TEKSING TOWARD STAAR

MATHEMATICS ®

PARENT GUIDE

for

GRADE 4

Mathematics LESSONS

Parent Guide Contents

TEKSING TOWARD STAAR MATHEMATICS®

Overview

This Parent Guide was written with the goals of giving parents an overview of the lessons the students will be completing during the school year and assisting parents in helping students to understand the mathematics they are learning. The guide was designed for use by parents and other caring individuals who are interested in helping students progress in comprehension of the Texas Essential Knowledge and Skills.

The Parent Guide includes Parental Roles and Common Questions, Student Activity Sample, Problem-Solving Sample, Homework Sample, Mini-Assessment Sample, a Problem-Solving Model, Six Weeks Scope and Sequences, and Background Information for all lessons.

The universal use of calculators and computers has changed what is important in mathematics as well as what students need to know to be prepared for college and the work force. The past focus of mathematics curriculum was to practice and memorize some techniques that are no longer useful because they were isolated from their origins and their uses in the real world.

Current research on how students learn is now telling us that most students cannot learn mathematics effectively and efficiently by being asked to memorize given rules and practicing those rules for mastery of basic math skills. A report to the nation by the National Research Council entitled Everybody Counts stated, "Presentation and repetition may help students do well on some standardized tests and lower order skills, but are generally ineffective for long term learning, for higher-order thinking, and for versatile problem solving."

Students should leave grade 2 with mastery of basic addition and subtraction facts. TEKS 3.4F for Mathematics Grade 3 states: "The student is expected to recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts." Therefore, students should leave grade 3 with mastery of basic multiplication facts and corresponding division facts. The TEKS for Mathematics in grade 4 and above assume that each student has previously mastered basic addition, subtraction, multiplication and division facts.

Recent research has also impacted teaching methods. The research strongly indicates that a teacher telling and/or showing students how to "do math" has very little to do with promoting true learning. Students must construct their own understanding. Research shows that most students learn best when working in partner pairs or small groups to communicate and freely discuss important skills and concepts as they solve problems.

This curriculum is designed to reflect research, to reflect the National Council of Teachers of Mathematics (NCTM) Standards and to meet the requirements of the Texas Essential Knowledge and Skills for grades 3-8 mathematics through focusing on core concepts throughout the year. The intent of this design is to develop students' confidence in their ability to understand and use mathematics as a tool to solve problems as well as help students develop an understanding of the importance of mathematics in relation to their future world.

This curriculum is designed to be composed of many problems – some for spiraled review of skills and concepts already presented, some to help students develop an understanding of new skills and concepts, some to involve the use of hands-on mathematics, some to include other disciplines such as reading, writing, science, social studies, art, and architecture.

The design of each lesson is consistent and includes a format for delivery of instruction, student learning, problem-solving, homework, review, and assessment. Where appropriate, the use of manipulatives and technology is included in a lesson. Cooperative learning as a learning setting is utilized in each lesson.

Curriculum Overview

Lesson Focus

Each lesson in the Parent Guide begins with a Lesson Focus. The TEKS expectations, focus for the lesson, and STAAR expectations are included.

Process Standards Incorporated Into Lesson

The Parent Guide includes a list of the Process Standards student expectations.

Vocabulary for Lesson

The Parent Guide includes a list of Vocabulary words and phrases students should know and understand by the end of each lesson.

Math Background

The Math Background for each part of a lesson is provided in the Parent Guide. Students are expected to take notes during instruction of the Math Background information in the lesson - notes will be used during the lesson - the goal is for students to record important information. Notes should be recorded in the student's own "words," "symbols," and pictures or diagrams.

Problem-Solving

A Problem-Solving Model is located in Lesson 1 of the Parent Guide for use throughout the entire school year. This model addresses the Process Standards TEKS in Grade 4. This model will be discussed in the classroom during this lesson and a copy will be given to each student to keep in a math notebook.

A general set of Problem-Solving Questions is addressed by students as they solve the problems and during class discussion of the solution process. Each student will keep a copy of these questions in a math notebook.

Students work in pairs to complete a Problem-Solving Activity, however, each student completes and records their individual work.

Student Activity

At least one Student Activity is included in each part of a lesson. Students work in pairs to complete a Student Activity, however, each student completes their own activity page(s). Math Notes are utilized to enable students to successfully complete the activity. If students did not take notes on material they need to complete the activity, the teacher will invite them to view the Math Background and to take more detailed notes.

Hands-On Activity

Most lessons include at least one Hands-On Activity. Students work in pairs or groups of four for a Hands-On Activity, however, each student completes their own recording of data during the activity and questions about the activity.

Skills and Concepts Homework

Students will be working on Skills and Concepts Homework at home. Students should use their math notes to help them with their homework. Each homework includes 5 open-ended questions.

Mini-Assessment

A Mini-Assessment in STAAR format is given at the end of each lesson. This assessment is completed by each individual student and scored by the teacher.

Six Weeks Review and Six Weeks Assessment

The Six Weeks Review is open-ended and will address all TEKS in the lessons. The review includes a Six Weeks Class Review and a Six Weeks Homework Review.

The Six Weeks Assessment is designed to assess all TEKS in the lessons from the six weeks. The assessment includes 20 questions.

For additional information please contact the author via e-mail.

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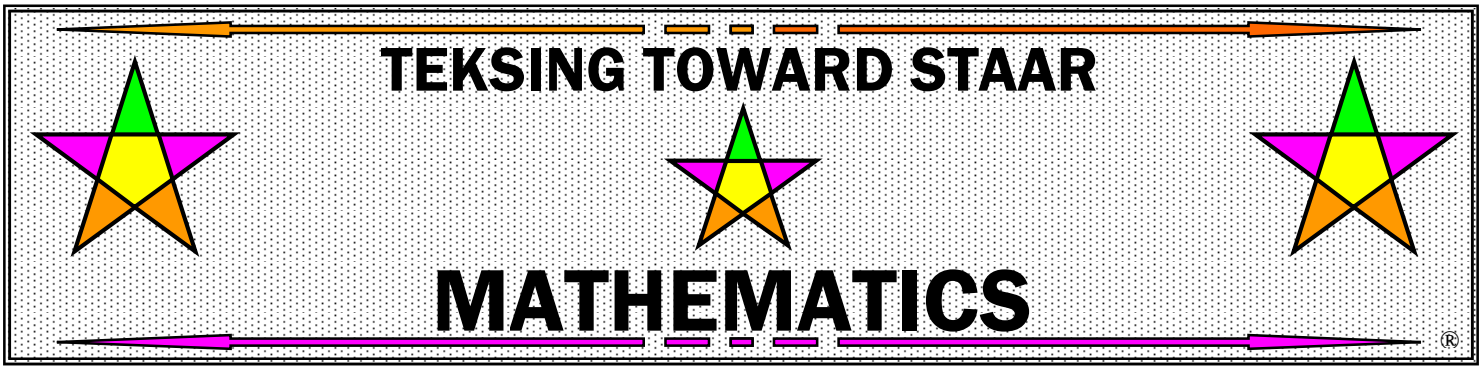

Parental Roles, Common Questions, and Answers

As a parent, you want to do what is best for your child. Sometimes when it comes to helping your child with mathematics, you may not be sure what "best" is. When parents of Grade 4 students work to help their children, they often discover a feeling that "this is not the math I encountered as a fourth grader" and begin to ask themselves what they can do to help their child. Often, parents find it difficult to decide what is "best" when helping their child. Some of the questions parents ask include:

- *How much help should I give my child?*
- *What if I don't remember (or recognize) some of the math I learned in school?*
- *How can I help my child prepare for tests and other assessments?*
- *How can I help my child discover that math can be interesting and fun rather than frightening to my child?*
- *How do I communicate with my child's teacher to find out what my child should learn?*
- *How do I communicate with my child's teacher to find out how my child is progressing with the understanding of math?*

A successful parent often takes on many roles in the process of parenting. The following roles are involved in helping your child become the best mathematics learner possible.

Role 1: Tutor

As a tutor, a parent can help with the practice and memorization that are part of getting a firm grasp on many math topics. You can also help your child learn how math topics he or she may have had trouble understanding at school. The Grade 4 Scope and Sequence in this Parent Guide helps to inform parents about the lessons that will be taught each Six Weeks.

You can also help your child learn about math skills and concepts he or she may have trouble understanding and applying. This guide provides background information to help you help your child with each lesson. Your child will be taking notes at school that will include background information during each lesson. You should start by checking to make sure your child is taking good notes, then by helping your child work through the information and examples as they are presented in the background information, but you might think of another way to help your child understand that works even better.

Role 2: Role Model

Make your child aware of how often you use math in everyday life. Discuss situations like comparing prices in a store, balancing a checkbook, setting up a new toy, or figuring out game scores.

Share examples of times when you need to stop and think about a problem before solving it. Ask your child about the Problem-Solving Plan he or she is using in the math curriculum (the Problem-Solving Plan is included in the Parent Guide and is explained in the very first lesson of the year). Talk to your child about the fact that some of your real-world problems are harder to solve than others, and that you end up spending more time on those problems and checking your work several times in several different ways. Discuss with your child how solving a very difficult problem is very satisfying, even though it takes a lot of time and hard work.

Role 3: Learning Facilitator

Your child may be very independent and be able to be very successful in math without your help at home. However, you may want to check your child's work just to be sure he or she really does not need help. Be sure to question your child daily about the lesson and homework, and make sure your child begins to review for the Six Weeks Assessment by the end of the fifth week of each six weeks. Also, keep reminding your child that you are always ready to help when needed, or you will find someone else who will help.

Role 4: Teaching Partner

Your child's teacher spends about six hours a day, five days a week with your child. He or she probably knows your child quite well. But remember, you have been with your child a lot longer and have many more chances to work one-on-one with your child.

There may be things the teachers doesn't know about your child. Maybe your child learns better by doing an activity than by reading about math in a book, or perhaps your child learns best by listening. It is important to provide the teacher with as much information about your child as you can. It is also important for you to know what is being taught, so that you can reinforce the math curriculum at home. Remember, you and the teacher have the same goal: to help your child learn. Your role as a partner to the teacher may be as important as your role as advocate for your child.

Role 5: Home Learning Environment Creator

When it comes to homework, many children need a little encouragement from their parents. Help your child find a homework location at home with good lighting and near enough to you or someone else to answer questions. Find a location with no distractions (if there are distractions in the room, your child may choose to work with a soothing music CD and earphones). Make sure the location has room to spread out all the tools and supplies (for example: paper, pencils, pencil sharpener, erasers, crayons, scissors, centimeter ruler, inch ruler, a collection of button, coins or other small objects your child can use to model math problems).

Provide encouragement for your child to utilize the space on an almost daily basis. Make homework a part of your child's daily routine - after at least a 30-minute break from the school day – and long before late evening. Help your child get started and stay focused if necessary. Encourage and allow your child to take a five-minute break every 20 minutes while completing homework.

Role 6: Homework Helper

Homework is an extremely useful teacher and parent tool that can be used to assess a child's progress in math. Homework provides opportunities for a parent to observe a child's comfort level and understanding of math skills and concepts. Following are steps a parent can take to help their child learn the math curriculum during the school year:

Step 1: Begin by reading the background information in this guide for each lesson.
Step 2: Ask your child to review the Math Notes taken during class for this lesson.
Step 3: Review any missing or incomplete background information with your child.
Step 4: Ask your child to describe each of the 5 homework problems to you in his or her own words.
Step 5: Ask your child to describe a process that can be used to answer each problem.
Step 6: After your child has solved the homework problems, ask if there is another way each problem might be solved. Share a different way you may have thought of, but remember that the way you learned to solve similar problems may or may not help your child understand the problem. Try not to value one method that works more than another method that also works. In mathematics, there are often several good ways to solve the same problem.
Step 7: Review your child's work. Praise your child for correct answers, then ask your child to redo any of the problems that were incorrect. Ask your child to explain his or her work as each problem is reworked. If the same errors are made again, your child probably does not understand the concept and should go back to his or her Math Notes for a review.

Step 8: If your child is having difficulty understanding homework, make sure he or she makes time in the daily schedule to attend tutorials offered by the teacher or the school.

Step 9: Review the previous day's homework with your child and/or review your child's Mini-Assessment after the teacher has graded it and returned it to your child.

Step10: Immediately contact your child's teacher and request a phone or in-person conference if your child appears to have difficulty for more than 3 days, or does not bring home a homework assignment for more than 2 days, or does not share graded Mini-Assessments with you on a regular basis.

You may have questions and we will try to help you with some answers to common questions on the next several pages of this guide.

Common Questions and Answers

The following questions from parents are very common. Following each question is a brief answer.

Question 1: Should my child be using a calculator at school or at home?

ANSWER: Students in Grade 4 should not be using a calculator in math class or while working on math homework. Students in Grade 4 are expected to come from Grade 2 with mastery of recall of basic addition and subtraction facts by memory. Students in Grade 3 are expected to recall multiplication facts and the corresponding division facts.

The Grade 2 TEKS adopted in 2012 states the following expectations:

"For students to become fluent in mathematics students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Grade 3 are expected to perform their work without the use of calculators."

"The student is expected to recall basic facts to add and subtract within 20 automatically."

The Grade 3 TEKS adopted in 2012 state the following expectations:

"For students to become fluent in mathematics students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Grade 3 are expected to perform their work without the use of calculators."

"The student is expected to recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division sentences."

Question 2: When my child comes home from school, he or she needs a break. Then after the break it is almost impossible for my child to get started again. Often homework is done late at night or not at all. How do I help my child change?

ANSWER: When children come home from school, they do need a break. Set a specified time for the break – 30 minutes should be long enough. Use a timer if you like. Then help your child get started. Allow short breaks during homework time. A five-minute break every 20 minutes works well for Grade 4 students.

Homework needs to be part of a routine. It is not always possible to have exactly the same schedule, because of outside activities, but let your child know that homework time always starts 30 minutes after getting home, or 10 minutes after dinner. If a child waits until late at night to do homework, he or she usually doesn't have the level of concentration that they need. Also, since it isn't always easy to predict how long an assignment may take, they may not finish before bedtime. If homework seems to be taking too much time, check with your child's teacher about how long it <u>should</u> be taking.

Question 3: My child has not been given a textbook, or says he or she doesn't need to use a textbook to do homework. I'd like to help him or her review from time to time, or help him study for tests, but I am not even sure what topics or TEKS are being presented in class or have been presented in class.

ANSWER: Refer to the Scope and Sequence in this guide. Your child should be able to help you identify current and past TEKS and topics presented during class. Look at the top of each homework page or lesson page your student brings home. The TEKS focus for the lesson is always listed at the top of each page.

Make sure your child is keeping Math Notes, Student Activities, Problem-Solving activites, returned homework assignments, and returned Mini-Assessments in a notebook in an organized manner. You should be able to ask your child for his math notebook at any time and review any of the material with your child. Remember to review the math background in this guide if you need to. *If you are really trying to play the role of tutor for your child, you should both be able to refer to his or her work in order to choose areas of weakness for a more focused review.*

Question 4: Often my child rushes through the math homework and makes many careless errors, then asks me to check the homework instead of checking it himself. How can I make my child more responsible for the work?

ANSWER: Try to convince your child not to rush through the homework. There are only 5 problems on the *TEKSING TOWARD STAAR* lessons homework so that students will have time to really think about the questions and do a good job completing the assignment with very few errors. Help your child understand that the teacher is giving fewer homework problems, therefore the teachers expects to see all the student's work to answer each problem, and also evidence the student has checked all answers to make sure they are accurate.

Offer to look over the homework and tell your child which problems contain errors. Your child should then check to find the incorrect answers. Eventually, your child should begin to slow down and be more careful when realizing that finding and correcting careless mistakes takes a lot more time than doing careful work in the first place.

Question 5: My child asks for help with homework, but what is really being asked is for me to do the work. How much help should I give?

ANSWER: Decide whether there is some non-math reason for your child's request for help. Your child could actually be overtired or would rather be doing something other than homework – if either of these are the case, try changing the routine homework time.

If your child really doesn't understand how to do the problem at all, first take a blank piece of paper and do the problem by yourself with your child being able to see your work as you do it (remember to refer to the background information for the lesson in this guide if you need help). Show every step and explain to your child what you are doing as you record your work. Next, remove the paper and ask your child to redo the same problem on the actual homework sheet, explaining each step to you just as you did for your child earlier.

If your child is still having difficulty, try recording the problem and your solution on another sheet of paper, this time leaving out parts of the solution. Have your child fill in the missing information.

If you child still doesn't seem to understand, work with your child to write a note to the teacher explaining the problem and promising to complete the homework assignment as soon as the teacher has time to provide additional help such as tutorials during, before and/or after school. Include all the work that you and your child did to try to solve the problem.

Question 6: My child is very independent and doesn't want me to be involved with math homework. However, sometimes the grade given on the assignment or assessment shows that my child didn't really understand a lesson. What can I do?

ANSWER: A major goal of all parents is to have a child grow into an independent adult. Don't discourage independence. A good goal is to have your child completely independent during homework time by the beginning of grade 9.

When your child finishes the homework, ask if you can check it over and ask your child to explain how one or two of the problems were solved. The explanation can help you decide if your child understands the main concepts. If your child does not want your help looking over the homework to find careless errors, then leave the finding of homework errors to the teacher. Your main concern is that your child understands the main concepts – and if you decide your child does not, then send them back to the Math Notes taken in class and review the material in this guide in the background information for the lesson.

Question 7: What should I do if my child brings home an overwhelming amount of homework or no homework at all?

ANSWER: First be sure that the homework is really intended to be done in one day. Often, teachers give assignments that are to be done over a period of a few days. If this is the case, help your child break the assignment into parts and write down which part should be completed each day.

If the assignment is intended to be done in one day, be sure your child's outside activities are not part of the problem. Next, understand that some students take longer to do certain assignments that others. Try cutting the assignment down, but be sure to include a few off each different type of problem. For example, if your child brings home a practice sheet with addition and subtraction problems, choose some of each. Then write a not to the teacher explaining that the assignment was too long for your child and that you will work with your child to complete the assignment the next night, or over the weekend.

In general, students should have a math homework assignment each day – or should be studying for the end of six weeks assessment. Communicate with your child's teacher if there appears to be a lack of homework assignments, or your child is consistently telling you that the homework was done in class.

Question 8: Sometimes my child brings home a worksheet that has small type or not enough space to really show the work. What can I do to help my child keep from becoming frustrated when this happens?

ANSWER: Sometimes worksheets can be overwhelming. Try copying the problem onto another piece of paper, leaving plenty of room for work. Sometimes having very little on a page can really help a child focus on a particular problem. Copying a problem onto a different piece of paper may also make it easier for your child to refer to examples or instructions that are not on the same side of the homework sheet as the problem. When you copy a problem, be sure your child sees you double-check that you copied it correctly. In the beginning you are acting as a role model so that eventually your child will be comfortable copying the problem. Be sure your child shows all the work they do to answer a problem.

Question 9: My child's work is so sloppy that I sometimes think this causes completion of the problem with a wrong answer. What can I do to help?

ANSWER: Try helping your child set up a paper before getting started. Figure out how much space will be needed for each problem (be generous). Fold the paper into sections. If your child has difficulty lining up the numbers when computing, try having your child use graph paper or lined notebook paper turned sideways. Also, encourage your child to slow down and take the time required for neatness

Question 10: When my child asks me to check homework, I find many answers that are wrong. How do I decide whether my child has been careless or does not actually understand the math concepts?

ANSWER: Ask your child to redo some of the problems that are wrong. If answers are correct his time, your child was probably being careless. If the same errors are made again, then your child probably does not understand the concept(s) and should go back to Math Notes or the Parent Guide for a review.

If your child successfully uses a method other than the examples given in class or in the Parent Guide, it might be a good idea to send a not to the teacher explaining why your child prefers a different method. In mathematics, there are often several good ways to solve the same problem.

OTHER QUESTIONS???? – Please contact your child's math teacher – if the teacher can't answer your question, feel free to contact the author via e-mail:

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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?

Problem-Solving 1

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

- Create the greatest number possible using all the number cards and placing the 6 card in the ten millions place.

  Write this number in standard and word form.

  Read the number out loud to your partner in standard form and in word form.

- Create the least number possible using all the number cards and placing the 6 card in the ten thousands place.

  Write this number in standard and word form.

  Read the standard form and word form out loud to your partner.

- Create two other 9-digit numbers using all the number cards and placing the 6 card in the tens place or the hundreds place.

  Write the numbers in standard form and in word form.

  Read the standard form and word form out loud to your partner.

Problem-Solving 2

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

- 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.

  Write and read this number in standard and word form.

- 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 thousandths place.

  Write and read this number in standard and word form.

- Write two numbers using 5 of the number cards, the decimal point after a two-digit whole number, and the 0 card in the tenths or hundreds place.

  Write and read the numbers in standard form and in word form.

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	0.9 meters

What is the expanded notation for each of the lengths?

What is the word form for each of the lengths?

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

What is the value of the digit 9 in the length of the blacknose shark?

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

Hands-On Activity 1

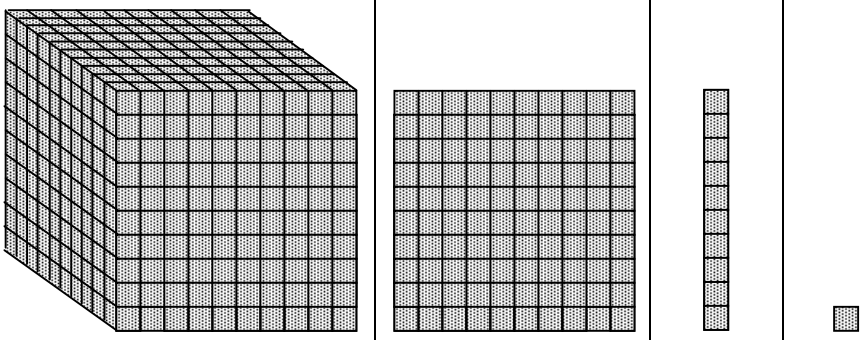
WHOLE NUMBER PLACE-VALUE PATTERNS

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

_____

_____.

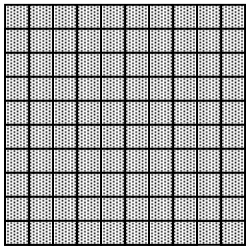
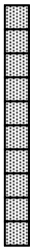
Hands-On Activity 2

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.

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*.

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 _____ + __ + _____ + _____

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 ___/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

_____

_____.

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 your know your answer is correct.

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

   Explain how your know your answer is correct.

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.

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

TEKSING TOWARD STAAR

MATHEMATICS ®

GRADE 4

TEKS/STAAR-BASED LESSONS

PARENT GUIDE
Six Weeks 1

TEKSING TOWARD STAAR
Six Weeks 1 Scope and Sequence
Grade 4 Mathematics

Lesson	TEKS/Lesson Content
Lesson 1	**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
Lesson 2	**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
Lesson 3	**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
Lesson 4	**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
Lesson 5	**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
Lesson 6	**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)
Lesson 7	**4.6A/**identify points, lines, line segments, …and parallel lines
Lesson 8	**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…
Lesson 9	**4.10A/**distinguish between fixed and variable expenses
Review	
Assessment	

NOTES:

Lesson 1 - 4.2A & 4.2B

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

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		

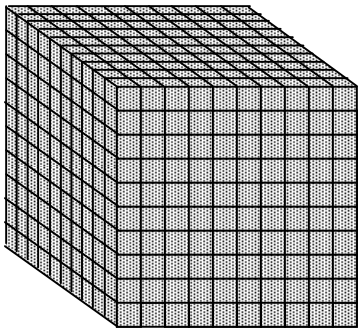
Math Background Part I - Whole Number Place-Value

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**.

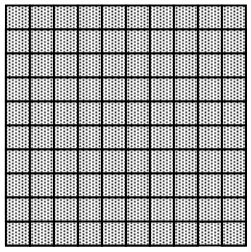
Whole Number Place-Value Patterns

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

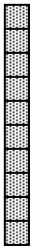
EXAMPLE 1: In our number system, each **place** has ten times the **value** of the place to its right.



1 Thousand
10 times greater than 1 hundred



1 Hundred
10 times greater than 1 ten



1 Ten
10 times greater than 1 one

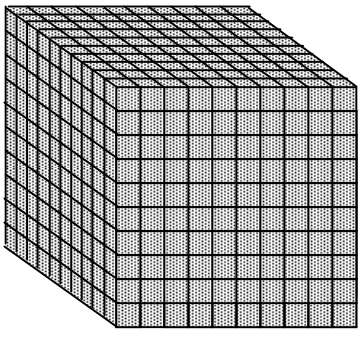
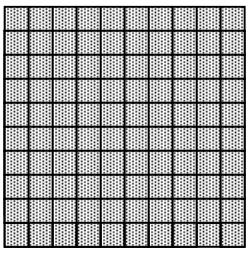
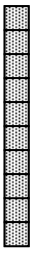
1 One

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.

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

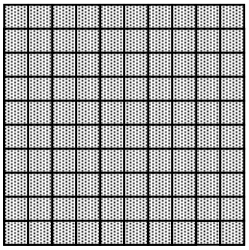
The value of the number **after** the decimal point is **less** than **1 dollar**.

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

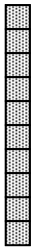
Decimal Place-Value Patterns

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

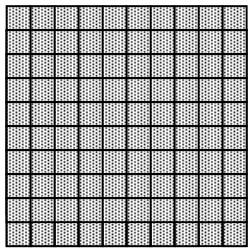
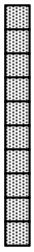
Decimal Place-Value Pattern of Tens

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.

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

LESSON 6 - 4.5A and 4.5B

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.

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 $n - 3$.

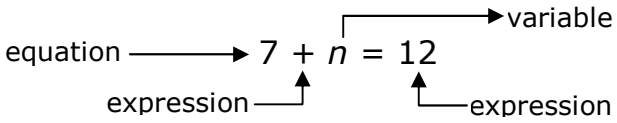
Writing Addition and Subtraction Expressions

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.



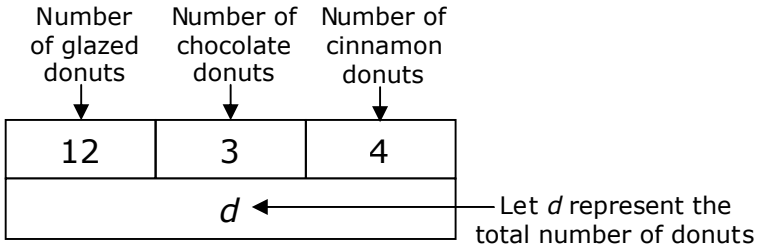
To write an equation, think about which two amounts are equal in a problem. Then write an expression for each amount.

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	$a - 7 = 35$

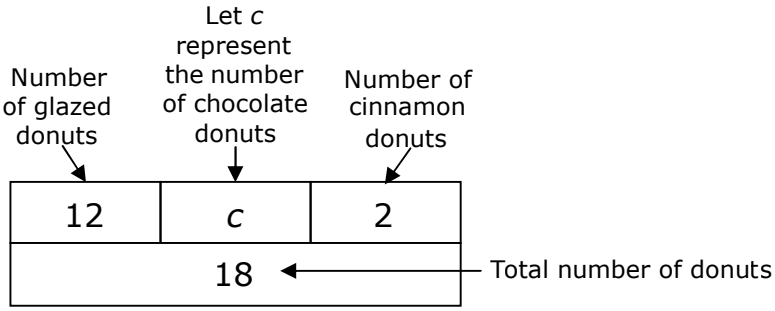
Strip Diagrams

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?

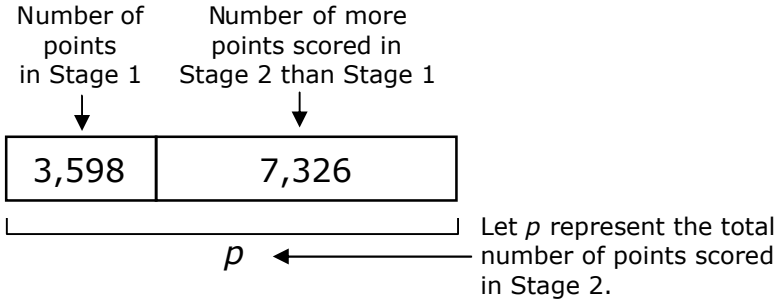


EXAMPLE 2: Miguel has 18 donuts. He has one dozen glazed donuts, some chocolate donuts, and 2 cinnamon donuts. How many chocolate donuts does he have?



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.



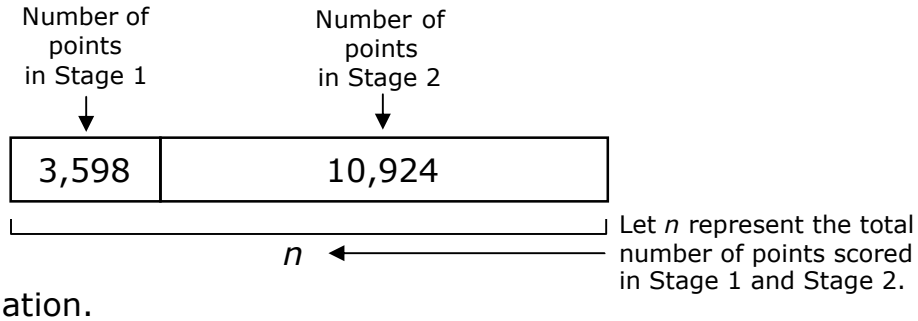
Write an equation.

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

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.

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

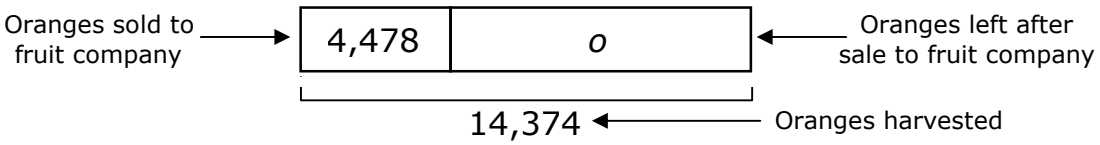
Solve the equation.

$$14{,}522 = n$$

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.



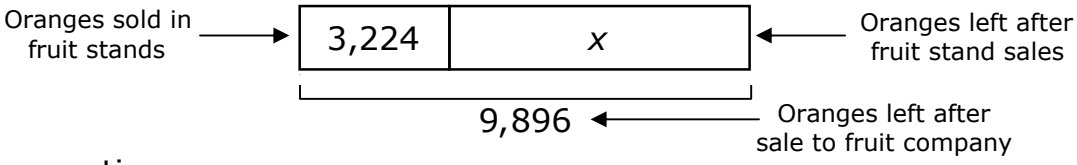
Write an equation.

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

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.

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 group finds 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

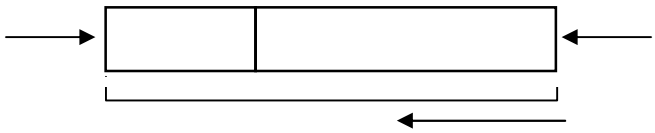
- What did you learn from this activity?

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.

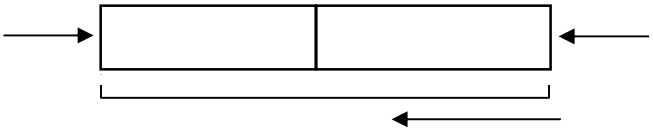
_____ – _____ = _____

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.

_____ = _____

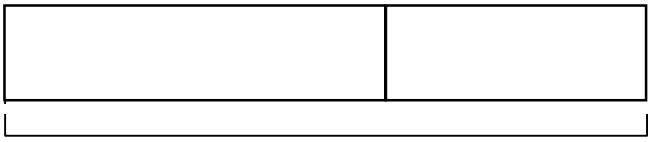
So, the number of students in the fifth grade is _____.

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.

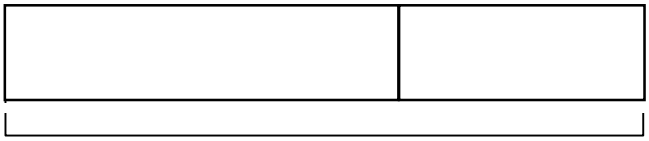
_____ + _____ = _____

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.

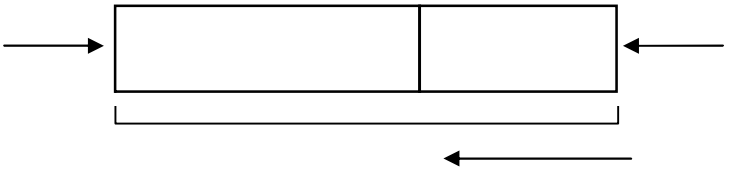
_____ + _____ = ___

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.

4 6 4
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.

−4 +6 −4 +6
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.

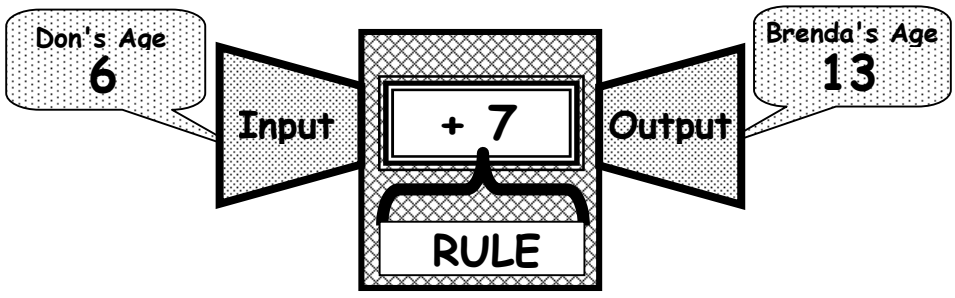
Generating a Number Pattern

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 ← $d + 7 = b$ → 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 → Brenda's age ←

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

First term → Value of term ←

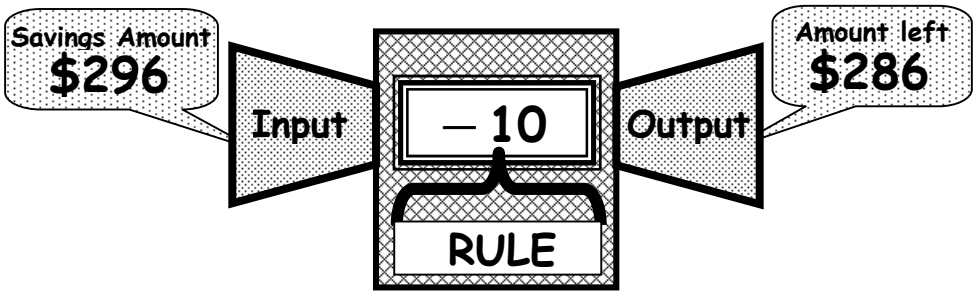
Second term → Value of term ←

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	296 − 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.