Cumulative Test on **Unit 1: Number Sense**

Name:_____Period:_____Date:_____

Level: 1 2 3 4 5

Patterns, Exponents, Scientific Notation

Math.Grade7.7.0.B *Identifying Number Patterns:* Analyze and describe simple exponential number patterns

Level 3

1. Write the "*five cubed"* in expanded form. Then evaluate the power and write in standard form.

2. Write the power if the base is 6 and the standard form is 216.

3. Extend and describe the pattern.

1, 2, 4, 8, 16, 32, ____, ____
Describe:

4. Extend and describe the pattern.

0.34, 3.4, ____, _____, 3,400, 34,000
Describe:

5. Damon has 4 times as many stamps as Julia. Julia has 4 times as many stamps as Claire. Claire has 4 stamps. Write the number of stamps Damon has in both exponential form and standard form.

6. Pluto is approximately 5.9×10^9 kilometers away from the sun. How many kilometers is that in standard notation?

7. Is 123×10^6 in scientific notation? **Explain**. If not, write it in scientific notation.

8a. Evaluate the *first five* powers of **base 3**.

b.Describe the pattern of the one's digit.

c. Predict the value of the one's digit of $3^{12.}$

d. Predict the value of the one's digit of $3^{81.}$

Level 4

9. In computer memory,

1 kilobyte (KB) = 1,000 bytes
1 megabyte (MB) = 1,000 kilobytes
1 gigabyte (GB) = 1,000 megabytes.

a. If a CD can hold up to 650 MB of memory, how many bytes can it hold? Write your answer in scientific notation.

b. If you back up 6 GB of memory, how many bytes of memory will you need? Write your answer in scientific notation.

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c. Explain the relationship between scientific notation and exponents.

10a. Choose a base. Evaluate the standard form of the *first five powers* of that base.

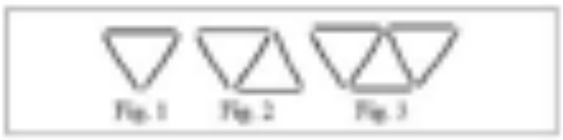
b. Can you find a pattern that exists in any of the place values (*ones, tens, hundreds,* etc.)? Explain and describe.

c. For the 100th power of the base you have chosen, can you predict any of the place values? If yes, state the value of the place(s) you are able to predict. If not, explain why not.

Level: 1 2 3 4 5
Patterns & Functions

Level 3

Math.Grade6.7.2.I *Number Sentences, Expressions, & Polynomials:* Write simple expressions and equations to represent mathematical situations



1a. Study the pattern above. Fill in the input/ output table for the perimeter and total toothpicks of each figure in the pattern.

figure number	perimeter (# of toothpicks)	total (# of toothpicks)

b. Write the number of toothpicks needed for the perimeter of figure 5.

c. Write the total number toothpicks needed for figure 5.

d. Write a function (algebraic expression) that describes the relationship between the figure number (n) and the perimeter (p).

e. Write a function (algebraic expression) that describes the relationship between the figure number (n) and the total number of toothpicks (t).

f. Use the functions you wrote above to determine the number of toothpicks needed for the perimeter of the 100th figure.

g. Use the functions you wrote above to determine the total number of toothpicks needed for the 100th figure.

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Name:_____Period:_____Date:_____

2a. Complete the following input/output table. Write an algebraic expression (or function) that describes the pattern.

function:_____	
input (n)	**output (x)**
1	4
2	16
3	64
4	
5	

b. Predict the value of the output when n = 0.

Level 4

3a. Create a function table to organize the information above. Label your input and outputs.

b. Predict the number of toothpicks needed for 5 houses. Predict the number of gumdrops needed for 5 houses.

c. Write a function (algebraic expression) that describes the relationship of houses to toothpicks. Be sure to define your variables!

d. Write a function (algebraic expression) that describes the relationship of houses to gumdrops. Be sure to define your variables!

e. Write a function (algebraic expression) that describes the relationship of toothpicks to gumdrops.

f. Predict the number of toothpicks and gumdrops needed for 35 houses.

Level 5

4a. The population of a bacteria triples every 30 minutes. Create an input/output table to describe the population growth for the next 5 hours.

Cumulative Test on **Unit 1: Number Sense**

Name:_____Period:_____Date:_____

b. Write an algebraic expression for the pattern in your input/output table.

c. Use your algebraic expression to determine what the population will be in 8 hours.

Level: 1 2 3 4 5
Order of Operations & Number Properties
Variables and Unknowns: Solve equations that represent algebraic and real-world problems using multiple methods including the real number properties.

Level 3
a. Evaluate the expression. **Show work!!!**
b. Name any **number properties** *(identity, inverse, commutative, associative, distributive)* you might apply in the expression.

1. $5(4 + 6) – 32$

Number property:

2. $28 + [20 - (1/4 \times 4)] \times 4^0$

Number property:

3. $[3 \times (3 - 0)]^2 \div 3 + 3$

Number property:

Level 4
Insert grouping symbols to make each statement true.

4. $4 + 6 - 3 \div 7 = 1$

5. $12 - 2^2 \div 5 = 20$

Level 5
6a. Write a numerical expression with an exponent and the use of the distributive property that is equal to 18.

b. Create an equation with an expression on one side demonstrating the distributive property equal to an expression on the other side demonstrating the associative property.

Process Standards

Level: 1 2 3 4 5
Reasoning & Proof
Recognize and apply deductive and inductive reasoning.

Level: 1 2 3 4 5
Communication
Use appropriate representations, symbols, and informal and formal mathematical language to communicate mathematical thinking coherently and clearly..