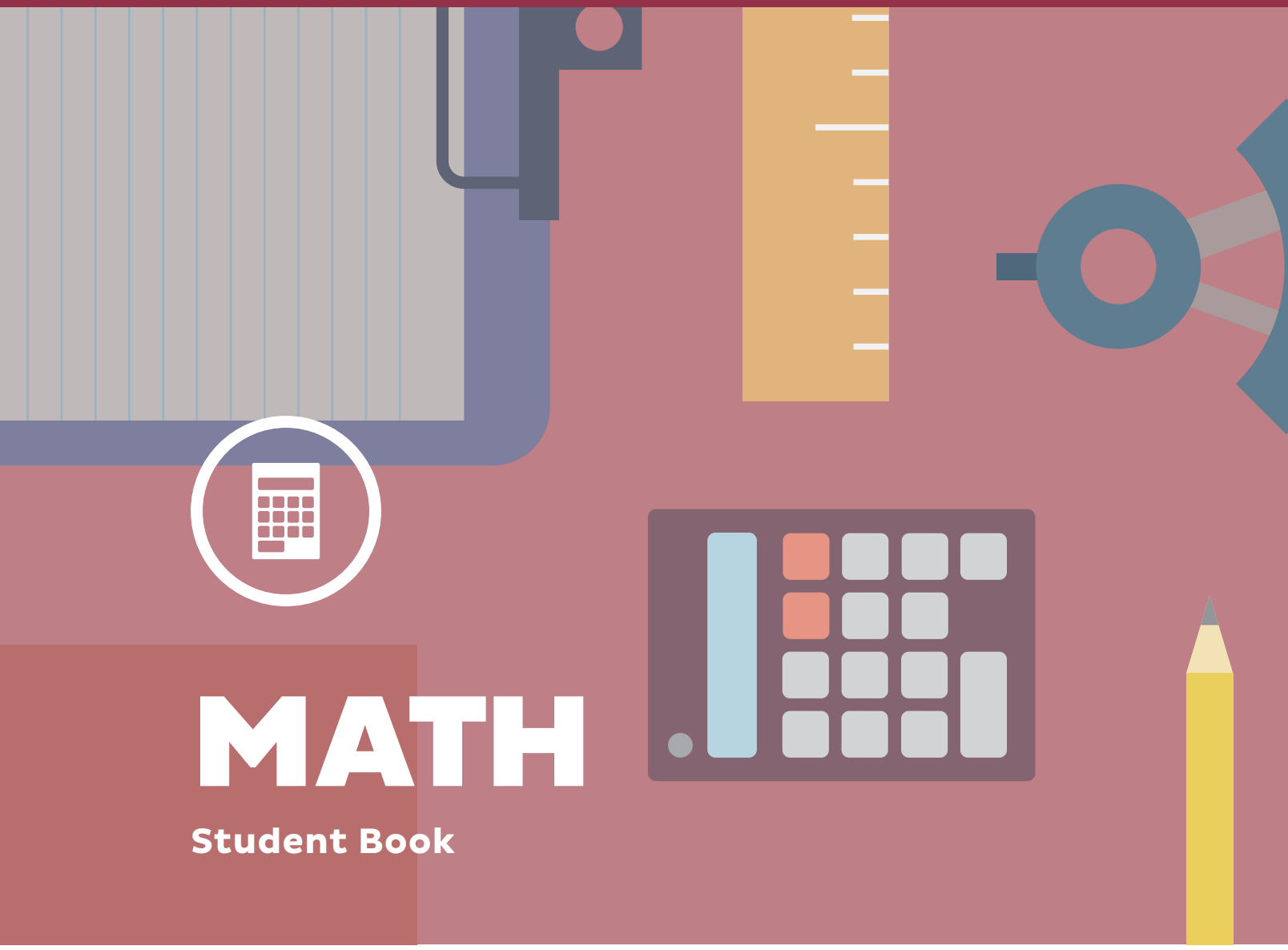
LIFEPAC®



MATH

Student Book

5th Grade | Unit 1

Alpha Omega
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MATH 501
PLACE VALUE, ADDITION, AND SUBTRACTION

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PLACE VALUE, ADDITION, AND SUBTRACTION

Math 500 is a full-year elementary math course focusing on number skills, numerical literacy, and geometric concepts. In it, students will gain solid experience with number theory and operations, including whole numbers, decimals, and fractions. In addition, students will develop their understanding of measurement and two- and three- dimensional figures. This course also integrates mathematical practices throughout the units, as well as introducing students to algebraic, statistical, and probability concepts.

By the end of the course, students will be expected to do the following:

- **Perform all four operations on whole numbers and decimals (to hundredths).**
- **Perform addition and subtraction of fractions and mixed numbers with like and unlike denominators.**
- **Understand place value of decimal numbers (to thousandths).**
- **Evaluate expressions for given values and plot whole number ordered pairs on coordinate grids.**
- **Represent and interpret data on line plots, stem-and-leaf plots, line graphs, and bar graphs.**
- **Convert units of measurement within a given measurement system.**
- **Classify plane shapes and calculate their perimeter and area.**

In this unit, you will explore whole numbers and decimals. You will learn about place value for these numbers, and use place value to compare, order, and round them. In addition, you will learn about the whole number properties and use them to compute sums and differences mentally. Finally, you will learn how to add and subtract whole numbers and decimals. You will use estimation to predict your answer and to check if your answer is reasonable.

Objectives

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LIFEPAC. When you have finished this LIFEPAC, you should be able to:

- Identify place value for whole numbers and decimals.
- Compare and order whole numbers and decimals.
- Round and estimate with whole numbers and decimals.
- Apply the whole number properties to solving problems.
- Add and subtract whole numbers and decimals.

1. PLACE VALUE

Have you ever thought about the number 1 billion? You probably know that it's a big number, but how big is it? Here are a couple of examples.

- **In time, 1 billion seconds is more than 31 years!**
- **If you stacked 1 billion pennies on top of each other, the stack would reach more than 962 miles high. And, it would be worth exactly 10 million dollars!**
- **A male elephant can weigh up to 15,000 pounds. It would take more than 66,000 of these large mammals to weigh 1 billion pounds!**

In this lesson, we'll explore numbers and how to read and write them. We'll also look at place value in both small and large numbers.

Objectives

Read these objectives. When you have completed this section, you should be able to:

- Identify place value for whole and decimal numbers.
- Read and write numbers in different forms.
- Compare and order numbers.
- Represent decimal numbers on a grid.

Vocabulary

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAC.

decimal number. A special fraction based on the number ten.

decimal point. The period in a decimal number that separates the whole from the part of a whole.

digit. One of the numerals from 0 to 9.
expanded form. Shows a number written as an addition statement.
greater than. When one number is larger in value than another.
less than. When one number is smaller in value than another.
number line. A line that graphically represents all numbers.
period. Each three-digit part of a whole number, separated by commas.
place value. The position of a digit in a number, which determines its value.
standard form. Shows a number written using digits.
whole number. A number belonging to the set of numbers made up of zero and the counting numbers: 1, 2, 3, and so on.
word form. Shows a number written in words.

Note: *All vocabulary words in this LIFEPAC appear in* **boldface** *print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.*

Whole Number Place Value

Vocabulary

As you know, 1 billion is a very large number. Another way to write it is a 1 with nine zeros behind it. When a number is written using **digits**, or the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9, it's in **standard form**. So, in standard form, 1 billion is written as 1,000,000,000.

The position of each digit in a number tells how much the digit is worth. This is called **place value**. Let's look at the place value of an even bigger number: 423,180,000,000.

So, each digit in this number represents a different part of the number. Take a look:

- The **4** is in the **hundred billions place**. It has a value of four hundred billion, or 400,000,000,000.
- The **2** is in the **ten billions place**. It has a value of twenty billion, or 20,000,000,000.

Vocabulary

Each three-digit part of a number, separated by commas, is called a **period**. And, in each period, from right to left, the value of a digit is worth one, ten, and one hundred.

Place Value Chart

Billions Period			Millions Period			Thousands Period			Ones Period		
hundred billions	ten billions	billions	hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
4	2	3	1	8	0	0	0	0	0	0	0

423,180,000,000

- The **3** is in the **billions place**. It has a value of three billion, or 3,000,000,000.
- The **1** is in the **hundred millions place**. It has a value of one hundred million, or 100,000,000.
- The **8** is in the **ten millions place**. It has a value of eighty million, or 80,000,000.

The value of the whole number is the same as all its different parts added together. So, 423,180,000,000 is the same as 400,000,000,000 + 20,000,000,000 + 3,000,000,000 + 100,000,000 + 80,000,000. When a number is written as an addition statement, it is in **expanded form**.

Keep in mind...

The digit 0 is called a placeholder. It has to be written in a number in standard form to show that there are none of that place value, but it does not have to be read aloud.

Example:

In the number 360,148,975, which digit is in the ten thousands place?

Solution:

Starting from the right, the first period represents the ones. The second period represents the thousands. So, the 4 is in the ten thousands place.

Example:

In the number 916,005,000,000, what value does the 6 have?

Solution:

Starting from the right, the 6 is in the fourth period. Remember that the first period represents the ones. The second period represents the thousands. The third represents the millions. And, the fourth represents the billions. The 6 is in the ones place of the fourth period, so it's in the **one billions place**. It has a value of six billion, or 6,000,000,000.

Three Number Forms

A number can be written in three different ways: standard form (using digits), expanded form (as an addition statement), or **word form** (using words). Here are some tips for writing a number in word form:

- Just as in standard form, each period is separated by a comma.
- The word *and* is not used to write whole numbers in word form.
- A hyphen is used in two-word numbers between 20 and 100. For example, 99 is written as ninety-nine.
- Zero acts only as a placeholder, so it does not need to be written.

Example:

Express the number 846,120,050 in word form and expanded form.

Reminder:

The word *and* is not used when writing out whole numbers.

Solution:

Word form: Eight hundred forty-six million, one hundred twenty thousand, fifty

Expanded form: 800,000,000 + 40,000,000 + 6,000,000 + 100,000 + 20,000 + 50

Example:

Write the number seventy billion, two hundred thirty-seven thousand, six hundred two in standard form and expanded form.

Be careful!

Even though there were no digits to write in the millions period, we had to write zeros in as placeholders. Otherwise, the other digits wouldn't have been in the right places.

Solution:

Standard form: 70,000,237,602

Expanded form: 70,000,000,000 + 200,000 + 30,000 + 7,000 + 600 + 2

One thing to notice about place value is that as you move from right to left through a number, the value of each digit gets larger. In fact, as you move left, each position is worth ten times more than the position to the right of it. For example, look at the number 888.

Standard form: 888

Word form: eight hundred eighty-eight

Expanded form: 800 + 80 + 8

Even though the digits are all 8s, they each are worth something different. An 8 in the ones place is only worth 8. But, in the tens place, the 8 is worth ten times more than the 8 to the right of it, which is 80. And, moving further to the left, an 8 in the hundreds place is worth ten times more than 80, which is 800.

Let's Review!

Before going on to the practice problems, make sure you understand the main points of this lesson.

- ✓ Numbers can be written in standard form, word form, or expanded form.
- ✓ In standard form, the position of each digit tells how much it is worth.
- ✓ A digit in one position is worth ten times as much as if it were in the position to its right.

Complete this activity.

1.1 Match the terms with their definitions.

a. _____ digit

b. _____ expanded form

c. _____ period

d. _____ place value

e. _____ standard form

f. _____ word form

1. shows a number written using digits
2. one of the numerals from 0 to 9
3. the position of a digit in a number, which determines its value
4. shows a number written as an addition statement
5. shows a number written in words
6. each three-digit part of a whole number, separated by commas

Circle the correct letter and answer.

1.2 What is the value of the bold digit? **1**50,648,700

a. millions b. hundred millions c. hundred billions d. ten billions

1.3 What is the value of the bold digit? 150,648,**7**00

a. tens b. ones c. thousands d. hundreds

1.4 What is the value of the bold digit? 92,007,6**4**2,188

a. hundreds b. hundred thousands c. ten thousands d. thousands

1.5 What is the value of the bold digit? 9**2**,007,642,188

a. billions b. thousands c. ten billions d. ten millions

1.6 Which digit is in the ten billions place? 163,097,000,452

a. 9 b. 6 c. 3 d. 1

1.7 Which digit is in the millions place? 50,862,115

a. 5 b. 2 c. 8 d. 0

1.8 Write a number (in standard form) that has the digit 7 in the thousands place. Use the digit 7 only once.

_____

Circle the correct letter and answer.

1.9 Write the following number in expanded form.

130,618

a. 100,000 + 30,000 + 600 + 10 + 8

b. 10,000 + 3,000 + 600 + 10 + 8

c. 100,000 + 30,000 + 6,000 + 10 + 8

d. 10,000 + 30,000 + 600 + 10 + 8

1.10 Write the following number in standard form.

700,000,000 + 2,000,000 + 80,000 + 90

a. 700,280,900 b. 720,800,090 c. 702,800,900 d. 702,080,090

1.11 Write the following number in standard form.

one hundred four billion, twenty-seven thousand, five hundred seventy-one

a. 140,270,571,000 b. 104,000,270,571

c. 104,000,027,571 d. 140,027,000,571

1.12 Write the following number in expanded form.

fifty-six million, two thousand, four hundred

a. 50,000 + 6,000 + 200 + 40

b. 50,000,000 + 6,000,000 + 2,000 + 400

c. 5,000,000,000 + 600,000,000 + 2,000 + 400

d. 50,000,000,000 + 6,000,000,000 + 2,000 + 400

Complete this activity.

1.13 Write the following number in word form. 8,409,120

_____

_____

Circle the correct letter and answer.

1.14 Which place is the digit 3 in? 134,590,278

a. ten millions

b. hundred millions

c. billions

d. ten thousands

1.15 Which digit is in the hundreds place? 134,590,278

a. 0 b. 7 c. 2 d. 5

1.16 How should 13,079 be written in word form?

a. thirteen thousand seventy nine

b. thirteen thousand, seventy nine

c. thirteen thousand and seventy-nine

d. thirteen thousand, seventy-nine

1.17 How should 13,079 be written in expanded form?

a. 1,000 + 300 + 70 + 9

b. 13,000 + 79

c. 10,000 + 3,000 + 700 + 9

d. 10,000 + 3,000 + 70 + 9

SELF TEST 1: PLACE VALUE

Each numbered question = 6 points

Write *true* or *false*.

1.01 _____ In word form, 3,478 is "three thousand, four hundred and seventy-eight."

1.02 _____ 1.7 and 1.700 have the same value.

Circle the correct letter and answer.

1.03 In the number 924,130, the 2 is in the _____ place.

a. hundreds
b. thousands
c. hundred thousands
d. ten thousands

1.04 What is the value of the bold digit? 9.2**0**6

a. tenths
b. thousandths
c. hundredths
d. ones

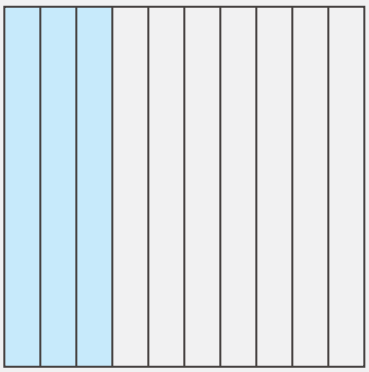
1.05 Write the following number in standard form.
eight hundred twenty-six and four hundredths

a. 8,264
b. 826.4
c. 826.004
d. 826.04

1.06 Write the following number in expanded form. 42,530

a. 40,000 + 2,000 + 500 + 30
b. 40,000 + 2,000 + 50 + 3
c. 40,000 + 200 + 50 + 3
d. 40,000 + 2,000 + 500 + 3

1.07 The grid below represents all of the following decimal numbers *except* _____ .



a. 0.300
b. 0.030
c. 0.30
d. 0.3

Compare the numbers using <, >, or =.

1.08 83,945,500,000 _____ 83,948,200,000

a. < b. > c. =

1.09 0.78 _____ 0.708

a. < b. > c. =

1.010 13.4 _____ 13.06

a. < b. > c. =

Circle the correct letter and answer.

1.011 The table below shows the elevation of the five highest mountain peaks in Alaska. Use the table to answer the following question.

MOUNTAIN	ELEVATION (IN FEET)
Mt. Blackburn	16,390
Mt. Bona	16,500
Mt. Foraker	17,400
Denali	20,320
Mt. St. Elias	18,008

Which sentence is true?

a. Mt. Blackburn is taller than Mt. Bona.

b. Mt. Foraker is shorter than Mt. Bona.

c. Denali is the tallest mountain.

d. Mt. Bona is the shortest mountain.

Complete these activities.

1.012 Put these numbers in order from smallest to largest.

235,305 232,407 235,116 232,411

_____ _____ _____ _____

1.013 Put these numbers in order from smallest to largest.

5.0 5.15 5.008

_____ _____ _____

1.014 Which digit is in the hundred millions place? 812,906,435,000

_____

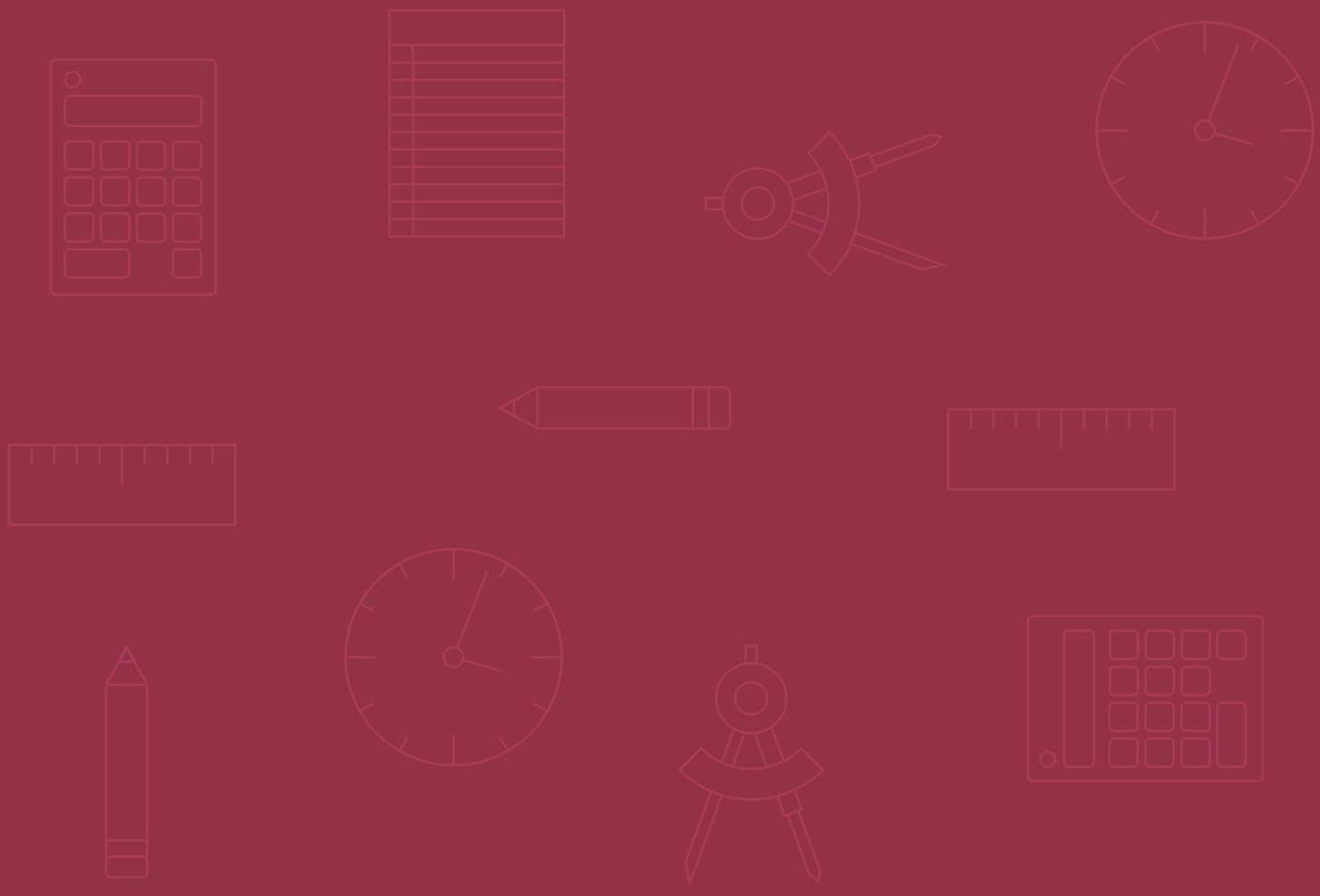
1.015 Which digit is in the tenths place? 512.386

_____

Teacher check: Initials _____

Score _____ Date _____

72/90



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