Essential Question: How can we distinguish between arithmetic and geometric sequences?

Do Now:

i) Identify each sequence as **arithmetic**, **geometric** or **neither**.

ii) If arithmetic, identify the common difference. If geometric, identify the common ratio.

A. 12, 18, 27, 40.5, … ____________________ __________

B. -123, -137, -151, -165, … ____________________ __________

C. 3, 7, 15, 31, … ____________________ __________

D. 1, $\frac{1}{4}$, $\frac{1}{16}$, $\frac{1}{64}$, … ____________________ __________

STOP HERE

1. For letters A. and B. above, write an equation that can be used to find the **nth** term of the sequence.

12, 18, 27, 40.5, … -123, -137, -151, -165, …

A. ____________________ B. ____________________

2. Using your equation, find the 10^{th} term in each sequence.

3. Katie works at the local pet shop. For a single litter of kittens, she puts out 17 ounces of wet food. For 2 litters she puts out 34 ounces of wet food and for 3 litters, she puts out 51 ounces of wet food. She continues this pattern for **n** litters.

   a) Write an equation that can be used to find the number of ounces of wet food, a_n, Katie will put out for **n** litters of kittens.

   b) How much wet food will Katie put out if there are 8 litters of kittens in the store?

4. A soup kitchen makes 16 gallons of soup every two weeks. Each day they serve 25% of the soup that remains from the previous day. The table below shows how much soup, **f(n)**, remains after **n** days.

n	1	2	3
f(n)	12	9	6.75

   a) Write an equation that can be used to find the number of gallons of soup remaining after **n** days.

   b) How many gallons of soup remain after the 12^{th} day? *Round your answer to the nearest tenth.*

   c) On what day is there about 2 gallons of soup left?

5. Write an explicit rule for an arithmetic sequence if $a_6 = 8$ and $a_{10} = 40$.

6. Write an explicit rule for a geometric sequence if $a_3 = 10$ and $r = \frac{1}{2}$.

The TAKEAWAY

If a sequence of numbers is **arithmetic**, the pattern will display a common ______________________________ between consecutive terms. An explicit formula **a_n** =____________________________ can be used to find the ***nth*** term of the sequence.

If a sequence of numbers is **geometric**, the pattern will display a common _____________________ between consecutive terms. An explicit formula **a_n** =____________________________ can be used to find the ***nth*** term of the sequence.