Unit 1 Quiz: Sequences challenge problems

Standards:

- Identify geometric and arithmetic sequences
- Apply function notation and recursive definitions of functions
  HSF-IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
  HSF-LE.A.2 - Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs.

1. Given the arithmetic sequence $f(n)$ whose first two terms are 4 and 9.
   a. Write down $f(2)$
   b. Write down the value of the common difference d
   c. Find $f(3)$
   d. Write and equation relating $f(5)$ and $f(6)$
2. Given the geometric sequence $g(n)$ whose first term is 3 with a growth rate of $r = 2$.
   a. Find the second term $g(2)$.
   b. State the value of the first term using function notation in an equation.
   c. Define g recursively using function notation. (There should be two equations)
   d. Write down the value of $\frac{g(7)}{g(6)}$.
3. A sequence is defined recursively as
   $f(1) = 2$
   $f(n) = f(n-1) \times 5$
   a. Is the sequence arithmetic, geometric, or neither?
   b. Find the value of $f(3)$.
4. Given an arithmetic sequence $f(n)$ whose first term is 11 and third term 17.
   a. Using d for the common difference and $x = f(2)$ for the second term, write and equation relating the values of the first two terms. (you may use x or $f(2)$)
   b. Write an equation relating the second and third terms.
   c. Solve the system of equations to find d and x.
5. Given an arithmetic sequence $47, x, 183, \ldots$, find x.
6. Given a geometric sequence $\frac{2}{5}, x, \frac{18}{125}, \ldots$, find x.