1. What are the four steps to Polya’s problem solving process?

2. What are some problem solving strategies?

3. Show why 3 always divides evenly into the sum of any three consecutive whole numbers. (Hint: What are the possible remainders for the first number upon division by 3.)

4. Recall that the Fibonacci sequence is 1, 1, 2, 3, 5, 8, 13, 21, 34, .... Let $F(n)$ denote the $n$-th Fibonacci number. Can you tell me what is $F(0) + F(1) + F(2) + ... + F(12)$ without writing out explicitly adding up all 12 numbers?

To do this, write out $F(0) + F(1)$, $F(0) + F(1) + F(2)$, $F(0) + F(1) + F(2) + F(3)$, etc. until you see a clear pattern.

5. Use a Venn Diagram to solve the following problem. Suppose 15 people are taking Piano Lessons, 18 people are taking Guitar Lessons, while 5 people are taking both. How many people are taking either Piano or Guitar, but not both?

6. What are the relative pros and cons of some of the ancient numeration systems we studied? Are they additive, multiplicative, positional, place-valued, have a zero?

7. Back to the Octopus’ garden (in the shade)...

   (a) What are the eight digits in Base 8?

   (b) Can you count to 32 in Base 8?

   (c) Convert 250\text{\textsubscript{Eight}} to Base 10/Decimal.

   (d) Convert 74 to Base 8.

   (e) Construct a basic one-digit Base 8 Addition and Multiplication Table. Use whatever counting strategy necessary to help.

8. Give an example on why Subtraction (or Division) is not associative.

9. What are some ways to illustrate addition/subtraction/multiplication/division to young students?

10. Explain how to explain carrying/borrowing to young students.

11. How do other bases make you understand our own decimal system better?