 10	266
266	266 – 10	256
256	256 – 10	246
246	246 – 10	236

Savings → Input, Position; Output, Value ← Savings left

First week → 296; 286 ← Savings left

Second week → 286; 276 ← Savings left

The **Input** is the amount of savings.

The **Output** is the amount of savings left.

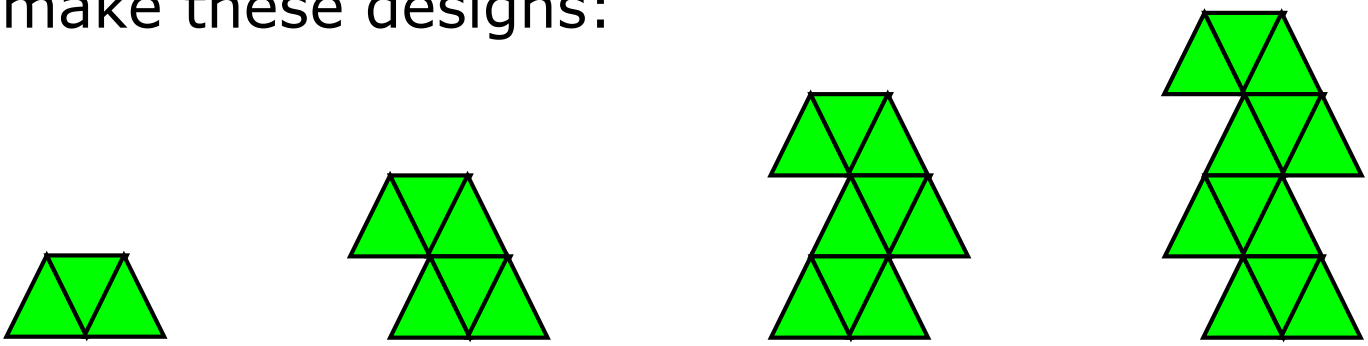
The **first term** in the pattern is 296.

The **value** of the **first term** is 286.

The **sixth term** in the pattern represents the sixth week, so Paul will have $236 of his savings left at the end of the sixth week of school.

Problem-Solving 2

Jeremy used green triangle pattern blocks to make these designs:



Design 1 Design 2 Design 3 Design 4

1. Make an input-output table and record the number of each design and the number of green pattern blocks in each design.

2. If he continues the pattern, how many green pattern blocks will he use for his 6th design? Explain your answer.

3. How many green pattern blocks will he use for his 9th design? Explain your answer.

4. What is the rule for this pattern? Explain your answer.

5. Record the sequence for the first five terms in this pattern. Explain the sequence.

Student Activity 2

Work with a partner to complete Student Activity 2 - PROBLEMS 1-8 only. Work alone to complete PROBLEM 9 and PROBLEM 10.

PROBLEM 1: 2, 5, 8, 11, 14, 17, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

_____, _____, _____, _____, _____, _____, …

Each number in this pattern is _____ than the number before it.

- Record the difference between the numbers in the pattern.

The difference between the numbers in this pattern is _____.

- Decide the rule for the pattern.
  The rule for this pattern _____ _____.

The first term in this pattern is _____. The sixth term in this pattern is _____.

To find the next term, or the seventh term in this pattern, _____ _____.

The next term in this pattern is _____ + _____, so the next term is _____.

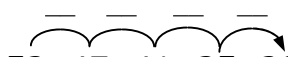
EXAMPLE 2: 53, 47, 41, 35, 29, … is a number pattern. Find and describe the rule for this number pattern.

- Decide if each number in the pattern is greater or less than the number before it.

_____, _____, _____, _____, _____, …

Each number in this pattern is _____ than the number before it.

- Record the difference between the numbers in the pattern.



The difference between the numbers in this pattern is _____.

- Decide the rule for the pattern.
  The rule for this pattern _____ _____.

The first term in this pattern is _____. The fifth term in this pattern is _____.

To find the next term, or the sixth term in this pattern, _____ _____.

The next term in this pattern is _____ − _____, so the next term is _____.

PROBLEM 3: Jackson is saving for his fourth grade class trip to the Alamo. He started with $25 in his savings account. Every week he earns $12 for helping a neighbor with yard work. Every week he spends $8 and saves the rest. What is the amount of savings he will have in six weeks?

- Complete the input-output table to show the amount of savings he will have in six weeks.

  Let *a* represent the amount of savings he starts with each week. Let *s* represent the amount of savings he ends with each week.

  The **Input** is _____.

  The **Output** is _____.

  The **first term** is _____. The **value** of the **first term** is _____.

  The rule for the function is _____ __ _____.

Input	Rule	Output

The amount of savings Jackson will have in six weeks is $_____.

- Record a number pattern that shows the amount of savings Jackson will have at the end of each week for six weeks.

  _____, _____, _____, _____, _____, _____…

Explain how you know the numbers in the pattern are correct.

PROBLEM 4: Ellie earns $8 each week walking her neighbor's dog. Every week she spends $5 and saves the rest. What is the amount of savings she will have in six weeks?

- Complete the input-output table to show the amount of savings she will have in six weeks.

  Let *a* represent the amount of savings she starts with each week. Let *s* represent the amount of savings she ends with each week.

  The **Input** is _____.

  The **Output** is _____.

The **first term** is _____. The **value** of the **first term** is _____.

The rule for the function is _____ __ _____.

Input	Rule	Output

The amount of savings Ellie will have in six weeks is $_____.

- Record a number pattern that shows the amount of savings Ellie will have at the end of each week for six weeks.

_____, _____, _____, _____, _____, _____…

Explain how you know the numbers in the pattern are correct.

PROBLEM 5: Look at this input-output table. The table represents a function.

Input	***s***	6	7	8	9	10	11
Output	***t***	3	4	5	6	7	8

- Decide if each number in the pattern is greater or less than the number before it.

_____, _____, _____, _____, _____, _____, …

Each number in this pattern is _____ than the number before it.

- Record the difference between each term and the value of the term.
  Remember: The input shows the position of the term and the output shows the value of the term.

The difference between the first term and the value of the first term is _____.

The difference between the second term and the value of the second term is _____.

The difference between the third term and the value of the third term is _____.

The difference between the fourth term and the value of the fourth term is _____.

The difference between the fifth term and the value of the fifth term is _____.

The difference between the sixth term and the value of the sixth term is _____.

So, the difference is _____.

- Decide the rule for the pattern.
  The rule for this pattern is _____.
- Record a number pattern that shows the output values, *t*.

_____, _____, _____, _____, _____, _____, …

Explain how you know the numbers in the pattern are correct.

PROBLEM 6: Renaldo is 5 years older than Jorge. What is Jorge's age when Renaldo's age is 17?

- Write a rule that can be used to represent Renaldo's age in terms of Jorge's age.
- Complete the table to represent the relationship between Renaldo's age and Jorge's age. Let *x* represent Renaldo's age and let *y* represent Jorge's age.

x	Rule	*y*

- Describe the relationship between the *x*-values and *y*-values in the table.

- Record a number pattern that shows Jorge's age, *y*.

_____, _____, _____, _____, _____, _____, …

Explain how you know the numbers in the pattern are correct.

Jorge's age is _____ when Renaldo's age is 17 because:

PROBLEM 7: Julio has been working out at the gym. The table shows the maximum weight Julio can lift at the end of each week.

Julio's Weight Lifting

Week Number	Weight Lifted (pounds)
1	84
2	90
3	96
4	
5	
6	

If the pattern continues, what will be the maximum weight Julio can lift at the end of the 6th week?

- The numbers in the pattern are getting _____.
- The difference between 90 and 84 is _____.
- The difference between 96 and 90 is _____.
- The rule is to add _____ pounds to the previous week's maximum weight.
- The maximum weight Julio could lift at the end of the 4th week is _____ pounds.
- The maximum weight Julio could lift at the end of the 5th week is _____ pounds.

The maximum weight Julio can lift at the end of the 6th week is _____ pounds.

PROBLEM 8: In two days Dawn made five bracelets. In four days she made seven bracelets. In six days she made nine bracelets. In eight days she made eleven bracelets. Dawn made an input/output table to show how many bracelets, *b*, she will make in *d* days.

Days	Rule	Bracelets
d	$d + 3$	*b*
2	$2 + 3$	5
4	$4 + 3$	7
6	$6 + 3$	9
8	$8 + 3$	11

- Is the output greater than or less than the input? Explain your answer.
- Is the value of the position three greater than or three less than the position number? Explain your answer.
- If the pattern continues, how many bird feeders will Morgan make in 12 days? Explain your answer.

EACH PARTNER WILL WORK ALONE ON PROBLEM 9. DO NOT LET YOUR PARTNER SEE YOUR HUNDRED CHART WHILE YOU ARE WORKING!

PROBLEM 9: Use a colored pencil to shade the numbers in the hundred chart to create a pattern that follows a certain rule. The rule you decide to use must include addition or subtraction. Multiplication or division can not be used in your rule.

Do **NOT** let your partner see your work and do not tell your partner about your rule.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- Now exchange your hundred charts with your partner.
- Look at your partner's hundred chart.
- See if you can guess the rule your partner used to create their pattern.
- After you have both guessed your partner's pattern, exchange hundred charts again.

PROBLEM 10: Answer these questions about PROBLEM 9.

- Describe the rule you used to shade the pattern on your hundred chart.

- Write the rule you used as an expression. _____ __ _____
- Did your partner find the rule you used to shade the pattern? _____
- Can you find a different rule that could have been used for your pattern? _____ If your answer is "yes", what rule did you find?

- Did your partner find a different rule that could have been used for your pattern? _____ If your answer is "yes", what rule did your partner find?

- Did you find the rule your partner used to shade their pattern? _____ If your answer is "yes", what rule did you find?

- Did you find a different rule that could have been used for your partner's pattern? _____ If your answer is "yes", what rule did you find?

What did you learn from this activity?

NAME_____ DATE_____ SCORE ___/5

4.5A/4.5B Skills and Concepts Homework 2

1. Students at Houston Elementary may wear school spirit shirts every Friday. The input/output table shows the relationship between *n*, the number of students and *s*, the number of students who wore a spirit shirt this Friday.

Input, Position	*n*	13	15	17	19	21
Output, Value	*s*	4	6		10	12

What is the rule for this table? _____ Explain how you know your answer is correct.

Use the rule to find the missing number in the table. Show your work.

Record the missing number in the table. Explain how you know this is the missing number.

2. Write a sequence of numbers in a pattern that follows the rule *add* 4. The first term in the pattern is 7.

_____, _____, _____, _____, _____, _____, …

Explain how you know the numbers in the pattern are correct.

What is the eight term in the pattern? _____ Explain how you know your answer is correct.

3. Write a sequence of numbers in a pattern that follows the rule *add* 4, *subtract* 3. The first term in the pattern is 7.

_____, _____, _____, _____, _____, …

Explain how you know the numbers in the pattern are correct.

What is the sixth term in the pattern? _____

What is the seventh term in the pattern? _____
Explain how you know your answers are correct.

4. Find a rule for the input-output table.

   - The output is ___ more than the input.
   - Use ___ for the input.
   - Rule: The output is ___ _ ___

   Now complete the table.

Input	Rule	Output
f		*g*
2		5
4		7
6		9
8		11

   Explain how you found the rule for the input-output table.

5. Find a rule for the input-output table.

   - The output is ___ less than the input.
   - Use ___ for the input.
   - Rule: The output is ___ _ ___

   Now complete the table.

Input	Rule	Output
a		*b*
7		3
9		5
11		7
13		9

   Explain how you found the rule for the input-output table.

NAME_____ DATE_____ SCORE ___/10

4.5A/4.5B Mini-Assessment

1. Suri scored a total of 19,221 points in three rounds of a video game. She scored 4,591 points in the first round of the game and she scored 8,526 points in the third round. Suri wants to find the number of points she scored in the second round. First, she used the equation shown below to represent the number of points she scored in the first and third rounds combined.

$$4{,}591 + 8{,}526 = 13{,}117$$

If s = second round score, which equation can Suri use to find the number of points she scored in the second round?

A $19{,}221 + 8{,}526 = s$

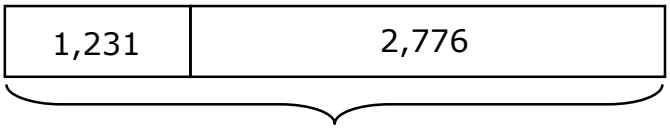
B $19{,}221 - 4{,}591 = s$

C $19{,}221 + 13{,}117 = s$

D $19{,}221 - 13{,}117 = s$

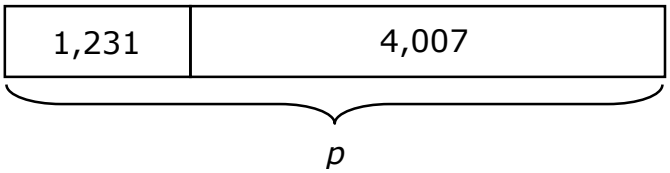
---

2. Marcus and his grandfather collect pennies. Marcus has 1,231 pennies and his grandfather has 2,776 pennies more than Marcus has. Marcus wants to find the number of pennies they have combined. First, he drew the strip diagram shown below to represent the number of pennies his grandfather has.



$1{,}231 + 2{,}776 = 4{,}007$

Then Marcus drew the strip diagram below to find the number of pennies, p, they have combined.



Which equation should Marcus use to represent the number of pennies they have combined?

F $1{,}231 + 4{,}007 = p$

G $4{,}007 - 1{,}231 = p$

H $1{,}231 + 2{,}776 = p$

J $2{,}776 - 1{,}231 = p$

3. During harvest season the Valley Citrus Company picked 14,594 grapefruit. The company shipped 5,691 grapefruit during the first week and 3,224 grapefruit during the second week. The owner needed to know how many grapefruit they have left after the two weeks. He used the equation shown below to represent the number of grapefruit left after the first week.

$$14{,}594 - 5{,}691 = 8{,}903$$

If n = number left, which equation can the owner use to find the number of grapefruit left after two weeks?

A $14{,}596 + 8{,}903 = n$

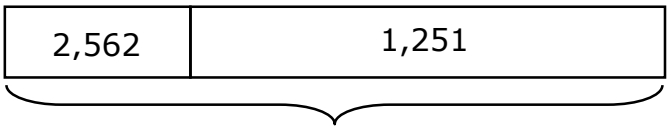
B $8{,}903 - 3{,}224 = n$

C $5{,}691 + 3{,}224 = n$

D $14{,}596 - 3{,}224 = n$

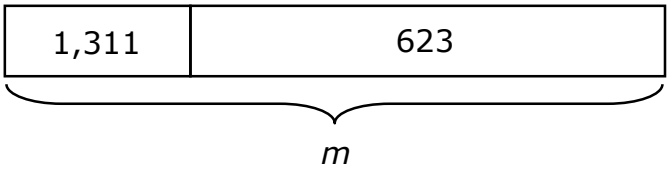
---

4. David and his family are driving 4 days to a national park where they will camp for vacation. The national park is 2,526 miles from their house. The first two days they drove 1,251 miles and the third day they drove 623 miles. David wants to find the number of miles they have left to drive. First, he drew the strip diagram shown below to represent the number of miles left after two days of driving.



$2{,}562 - 1{,}251 = 1{,}311$

Then he drew the strip diagram below to find the number of miles, m, they have left to drive after the third day.



Which equation should David use to find the number of miles they have left to drive?

F $2{,}562 - 623 = m$

G $1{,}311 + 623 = m$

H $1{,}311 - 623 = m$

J $1{,}251 + 623 = m$

5. A store sold 275 DVDs of a new movie during the first week it was released. During the second week they sold 295 DVDs and they sold additional DVDs during the third week. After the first three weeks the store had sold 984 DVDs. The store manager added 275 and 295 to find that 570 DVDs were sold during the first and second week. Which equation should he use to find n, the number of DVDs sold during the third week?

   A Use the equation $570 + 275 = n$ because 275 DVDs were sold the first week.

   B Use the equation $984 - 570 = n$ because 570 DVDs were sold in two weeks.

   C Use the equation $984 + 570 = n$ because 984 DVDs were sold in 3 weeks.

   D Use the equation $984 - 295 = n$ because 295 DVDs were sold the second week.

---

6. Use the rule to find the missing number.

Rule: The output is $x - 6$.					
Input	***x***	10	12	14	16
Output	***y***	4	6		10

   What is the missing number?

   F 20

   G 8

   H 2

   J 5

---

7. The rule for a pattern is *add* 7. The first term in the pattern is 1. Which shows the numbers in the pattern?

   A 1, 8, 16, 24, …

   B 1, 8, 9, 10, …

   C 1, 7, 13, 21, …

   D 1, 8, 15, 22, …

8. Students will be divided into 2 teams to play games at recess. For 30 students there will be 15 on each team. For 28 students, there will be 14 on each team, and so on.

Input	***s***	30	28	24	22
Output	***t***				

How many students (*t*) will be on each team if there are 22 students (*s*).

F 11

G 8

H 12

J 10

---

9. The rule for a pattern is *add 6*, *subtract 5*. The first term in the pattern is 16. Which shows the first five terms of the pattern?

A 16, 11, 17, 12, 18

B 16, 22, 28, 23, 18

C 22, 17, 23, 18, 24

D 16, 22, 17, 23, 18

---

10. Giselle made the input-output table below.

Input	***a***	6	7	8	9
Output	***b***	3	4	5	6

Which could be a rule for her table?

F The output is $a + 3$.

G The output is $a - 1$.

H The output is $a + 2$.

J The output is $a - 3$.

Six Weeks 1 Review

Teacher Notes: Six Weeks Review

The Six Weeks Review includes two components:

- A classroom review with 4 questions for each TEKS addressed in lessons and on the Six Weeks Assessment.
- A homework review with 1 question for each TEKS addressed in lessons and on the Six Weeks Assessment.

Classroom Review

- Students should work in partner pairs to complete the review.
- Students may use their math notes and other work from the six weeks to help them complete the review.
- Assign pairs of students to lead a class discussion for each question and answer.

Homework Review

- Remind parents/guardians that they have a Parent Guide that may be useful as a tool to help students who have difficulty with any of the review questions.
- Students may use their math notes and other work from the six weeks to help them complete the homework review.
- Before the Six Weeks Assessment is given - assign pairs of students to lead a class discussion for each question and answer.

Name _____ Date _____

4.2A

1. What is the place value that is 10 times the value of the position of the digit 9 in 89,162.91? _____

2. What is the relationship between the value of 10 dollars and 1 dollar?

3. What is the place value that is $\frac{1}{10}$ of the value of the position of the digit 2 in 53.27?

_____

4.2B

4. Write the number 550,505 in expanded form.

5. Write the number 6.83 in expanded form.

6. Write the number 3.09 in expanded form.

4.2C

7. Janice was working on a social studies project. She recorded the projected population for the year 2025 for the four largest states.

Projected Population in 2025	
State	Total Population in Thousands
California	49,285
Florida	20,710
New York	19,830
Texas	27,183

List the order of the states from least to greatest population.

8. Use the table in problem 7. List the order of the populations of the states from greatest to least population.

9. Complete each statement with a comparison symbol to create a true statement.

1,285 __ 1,342 1,432 __ 1,429 2,347 __ 2,339 2,673 __ 2,669

4.2D

10. Garcia Elementary has 728 students and Travis Elementary has 784 students. Round the total number of students in the 2 schools to the nearest ten. _____

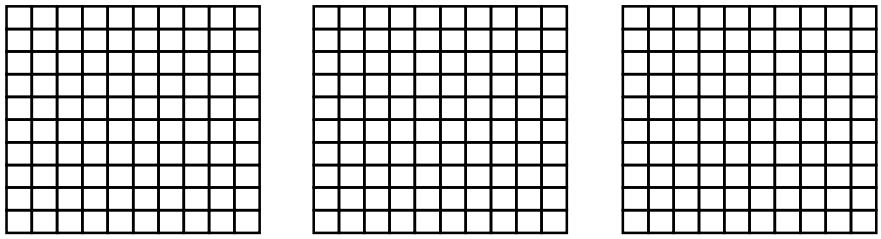
11. Round each number to the nearest ten-thousand.

27,912 _____ 271,395 _____ 63,024 _____ 72,093 _____

12. Hannah rounded 17,582 to the nearest hundred. Then she rounded her answer to the nearest thousand. What is her final number? _____

4.2E

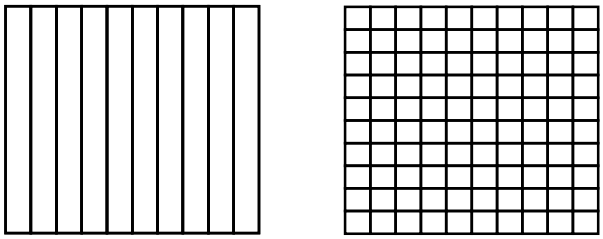
13. Shade the grids to create a model to represent a number with the digit 2 in the ones place, the digit 0 in the tenths place, and the digit 6 in the hundredths place.



The shaded part of the model represents the number_____.

14. Describe a set of coins and bills that can be used to represent an amount of money with the digit 1 in the tens place, the digit 0 in the ones place and the digit 1 in the tenths place.

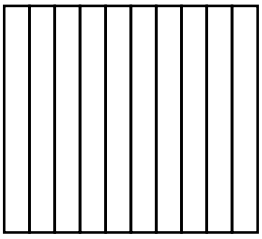
15. Shade the model so the part that is **NOT** shaded represents 0.95.



The shaded part of the model represents the number_____.

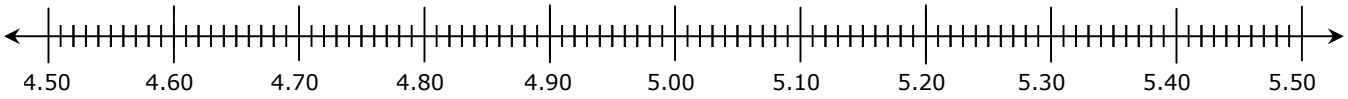
4.2F

16. Shade the model to represent a number greater than 0.45 and less than 0.57.



17. Describe a set of coins and bills that has a value greater than $7.38 and less than $7.48.

18. Use the number line to order \$4.88, \$5.19, \$4.83, and \$5.02 from least to greatest.

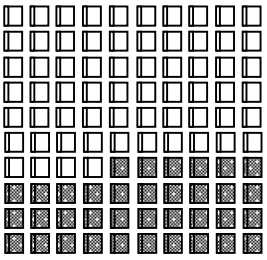


Now list the amounts of money in order from greatest to least.

_____, _____, _____, _____

4.2G

19. Chuck organized 100 books in his classroom library. The model shown below is shaded to represent the part of the books that are fiction books.



Write a fraction and decimal to represent the part of the books that are **NOT** fiction.

fraction: _____ decimal:_____

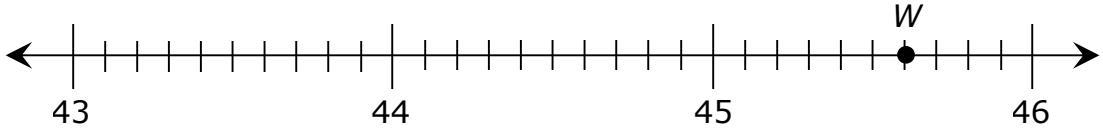
20. Write a fraction and decimal to represent the part of the books that are fiction.

fraction: _____ decimal:_____

21. $\frac{8}{10}$ = 0.08 is not a true statement. Change the numbers to show a fraction and a decimal that both represent eight tenths. _____ = _____

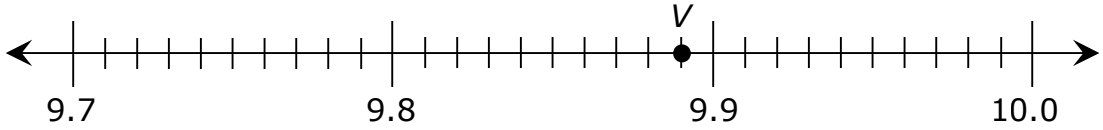
4.2H

22. Write the number represented by point *W* on the number line to the tenths or hundredths as a decimal and as a fraction.



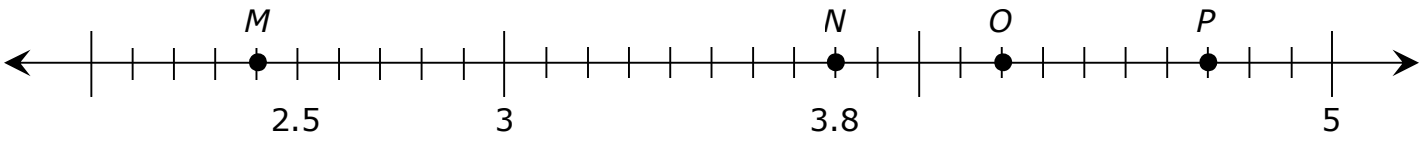
fraction: _____ decimal:_____

23. Write the number represented by point *V* on the number line to the tenths or hundredths as a decimal and as a fraction.



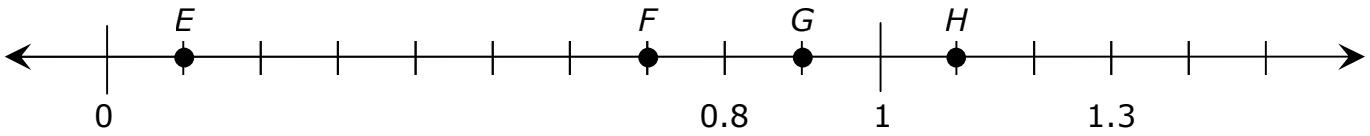
fraction: _____ decimal:_____

24. Name the point that represents 4.7 on the number line. _____



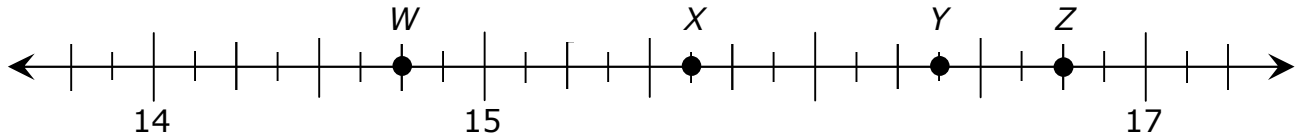
4.3G

25. Name the point that represents 0.9 on the number line. _____ Write the fraction this point represents. _____



26. Name the point that represents 0.1 on the number line. _____ Write the fraction this point represents.

27. Name the point that represents $16\frac{3}{4}$ on the number line. _____



4.4A

Terence is shopping for new clothes for school. He has $150 to spend. He wants to buy a pair of jeans for $24.45, a shirt for $22.84, a pair of shoes for $56.82, and a package of socks for $12.24. All prices include tax.

28. What is the total cost of the four items? _____

29. How much money will he have left after paying for the 4 items? _____

30. Alex is 4.25 feet tall. His sister Andrea is 0.5 foot shorter than Alex. How tall is Andrea? _____ feet

4.4G

31. Maryland has an area of 12,407 square miles and Texas has an area of 268,601 square miles. Estimate the difference between the area of these two states to the nearest thousand. _____

32. A team of editors finished a movie with 129,600 frames. The next movie they edit will have 172,800 frames. Estimate the difference between the number of frames in the two movies to the nearest hundred. _____

33. During June 208,128 tourists visited the Alamo and during July 197,695 tourists visited the Alamo. To the nearest hundred thousand, about how many tourists visited the Alamo during these two months?

4.5A

34. During the first week of a musical, there were 8,716 tickets sold at the box office. During the second week, there were 1,316 fewer tickets sold. Draw and label strip diagrams to represent the number of tickets, t, that were sold during the two weeks.

35. Use the information in problem 34 to write an equation that can be used to find the number of tickets, *t*, that were sold during the two weeks.

36. An electronics store sold 456 cell phones in May and 798 phones in June. By the end of July, the store had sold a total of 2,197 phones during the three months. Write an equation that can be used to find the number of cell phone, *c*, that were sold by the store in July.

4.5B

37. Alicia made miniature U.S. flags each day during the month of June. The number of flags she made each day is 2 more than the day number. The input/output table represents the *d* day number and the number of *f* flags she made for each of the first four days in June.
Write the rule Alicia used for the table. _____

Rule: ?	
Input	Output
d	*f*
1	3
2	4
3	5
4	6

38. The first term in a pattern is 8. The rule for the pattern is *skip-count by 4*. Write the next four numbers in the pattern.

8, _____, _____, _____, _____...

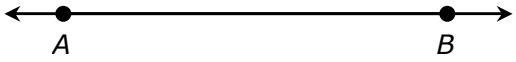
39. The input/output table shows the relationship between the number of students in *b* band, the input, and the number who do not play *d* drums, the output. The output is $b - 4$. How many students do not play drums if the number of students in the band is 40? _____

Input, Position	***b***	24	30	36	40
Output, Value	***d***	20	26	32	

4.6A

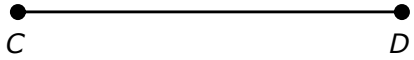
Fill in each blank with "a line", "a line segment", "parallel lines" or "parallel line segments".

40. The figure below represents _____.



41. _____ never meet.

42. The figure below represents _____.



4.9A

Hector recorded the number of smoothies he sold on 16 different days. His data is shown in the chart. Use the data to answer questions 43-45.

Number of Smoothies Sold			
10	8	10	7
12	7	10	8
10	10	8	10
7	10	12	8

43. Hector has decided to put the data into a frequency table. He will have two columns in the table. The second column will be titled "Frequency." The title of the first column should be "_____."
44. The frequency Hector will record in the table for 8 smoothies sold is _____.
45. The highest frequency Hector will record in the table for number of smoothies sold is _____.

4.9B

Marissa recorded the amount of time the tennis players on her team practice their serves each day.

Time Spent Practicing Tennis Serves	
Hour	Frequency
0	5
$\frac{1}{4}$	2
$\frac{1}{2}$	3
$\frac{3}{4}$	5
1	4

Use the frequency table on the previous page to answer questions 46-48.

46. How many more tennis players on Marissa's team practice at least $\frac{3}{4}$ hour a day than practice $\frac{1}{4}$ hour or less?

47. What is the total number of tennis players represented in the data on the frequency table? _____

48. What is the number of tennis players that practice $\frac{1}{2}$ hour or more each day? _____

4.10A

49. Is entertainment cost, electric bill, car payment or cost of food a fixed expense for a family? _____

50. Gina used a table to record some of her expenses for the month of November.

November Expenses	
Expense	Amount
Student Loan	$357
Food	$196
Clothes	$104
Entertainment	$238

Which item in the table is a fixed expense? _____

51. Is rent payment, mortgage payment or vacation cost a variable expense for a family?

_____

Name _____ Date _____

Homework Review

4.2A

1. Is 5 $\frac{1}{10}$ as much as 500? _____ Explain why your answer is correct.

4.2B

2. Write the number 829,611 in expanded form.

4.2C

3. Fourth grade students collected pennies during the school year to try to represent one million. Jonah collected 5,138 pennies, Mitzi collected 5,375 pennies, and Brandon collected 5,567 pennies. List the numbers of pennies in order from least to greatest.

4.2D

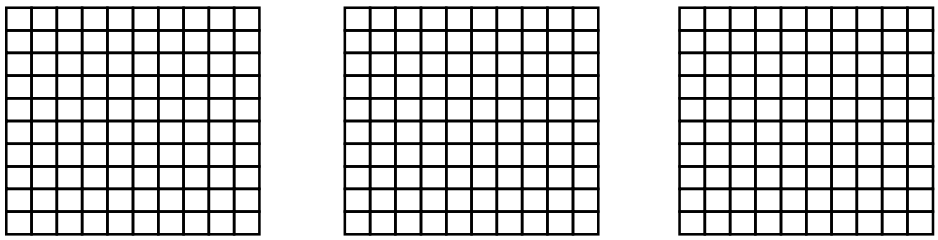
4. A coin collector has 38,718 coins in his collection. Round this number to the nearest thousand. _____

4.2E

5. Describe a set of 9 coins that have a total value of $0.83.

4.2F

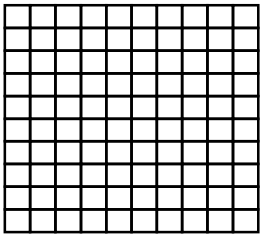
6. Shade the grids to represent a number less than 2.54 and greater than 2.37.



What number does the model represent? _____

4.2G

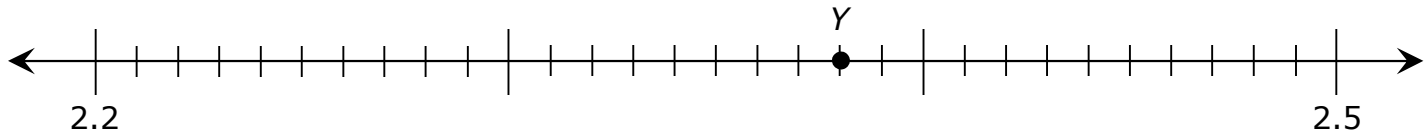
7. Shade the grid to represent 0.23.



What fraction does the shaded part of the grid represent? _____

4.2H

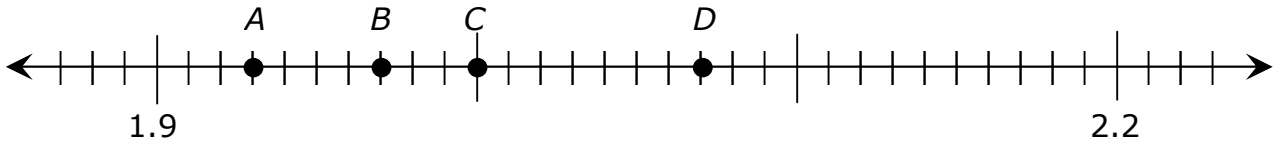
8. Write the fraction and the decimal represented by point *Y* best on the number line.



fraction: _____ decimal:_____

4.3G

9. Name the point that represents 2.07 on the number line. _____ This point also represents 2 and _____ hundredths.



4.4A

10. In women's gymnastics there are 4 events: the floor exercise, the balance beam, the vault and the uneven bars. The all-around competition score is determined by adding together each of the individual event scores.

Gymnastics Scores

Gymnast	Floor Exercise	Balance Beam	Vault	Uneven Bars
Katie	9.375	8.9	9.875	10
Shanna	9.45	9.25	9.625	9.875

What is Katie's all-around score?_____ What is Shanna's all-around score?_____

What is the difference between Shanna's and Katie's all-around scores? _____

4.4G

11. A jewelry store had 1,276 customers in November and 1,024 customers in December. Estimate the total number of customers in November and December to the nearest hundred. _____

Estimate the difference between the number of customers in November and December to the nearest ten. _____

4.5A

12. Levi has 2,796 pennies. His sister Triana has twice as many pennies. They have decided to put their pennies together in a large coin bank. Write an equation that can be used to find p, the number of pennies they will put into the large coin bank.

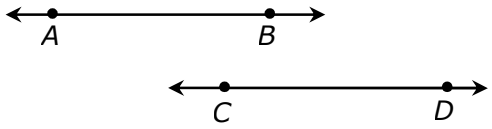
4.5B

13. The rule for a pattern is *subtract* 4, *add* 6. The first term is 10. Write the next four numbers in the pattern.

10, _____, _____, _____, _____...

4.6A

14. The figure below appears to represent _____ lines.



4.9A

15. Alicia decided to record the number of text messages she receives each day. Her data is shown below.

Number of Text Messages Sent Each Day				
31	19	17	19	23
25	31	16	14	31
32	37	15	23	28

She has decided to make a frequency table to represent her data. In the table she will record 31 for a number of text messages sent in a day. What number will she record in the table for the frequency of 31 text messages sent in a day? _____

4.9B

16. The frequency table shows the ages of child actors, and the number of actors of each age in a Community Theater musical. Six of the actors who are 9 years old and ten of the actors who are 10 years old will sing and dance in the musical.

Ages of Child Actors	
Age	Number
7	10
8	9
9	15
10	16
11	17

What is the number of actors who are 9 and 10 years old who do **NOT** sing and dance in the musical? _____

4.10A

17. Lealys opened a sporting goods store at an outdoor mall. Is rent payment, electricity bill, or advertising cost a fixed expense for her business? _____

TEKSING TOWARD STAAR

MATHEMATICS ®

GRADE 4

TEKS/STAAR

Six Weeks 1 Assessment

Answer Key and TEKS/STAAR Category and Standard Correlation

- Copy 1 assessment for each student.
- Students answer the questions individually, however, the same assistance may be given as will be allowed on the actual STAAR.
- Record class performance on the Class Profile and have students record individual performance on their Student Profile.

Question	Answer	TEKS Assessed	STAAR Category	STAAR Standard
1	D	4.2A	1	Readiness
2	500	4.2B	1	Readiness
3	A	4.2C	1	Supporting
4	J	4.2D	1	Supporting
5	C	4.2E	1	Supporting
6	G	4.2F	1	Supporting
7	B	4.2G	1	Readiness
8	G	4.2H	1	Supporting
9	D	4.3G	1	Supporting
10	J	4.4A	2	Readiness
11	A	4.4G	2	Supporting
12	J	4.5A	2	Readiness
13	A	4.5B	2	Readiness
14	j	4.6A	3	Supporting
15	B	4.9A	4	Readiness
16	48	4.9B	4	Supporting
17	D	4.10A	4	Supporting
18	G	4.4A	2	Readiness
19	244	4.5A	2	Readiness
20	G	4.5B	2	Readiness

1. What is the relationship between the place-value position of the 7 and the 5 in the number 462,903.75?

   A The place value of the 7 represents $\frac{1}{100}$ of the place value of the 5.

   B The place value of the 5 represents 10 times the place value of the 7.

   C The place value of the 7 represents 100 times the place value of the 5.

   D The place value of the 5 represents $\frac{1}{10}$ of the place value of the 7.

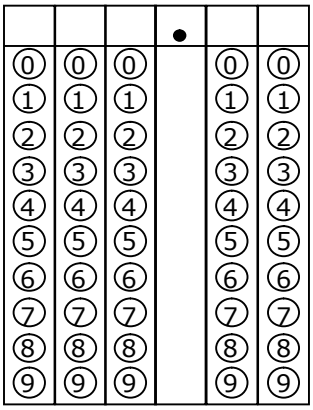
---

2. Jessica wrote the number 42,573 in expanded form.

   40,000 + 2,000 + □ + 70 + 3

   What number is missing in the expanded form of 42,573?

   Record your answer and fill in the bubbles on the grid. Be sure to use the correct place value.



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3. A sports stadium in Houston, Texas can hold 54,816 people for baseball games, 62,439 people for football games, and 67,925 people for wrestling events. Which shows these numbers in order from greatest to least?

   A 67,925; 62,439; 54,816

   B 62,439; 54,816; 67,925

   C 54,816; 67,925; 62,439

   D 54,816; 62,439; 67,925

4. A male elephant at a zoo in Texas weighs 6,728 pounds. What is the weight of the elephant rounded to the nearest hundred?

F 6,730

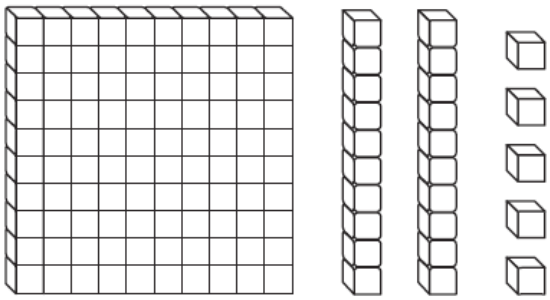
G 6,600

H 6,800

J 6,700

---

5. In this model, a flat represents 1 unit.



What decimal does the model represent?

A 125

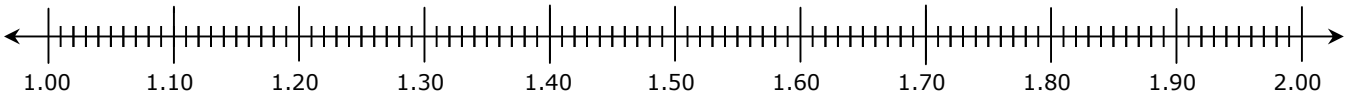
B 12.5

C 1.25

D 0.125

---

6. Use the number line below to order 1.31, 1.13, 1.3, and 1.1 from least to greatest.



Which list shows the numbers in order from least to greatest?

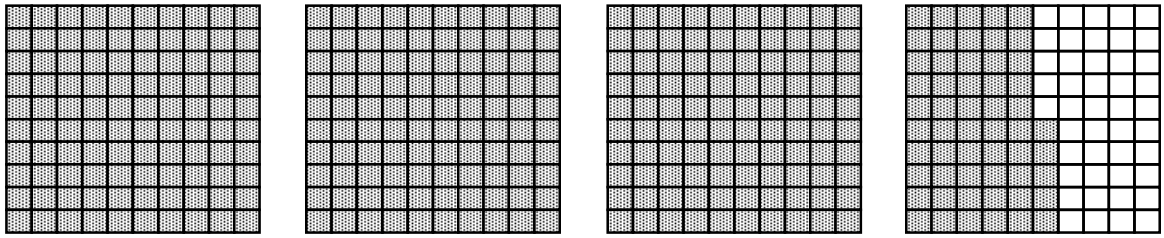
F 1.13, 1.1, 1.31, 1.3

G 1.1, 1.13, 1.3, 1.31

H 1.13, 1.31, 1.1, 1.3

J 1.1, 1.3, 1.13, 1.31

7. The model shown below is shaded to represent a number greater than 1.



Which fraction and decimal represent this number?

A $3\frac{5}{10}$ and 3.05

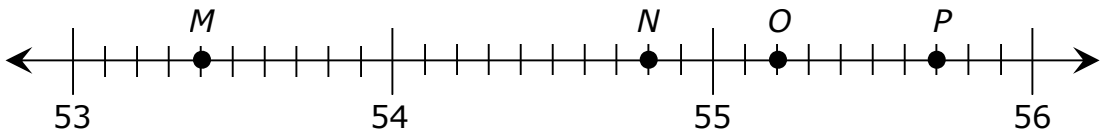
B $3\frac{55}{100}$ and 3.55

C $3\frac{5}{10}$ and 3.5

D $\frac{55}{100}$ and 0.55

---

8. Which point best represents 54.8 and $54\frac{8}{10}$ on the number line?



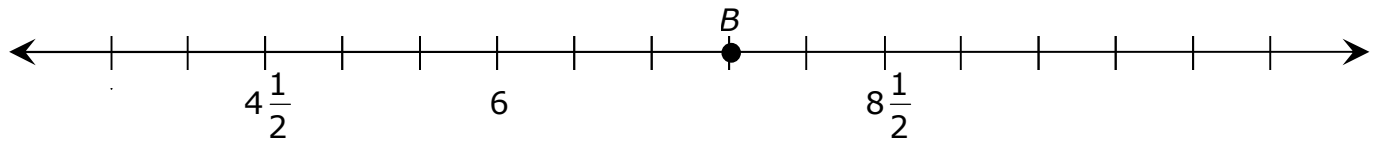
F Point *M*

G Point *N*

H Point *O*

J Point *P*

9. Which number does point *B* best represent on the number line?



A 7

B $8\frac{1}{2}$

C 8

D $7\frac{1}{2}$

---

10. Meisha adopted a new puppy that weighed 3.85 pounds. After one month the puppy weighed 0.95 pound more than it weighed when it was adopted. How much did the puppy weigh one month after it was adopted by Meisha?

F 4.70 pounds

G 3.70 pounds

H 480 pounds

J 4.80 pounds

---

11. The diameter of Jupiter is 88,846 miles and the diameter of Saturn is 74,898 miles. About how much greater is the diameter of Jupiter than the diameter of Saturn?

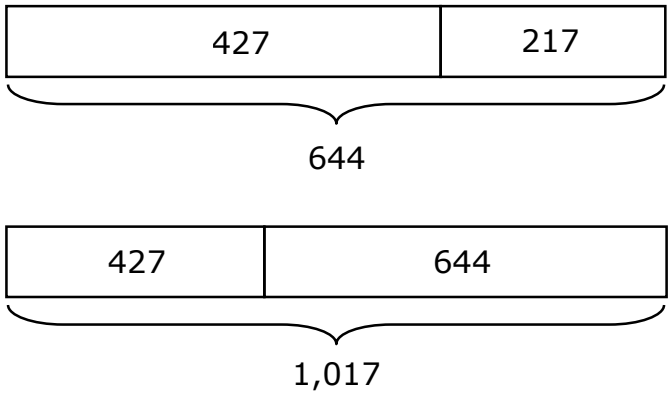
A 13,900 miles

B 14,100 miles

C 13,100 miles

D 14,900 miles

12. Rowena has 427 pennies in her coin bank. Larry has 217 more pennies in his coin bank than Rowena has. The strip diagrams show a way to find the number of pennies they have together.



What does 644 in the strip diagram represent?

F The number of pennies they have together

G The number of pennies Rowena has

H How many more pennies Larry has than Rowena has

J The number of pennies Larry has

---

13. The rule for a pattern is *add 9*, *subtract 2*. The first term in the pattern is 19. Which shows the numbers in the pattern?

A 19, 28, 26, 35, 33, …

B 19, 21, 12, 14, 5, …

C 10, 19, 17, 26, 24, …

D 19, 17, 26, 24, 33, …