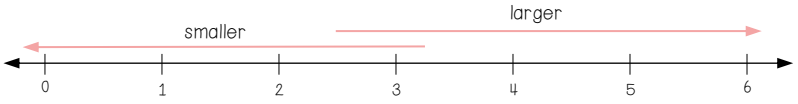
Name:_____ Date: _____ Period: _____

Place Value with Whole Numbers notes

Vocabulary		
Term	Definition	Example
Counting Numbers (Natural)	Basic numbers used to count objects	1, 2, 3, 4....
Whole Numbers	Counting numbers plus zero	0, 1, 2, 3, 4, 5...
Number Line		

Place Value

Our number system is called a **place value system,** because the value of a digit depends on its position in a number. The place values are separated into groups of three, which are called periods. The periods are ones, thousands, millions, billions, trillions, etc. When we write a number, commas separate the periods.

To write a number in words, write the number in each period, followed by the name of the period, without the "*s*" at the end. Start at the left, where the periods have the largest value. The ones period is not named. The commas separate the periods, so wherever there is a comma in the number, put a comma between the words. The number 74,218,369 is written as seventy-four million, two hundred eighteen thousand, three hundred sixty-nine.

Place Value														
Trillions			Billions			Millions			Thousands			Ones		
Hundred trillions	Ten trillions	Trillions	Hundred billions	Ten billions	Billions	Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
								5	2	6	8	9	0	1

Name:_____ Date: _____ Period: _____

Place Value with Whole Numbers Practice

HOW TO NAME A WHOLE NUMBER WITH WORDS

- Step 1. Start at the left and name the number in each period, followed by the period name.
- Step 2. Put commas in the number to separate the periods.
- Step 3. Do not name the ones period.

Example: Name the number 8,934,242,354 using words.

Name the number using words.

9,825,317,904,390	19,864,323,619,005

HOW TO WRITE A WHOLE NUMBER USING DIGITS

- Step 1. Identify the words that indicate periods. (Remember, the ones period is never named.)
- Step 2. Draw three blanks to indicate the number of places needed in each period. Separate the periods by commas.
- Step 3. Name the number in each period and place the digits in the correct place value position.

Example: Write *nine billion, two hundred forty-six million, seventy-three thousand, one hundred eighty-nine* as a whole number using digits.

Write the number using digits.

Three billion, two hundred sixty-six million, eight hundred fourteen thousand, fifty-one	Twelve billion, nine hundred forty-one million, eight hundred five thousand, two hundred six

Name:_____ Date: _____ Period: _____

Rounding Whole Numbers notes

Rounding Numbers

In 2013, the U.S. Census Bureau estimated the population of the state of New York as 19,651,127. We could say the population of New York in 2013 was approximately 20 million. In several cases, like population, you don't need an exact number; an approximate number is good enough.

The process of approximating a number is called **rounding**. Numbers are rounded to a specific place value, depending on how much accuracy is needed. Saying that the population of New York is approximately 20 million means that we rounded to the millions place.

HOW TO ROUND WHOLE NUMBERS

- Step 1. Locate the given place value and mark it with an arrow. All digits to the left of the arrow do not change.
- Step 2. Underline the digit to the right of the given place value.
- Step 3. Is this digit greater than or equal to 5?
  - Yes–add a one to the digit in the given place value.
  - No–do <u>not</u> change the digit in the given place value.
- Step 4. Replace all digits to the right of the given place value with zeros.

Example: Round 203,958 to the nearest: ⓐ hundred ⓑ thousand ⓒ ten thousand

your turn

Round each number to the nearest ⓐ hundred ⓑ thousand ⓒ ten thousand	
307, 971	793,952

Name:_____ Date: _____ Period: _____

Identify Multiples & Apply Divisibility notes

Vocabulary		
Term	**Definition**	**Example**
Multiples	A number is a **multiple** of n if it is the product of a counting number and n.	Multiples of 2 are 2, 4, 6, 8, 10, 12 ...
Divisible	If a number m is a multiple of n, then m is **divisible** by n.	12 is divisible by 3, because 12 divided by 3 is 4.
Divisibility Test	A number is divisible by: • 2 if the last digit is 0, 2, 4, 6, or 8. • 3 if the sum of the digits is divisible by 3. • 5 if the last digit is 5 or 0. • 6 if it is divisible by both 2 and 3. • 10 if it ends with 0.	

Example

Is 5,635 divisible by 2? By 3? By 5? By 6? By 10?

your turn

Determine whether each number is divisible by 2, by 3, by 5, by 6, and by 10.	
4,832	3,865

Name:_____ Date: _____ Period: _____

Prime Factorization notes

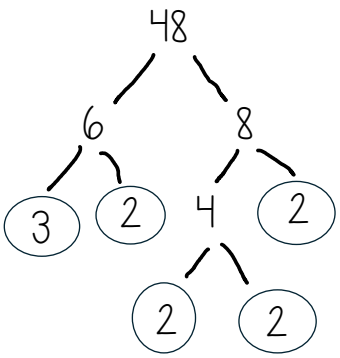
Vocabulary		
Term	Definition	Example
Factors	In the expression $a \cdot b$, both a and b are called **factors**. If $a \cdot b = m$ and both a and b are integers, then a and b are **factors** of m.	The factors of 12 are 1, 2, 3, 4, and 6, because 1 x 12 = 12, 3 x 4 = 12, and 2 x 6 = 12
Prime Number	A counting number greater than 1, whose only factors are 1 and itself.	1, 2, 3, 5, 7, 9, 11, 13, 17....
Composite Number	A counting number that is not prime. A composite number has factors other than 1 and itself.	4, 6, 8, 10, 12, 14, 15, 16, 18...
Prime Factorization	The product of prime numbers that equals the number	The prime factorization of 12 is 2 x 2 x 3.

HOW TO FIND THE PRIME FACTORIZATION OF A COMPOSITE NUMBER

There are several different methods to finding the prime factorization of a composite number. One common method is the **factor tree method.**

1. Find two factors whose product is the given number and use these numbers to create two branches.
2. If a factor is prime, that branch is complete. Circle the prime, like a bud on the tree.
3. If a factor is not prime, write it as the product of two factors and continue the process.
4. Write the composite number as the product of all the circled primes.

Example:



48 = 2 x 2 x 2 x 2 x 3

your turn

Find the prime factorization of 126.

Name:_____ Date: _____ Period: _____

Finding the LCM notes

Least Common Multiple (LCM)

One of the reasons we look at multiples and primes is to use them to find the **least common multiple** (LCM) of two numbers. LCMs are useful when we add and subtract fractions with different denominators. The **least common multiple** (LCM) of two numbers is the smallest number that is a multiple of both numbers.

Listing Multiples Method

To find the least common multiple of 12 and 18, we list the first few multiples of 12 and 18:

12: 12, 24, 36, 48, 60, 72, 84...

18: 18, 36, 54, 72, 90...

The multiples that are found in both lists are your common multiples. The smallest number in that common least is your LCM.

Prime Factors Method

To find LCM using prime factors method:

1. Write each number as a product of primes.
2. List the primes of each number. Match them vertically when possible.
1. Bring down the number from each column.
2. Multiply the factors.

$12 = 2 \cdot 2 \cdot 3$

$18 = 2 \cdot 3 \cdot 3$

LCM = 2 x 2 x 3 x 3

LCM = 36

your turn

Find the LCM using the Prime Factors method.	
9 and 12	18 and 24

Name:_____ Date: _____ Period: _____

Finding the LCM Part 2 notes

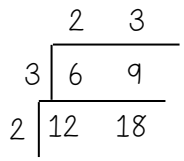
Least Common Multiple (LCM)

The last method is my personal favorite!

Cake Method

To find the least common multiple of 12 and 18, we make a "cake":

1. Write your numbers underneath a division sign.
2. Divide the first "layer" using a common factor, in this case, 2.
3. Check the new "layer" for a common factor, in this case 3.
4. Keep dividing until your layer doesn't have any common factors.
5. Multiply the outside numbers ("candles").



$2 \cdot 2 \cdot 3 \cdot 3 = 36$

Ta-da! It's very similar to the cake method for finding the greatest common factor.

your turn

Find the LCM using the cake method.	
9 and 12	18 and 24

Name:_____ Date: _____ Period: _____

Unit 1.1: Intro to Whole Numbers Practice

Find the given place value of each digit in the given numbers.

1. 51,493

ⓐ 1
ⓑ 4
ⓒ 9
ⓓ 5
ⓔ 3

2. 7,284,915,860,132

ⓐ 7
ⓑ 4
ⓒ 5
ⓓ 0
ⓔ 3

Name each number using words.

3. 5,902

4. 37,889,005

5. 34,904,837

6. 53,000,000,454

Write each number using whole digits.

7. Four hundred twelve

8. sixty-two thousand, fifteen

9. Three billion, two hundred three million, five hundred fifty-two thousand, four

10. Eleven million, forty-four thousand, one hundred sixty-three

Round each number to the nearest ⓐ ten, ⓑ hundred, and ⓒ thousand.

11. 2,931

12. 481,628

13. 63,940

14. 4,287,965

q

Name:_____ Date: _____ Period: _____

Unit 1.1: Intro to Whole Numbers Practice

Use the divisibility tests to determine if each number is divisible by 2, 3, 5, 6, and 10.

15. 84	16. 942	17. 22,335	18. 39,075

Find the prime factorization of each number.

19. 86	20. 400	21. 2,520

Find the least common multiple using any method.

22. 20, 30	23. 8, 12
24. 55, 88	25. 12, 16

Answer the following questions.

26. Give an everyday example where it helps to round numbers.	27. What is the difference between prime numbers and composite numbers?