

Challenge

1. What are the possible values of n given this set notation: $\{n \in \mathbb{Z} \mid n \text{ is a factor of } 8\}$?
2. Identify each of the following as true or false:
 - a. $\{3\} \in \{1, 3, 5, 7\}$
 - b. $\{3\} \subseteq \{1, 3, 5, 7\}$
 - c. $\{3\} \in \{\{1\}, \{3\}, \{5\}, \{7\}\}$
 - d. $\{3\} \subseteq \{\{1\}, \{3\}, \{5\}, \{7\}\}$
3. For all sets A , B , and C , prove: $A - (A \cap B) = A - B$. 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. $A \cap B$
 - b. $A \cup B$
 - c. $A - B$
 - d. $B - A$
5. Illustrate the following using Venn Diagrams:
 - a. $(A \cap B) - A$
 - b. $(A - B) \cup (B - A)$
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 $j = i + 2$:

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

11. Given the recursive definition for a function g :

$$g(0) = 0$$

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

Find $g(3)$