ALBERT

Name _____ Date _____

Sequences as Functions Worksheet

Algebra 1 · Common Core HSF-IF.A.3

> Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.

Practice

Builds the skill step by step.

1. What is the next term of the sequence 3, 7, 11, 15, ...?

2. f(n) = 2n + 1 defines a sequence. What is f(5)?

3. $a_1 = 4$ and $a_n = a_{n-1} + 5$. What is a_4?

4. What is the next term of the sequence 2, 6, 18, ...?

5. What is the usual domain of a sequence that starts at term 1?

   A. the negative numbers

   B. all real numbers

   C. the fractions between 0 and 1

   D. the positive integers

6. $a_1 = 100$ and each term is half the one before. What is a_3?

7. $f(n) = n^2$. What is $f(6)$?

8. The Fibonacci sequence is $f(0) = f(1) = 1$ and $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$. What is $f(5)$?

9. The sequence 5, 10, 15, ... is $f(n) = 5n$. What is $f(20)$?

10. Which rule is recursive?

    A. $f(n) = 3n$

    B. $f(n) = n^2$

    C. $a_n = a_{n-1} + 3$

    D. $f(n) = 2^n$

ALBERT

Name _____ Date _____

Sequences as Functions Worksheet

Algebra 1 · Common Core HSF-IF.A.3

On Level

Grade-level practice.

1. The sequence 4, 7, 10, 13, … has the explicit rule f(n) = 3n + 1. What is f(10)?

2. $a_1 = 3$ and $a_n = 2a_{n-1} + 1$. What is a_4?

3. f(n) = 50 − 4n. Which term number n has the value 2?

4. The sequence 1, 4, 9, 16, … continues the pattern. What is the 7th term?

5. The sequence 81, 27, 9, … continues the pattern. What is the 5th term?

6. Explain why a sequence is a function.

7. $a_1 = 2$ and $a_n = 3a_{n-1}$. What is a_5?

8. Use the Fibonacci rule $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$. What is $f(7)$?

9. Which explicit rule gives 6, 11, 16, 21, … for $n = 1, 2, 3, \ldots$?

   A. $f(n) = n + 5$

   B. $f(n) = 5n + 1$

   C. $f(n) = 5n + 6$

   D. $f(n) = 6n$

10. Row 1 of a theater has 20 seats, and each row has 2 more seats than the row before. How many seats are in row 15?

ALBERT

Name _____ Date _____

Sequences as Functions Worksheet

Algebra 1 · Common Core HSF-IF.A.3

Challenge

Multi-step and word problems that stretch it.

1. What is the sum of the first 5 terms of 3, 7, 11, ...?

2. $a_1 = 1$ and $a_n = a_{n-1} + n$. What is a_5?

3. Which recursive rule gives 5, 15, 45, ...?

   A. $a_1 = 5$, $a_n = 3a_{n-1}$

   B. $a_1 = 5$, $a_n = a_{n-1} + 10$

   C. $a_1 = 5$, $a_n = a_{n-1} + 3$

   D. $a_1 = 3$, $a_n = 5a_{n-1}$

4. $f(n) = 2^n - 1$. What is $f(6)$?

5. $f(0) = 2$ and $f(n) = f(n - 1) + f(n - 1)$. What is $f(4)$?

6. Which term number of 7, 12, 17, ... is 102?

7. A colony starts with 50 bacteria (hour 0) and doubles every hour. How many are there at hour 6?

8. Write a recursive rule and an explicit rule for 10, 13, 16, ... (with the first term as term 1).

9. A sequence is defined for n = 0, 1, 2, ... What is its domain?

   A. the negative integers

   B. the nonnegative integers

   C. the positive integers

   D. all real numbers

10. $f(1) = 1$, $f(2) = 1$ and $f(n) = f(n - 1) + 2f(n - 2)$ for $n \geq 3$. What is $f(5)$?