Lecture Notes

Place Value

A **digit** is a number 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9 that names a place-value location. For large numbers, digits are separated by commas into groups of three, called **periods**. Each period has a name: *ones, thousands, millions, billions, trillions,* and so on.

PLACE-VALUE CHART											
Trillions			Billions			Millions			Thousands			Ones		
								2	7	3	7	4	0	0
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

Periods →

2 millions   737 thousands   400 ones

- This is called a **Place Vaue Chart**.
- Starting from the right, a group of 3 digits is called a **period**.
  - The left-most period can have 3 digits, 2 digits, or 1 digit, depending on the number.
  - Periods to the right of the left-most period will all have 3 digits.
    - **6**,827,306 (one digit in left-most period).
    - **58**,921,475,040 (two digits in left-most period).
    - **328**,001 (three digits in left-most period).
  - Notice above that each period to the right of the left-most period all contain 3 digits.
- **Place value** is the value of each digit that appears in a number.
- Each period has three identical place value identifiers:
  - Ones.
  - Tens.
  - Hundreds.

- Write or say the number in the following order:
  - The number itself. The actual name of the number. Ex: "eight."
  - The place value (ones, tens, or hundreds).
  - The period (thousands, millions, or billions).
- When the left-most digit of a number is in the *ones* place (in the thousands, millions, billions), it is not written down or verbalized.
  - Ex: For the digit **8** in the number 27**8**,342, we *do not* say "8 one thousands." Instead, we just say "8 thousands." The *ones* place value is implied but not written down or verbalized.
- However, the *tens* and *hundreds* place value is written down and verbalized.
- For a number that falls in the *ones period*, we do not write down or say the "ones" period but instead we write down or say the appropriate place value. This is different from the other periods.
  - If the number is 32**8**, the digit 8 would be identified as "8 ones".
  - If the number is 3**8**2, the digit 8 would be identified as "8 tens".
  - If the number is **8**32, the digit 8 would be identified as "8 hundreds".

Write the digit in the thousands place and the digit in the tens place for the given place value.

8691

thousands ☐

tens ☐

- Remember that the *ones* place (thousands, millions, billions) is not written down or verbalized.
- So when the problem wants you to find the digit in the "thousands" place and they do not mention whether it is the *ones*, *tens*, or *hundreds*, it is understood to be the "**one** thousands." The *ones* place is implied.

What digit is in the thousands place?

841,952

What is the thousands digit? ☐

Write the digit in the thousands place and the digit in the tens place for the given place value.

2139

thousands ☐

tens ☐

What digit is in the ten thousands place?

685,143

What is the ten thousands digit? ☐

Enter the number for the given period in the number 9,285,937.

The millions period

The number in the millions period is ☐.

- Here, the question is referencing the *period*.
- Enter all the digits that are in the millions period.

What is the number for the given period in the number 90,000,888,238.

The millions period

What is the number in the millions period?

- A. 90
- B. 000
- C. 888
- D. 238

- This question is also referencing the *period*.

Identify the place occupied by the digit 2.

3,467,243

The digit 2 occupies the [▼] place.

Identify the place value of the digit 4 in the number.

284,560

What is the place value of 4?

○ Thousands
○ Tens
○ Hundreds
○ Hundred-thousands

Identify the place occupied by the digit 5.

3,613,566

The digit 5 occupies the [▼] place.

Identify the place value of the digit 6 in the number.

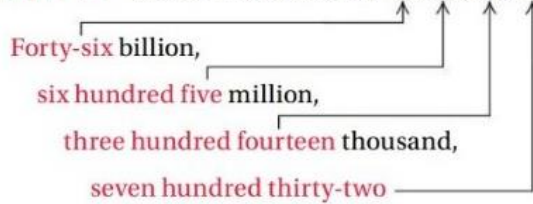397,560

What is the place value of 6?

○ Ten-thousands
○ Thousands
○ Hundred-thousands
○ Tens

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Word Name and Standard Notation

For word names for larger numbers, we begin on the left with the largest period. The number named in the period is followed by the name of the period; then a comma is written and the next number and period are named. Note that the name of the ones period is not included in the word name for a whole number.

EXAMPLE 12   Write a word name for 46,605,314,732.

Forty-six billion,

six hundred five million,

three hundred fourteen thousand,

seven hundred thirty-two

The word "and" *should not* appear in word names for whole numbers. Although we commonly hear such expressions as "two hundred *and* one," the use of "and" is not, strictly speaking, correct in word names for whole numbers. For decimal notation, it is appropriate to use "and" for the decimal point. For example, 317.4 is read as "three hundred seventeen *and* four tenths."

- Converting from **Standard Notation** (number format) to **Word Name** (written format).
    - Begin on the left with the largest period.
    - Write down or say the number in the period.
    - Write down or say the name of the period.
    - Write a comma to separate the periods.
    - Repeat steps above if there are more periods.
    - Do not say the word "and" for whole numbers. "And" is used to represent the decimal.
- A dash ' - ' is needed to connect compound Words Names.
    - Ex: forty-two, thirty-eight, twenty-one, etc.
    - All numbers between 21-99 need a dash, with the following exceptions:
        - thirty, forty, fifty, sixty, seventy, eighty, and ninety.
    - The Word Names for the numbers "one" through "twenty" do not need a dash since they are all a single word.

EXAMPLE 13 Write standard notation.

Five hundred six million,

three hundred forty-five thousand,

two hundred twelve

Standard notation is 506,345,212.

- Converting from **Word Name** (written format) to **Standard Notation** (number format).
- Read the Word Name from left to right.
- Do this in chunks with the comma separating each chunk.
- It is best to verbally say the word name (whisper it or say it in your head). It is easier to translate words into numbers as you hear yourself say them.

Write the word name for the following standard numeral.

2868

Choose the correct word name below.

○ **A.** two thousand-eight hundred-sixty-eight

○ **B.** two thousand, eight hundred sixty and eight

○ **C.** two thousand, eight hundred sixty, eight

○ **D.** two thousand, eight hundred sixty-eight

- Keep the commas and dashes ' - ' in mind.

Write this number in words.

51,104

What is the correct word name?

○ **A.** fifty one thousand, one hundred four

○ **B.** fifty-one thousand, one hundred four

○ **C.** fifty-one thousand and one hundred and four

○ **D.** fifty-one thousand one hundred four

Write the word name for the following standard numeral.

9468

Choose the correct word name below.

- ○ A. nine thousand, four hundred sixty and eight
- ○ B. nine thousand, four hundred sixty, eight
- ○ C. nine thousand-four hundred-sixty-eight
- ○ D. nine thousand, four hundred sixty-eight

Write this number in words.

73,789

What is the correct word name?

- ○ A. seventy-three thousand, seven hundred eighty-nine
- ○ B. seventy-three thousand seven hundred eighty-nine
- ○ C. seventy-three thousand and seven hundred and eighty-nine
- ○ D. seventy three thousand, seven hundred eighty nine

Choose the correct word name for the number below.

15,231

Choose the correct word name below.

- ○ A. fifteen thousand two hundred thirty-one
- ○ B. fifteen thousand, two hundred thirty-one
- ○ C. fifteen thousand, two hundred thirty one
- ○ D. fifteen thousand and two hundred and thirty-one

Choose the correct word name for the number below.

173,789

Choose the correct word name below.

○ **A.** one hundred seventy-three thousand, seven hundred eighty-nine
○ **B.** one hundred seventy-three, seven hundred eighty-nine
○ **C.** one hundred seventy-three million, seven hundred eighty-nine
○ **D.** one hundred seventy-three thousand and seven hundred and eighty-nine

Rewrite the number using digits.

Five thousand, seven hundred eighty-nine

The number is ☐.
(Use commas between periods of digits where needed.)

- Commas are *required* when writing down the numbers in a Standard Notation problem.
- Commas are *optional* when writing the answer to a computational problem (addition, subtraction, multiplication, division). When using commas in your answer:
  - Start from the right of the number and place a comma every 3 digits going to the left.
  - Commas are placed *between* the periods.
  - Each period holds 3 digits (except the left-most period which can have 1, 2, or 3 digits).

Using digits, write the number twenty-seven thousand, eight hundred thirty-nine.

Twenty-seven thousand, eight hundred thirty-nine is ☐.

Rewrite the number using digits.

Eight hundred twenty-eight thousand, seven hundred forty-nine

The number is ☐.
(Use commas between periods of digits where needed.)