***Recursive Sequences (Lesson 5.2.3)***

You have been writing **EXPLICIT** equations so that you could find the value of any term in the sequence, such as the 100th term, directly. Today, you will investigate **RECURSIVE** sequences. A term in a recursive sequence depends on the term(s) before it.

**5-71.** Look at the following sequence: $ –8, –2, 4, 10, …$

1. What are two ways that you could find the 10th term of the sequence? What is the 10th term?
2. If you have not done so already, write an equation that lets you find the value of any term $t(n)$. This kind of equation is called an **explicit equation**.
3. The next term after $t(n)$ is called $t(n + 1).$ Write an equation to find $t(n + 1)$ if you know what $t(n)$ is. An equation that depends on knowing other terms is called a **recursive equation**.

**5-72.** Alejandro used his recursive equation, $t(n + 1) = t(n) + 6$, from part (c) of problem 5‑71 to write the following sequence: $0, 6, 12, 18, 24$

1. Does Alejandro’s sequence match the sequence from problem 5‑71?
2. Why did he get a different sequence than the one from problem 5‑71? How can you mathematically write down the information he needs so that he can write the correct sequence?

**5-74.** Collin wrote: $t(2) = 19 t(n + 1) = t(n) – 2 $

1. Help Avery write an **explicit equation**. Is the sequence arithmetic, geometric, or neither? How do you know?
2. Then Avery wrote $t(n) = 6n + 8$. Help Collin write a **recursive equation**.

**5-77**. Write both an **explicit equation** and a **recursive equation** for the sequence: $5, 8, 11, 14, 17…$

Write both an **explicit equation** and a **recursive equation** for the sequence: $12, 144, 1728, …$