Challenge

1. What are the possible values of *n* given this set notation: {*n* ∈ *Z* | *n is a factor of* 8}?

2. Identify each of the following as true or false:
   a. {3} ∈ {1,3,5,7}
   b. {3} ⊆ {1,3,5,7}
   c. {3} ∈ {{1}, {3}, {5},{ 7}}
   d. {3} ⊆ {{1}, {3}, {5}, {7}}

3. For all sets *A*, *B*, and *C*, prove: *A* – (*A* ∩ *B*)= *A* – *B*. Identify the name of each law used.

4. Let set *A* be a set of all the NASA employees and B is the set of all astronauts. Describe the following sets:
   a. *A* ∩ *B*
   b. *A* ∪ *B*
   c. *A* – *B*
   d. *B* – *A*

5. Illustrate the following using Venn Diagrams:
   a. (*A* ∩ *B*)– *A*
   b. (*A* – *B*) ∪ (*B* – *A*)

6. What is the power set of {*a*, *b*, *c*}?

7. Interest rates are an example of a geometric sequence. In this example, you deposit $1,000 in a CD at your local bank, it earns 6% annual interest compounded monthly. What is the balance at the end of 12 months? (hint: don't forget to find the monthly interest rate)

8. Find the value for the given summation:

$$\sum_{j=2}^{5}(2j-1)$$

9. Rewrite the summation notation after separating out the last term:

$$\sum_{j=0}^{n} 2^j$$

10. Rewrite the summation by changing the summation index using $j = i+2$

$$\sum_{i=3}^{21} \frac{1}{i+3} = \sum_{j=5}^{23} \frac{1}{j+1} \qquad = \sum_{i=3}^{21} \frac{1}{i+3}$$

11. Given the recursive definition for a function g:

$g(0) = 0$

$g(n) = g(n-1) + n^3$

Find $g(3)$

$g(1) = 0+1 = 1$

$g(2) = 1+8 = 9$

$g(3) = 9+27 = 36$