TEKSING TOWARD STAAR

MATHEMATICS

Grade 4 Student Book

Six Weeks 1

Lesson 1

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?

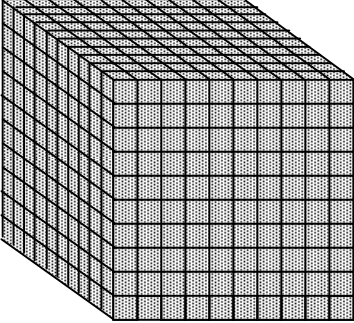10. How can you check for reasonableness of your solution to this problem?

Hands-On Activity 1
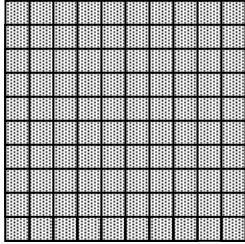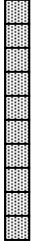
WHOLE NUMBER PLACE-VALUE PATTERNS

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

_____

_____.
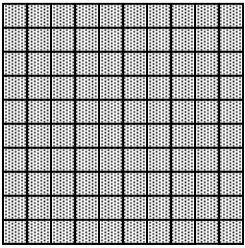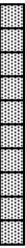
Hands-On Activity 2

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.

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.

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.

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?

Lesson 6

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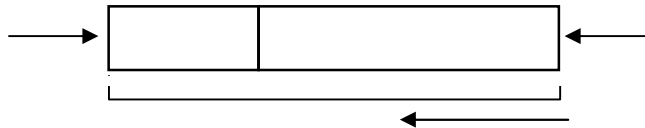
Write an equation to represent the number of students that are not in the third grade.

_____ – _____ = _____

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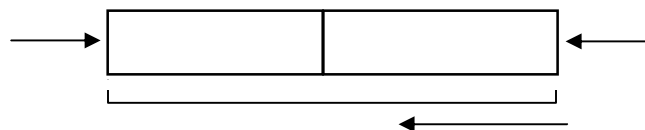
Write an equation to represent the number of students in the fifth grade.

_____ – _____ = _____

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.

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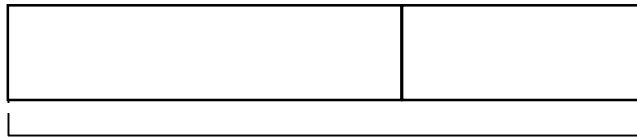
So, the number of baseball cards Kevitt and Jimmy have altogether is _____.

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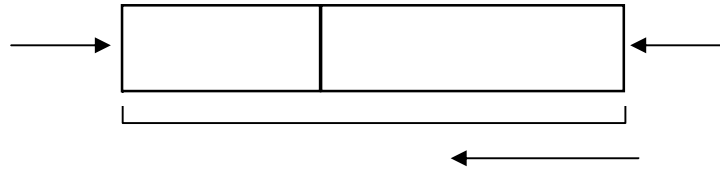
Write an equation to represent the number of cell phones sold in January and February together.

_____ + _____ = ___

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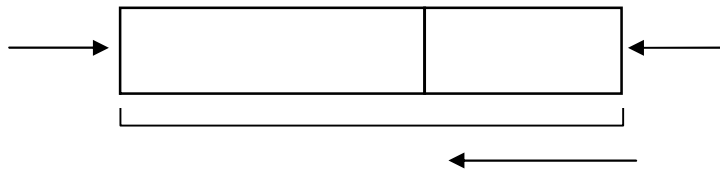
Write an equation to represent the number of cell phones sold in March.

_____ – _____ = ___

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.

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.

2, 5, 8, 11, 14, 17, …

  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.

53, 47, 41, 35, 29, …

  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?

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.