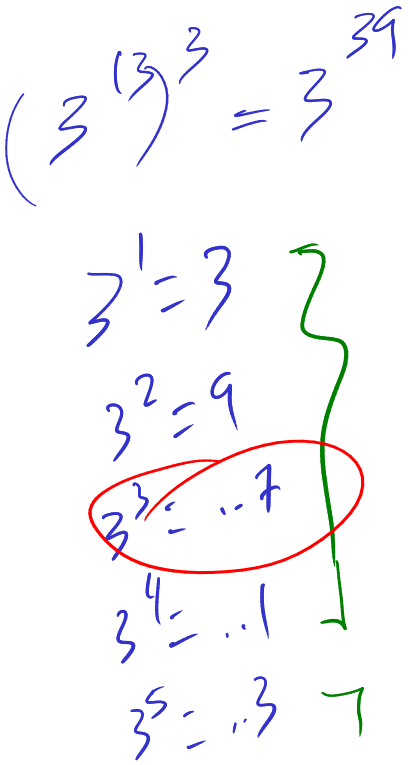
The Ninth Grade Math Competition Class
Unit Digit
Anthony Wang

1. What is the units digit of $(123^{13})^3$?



2. Find the units digit of n given that $m^n = 21^6$ and m has a units digit of 7.

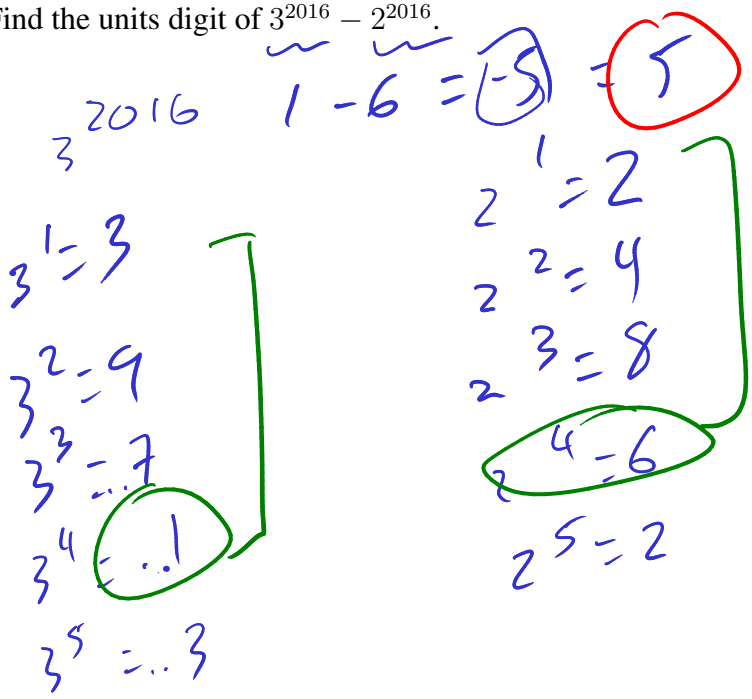
3. **(a:)** Find the units digit of the sum

$$1! + 2! + 3! + \cdots + 2006!$$

(b:) Find the units digit of the above sum when it is expressed in base 7.

4. A positive two-digit integer is divisible by n and its units digit is n. What is the greatest possible value of n?

5. Find the units digit of $3^{2016} - 2^{2016}$.



6. The cube of the 3-digit natural number $A7B$ is 108531333. What is $A + B$?

7. How many of the positive divisors of 6^{2006} have a units digit of 6?

8. **(a)** Convert 1599 to base 16.

(b) Find all possible units digits of perfect fourth powers when written in base 16.

(c) Determine all non-negative integral soulations $(n_1, n_2, \ldots, n_{14})$ if any, of the Diophantine equation.

$$n_1^4 + n_2^4 + \cdots + n_{14}^4 = 1599.$$

(A Diophantine equation is an equation in which only integer solutions are allowed.)