Introducing Number Theory in the Elementary Classroom
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Prime and Composite Numbers

College Level Definitions:

Prime: Let p be in the element of natural numbers. p is prime if its only positive factors are 1 and p.

Composite: Let n be in the element of natural numbers. n is composite if it has at least one positive factor other than 1 and n.

Elementary School Definitions:

Prime: A number that can be divided by only the number 1 and itself.

Composite: Any number that is divisible by itself, 1, and another number.

Fibonacci Numbers

College Level Definition: The Fibonacci Sequence is defined by $F_1 = 1$, $F_2 = 1$, $F_n = F_{n-1} + F_{n-2}$, for n is greater than or equal to 3.

Elementary School Definition: The Fibonacci Sequence is a series of numbers that start with 0 and 1, and then each new number is created by adding the two numbers that come before it.

Fun Fact: Fibonacci Numbers can often be found on many things in nature, including this pineapple! These pictures show the same pineapple being rotated; the labels are counting the number of spiral patterns shown on this pineapple. By counting the number of spiral columns around the pineapple, I found that there are 8 spirals, which is a Fibonacci Number!

How?

The Fibonacci Sequence is 1,1,2,3,5,8,13,21,etc.

To find the next number, just add the previous two numbers together!

Even and Odd Numbers

College Level Definitions:

Even: Any integer that can be written in the form 2k, where k is also an integer.
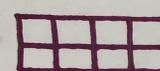
Odd: An integer that cannot be divided evenly by 2. An integer n can be expressed as $n = 2k+1$, where k is an integer.

Elementary School Definitions:

Even: A number that can be split into equal groups with nothing left over. In other words, a number that is divisible by 2.
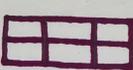
Odd: A number that cannot be split into equal groups. In other words, a number that is not divisible by 2.

Euclidean Algorithm:

Finding the **greatest common divisor (gcd)** of two numbers.

gcd: Let a and b be integers that are not both equal to 0. The greatest common divisor of a and b is the largest d in the element of natural numbers for which d divides a and d divides b. We express this in symbols as $d = \gcd(a,b)$.


Rational Numbers

College Level Definition: We define the set of rational numbers by Q= the set of a/b such that a,b is an element of integers and b cannot be 0.

Elementary School Definition: A real number that can be written as a fraction, where both the numerator and the denominator are integers, and the denominator is not zero.

https://www.geometricfunctions.org/wsp/oct2014/calculator/

We can see some cool patterns within some rational numbers, using their decimal and color-coded numbers!
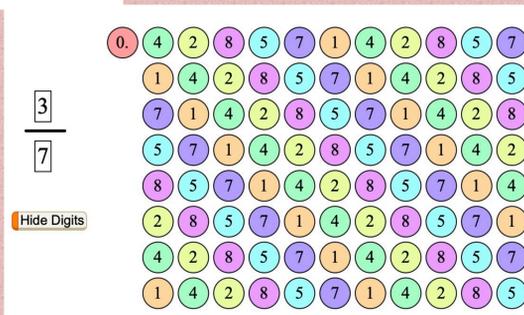
Factoring into Primes:

Fundamental Theorem of Arithmetic:

Every positive integer (except the number 1) can be represented uniquely as a product of one or more primes.