BECA / Huson / Algebra 2 Unit 1 Sequences (9.3)   Name:

29 September 2023

Quiz 2: HSF-BF.A.2 Identify and use sequences

Identify arithmetic and geometric sequences

Circle whether the sequence is arithmetic, geometric, or neither.

1. $2, 4, 8, 16, \ldots$
   arithmetic, geometric, neither
2. $1, 3, 5, 7, \ldots$
   arithmetic, geometric, neither
3. $-10, -5, 0, 5, \ldots$
   arithmetic, geometric, neither
4. $10, 9, 7, 4, \ldots$
   arithmetic, geometric, neither
5. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \ldots$
   arithmetic, geometric, neither

Write recursive formulas

6. Write a recursive formula for the sequence $1, 5, 25, 125, \ldots$

7. Write a recursive formula for the sequence $3, 9, 15, 21, \ldots$

Apply sequences as models

8. A metal sculture is made from welded steel rods. The first rod is 3 feet long. Each successive rod is 80% of the length of the previous rod. Indicate whether each formula correctly defines the length $L(n)$ of the nth rod by circling True or False.

   a. $L(n) = 3 - 0.80(n - 1)$
   True, False
   b. $L(n) = 3(0.8)^n$
   True, False
   c. $L(n) = 3(0.8)^{n-1}$
   True, False
   d. $L(1) = 3$
   $L(n) = L(n - 1) \times (0.8)$
   True, False

Fractions, percent, decimals (7-NS)

Write each fraction as a percent and as a decimal.

9. $\frac{1}{4}$

10. $\frac{1}{2}$

11. $\frac{1}{3}$

Write each percent as a fraction in simplest terms.

12. 75%

13. $66\frac{2}{3}\%$

14. 150%

Operations on fractions

15. $\frac{1}{2} + \frac{1}{3} =$

16. $\frac{1}{2} - \frac{1}{3} =$

17. $\frac{3}{2} \times \frac{1}{3} =$

18. $\frac{1}{2} \div \frac{2}{3} =$

Use standard algebraic function notation

19. 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 an equation relating $f(5)$ and $f(6)$

20. 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 $\dfrac{g(7)}{g(6)}$.

21. 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 $f(3)$.

22. 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.

23. Given an arithmetic sequence $47, x, 183, \ldots$, find x.

24. Given a geometric sequence $\dfrac{2}{5}, x, \dfrac{18}{125}, \ldots$, find x.

Standards:

- Identify geometric and arithmetic sequences
- Write a recursive formula for a geometric sequence
  HSF-IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
  HSF-BF.A.2 - Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms
  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
- Find the sum of a finite geometric series
  HSA-SSE.B.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.