



Recurrence Relations

SCORE

___ / 20

Chapter: Discrete Mathematics • Level ★★★ • Time: 30 min

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Compute terms of a recurrence.
- ✓ Recognise arithmetic and geometric recurrences.
- ✓ Work with the Fibonacci sequence.
- ✓ Understand the need for a base case.



Section A • Concept Check

• BEGINNER

4 × 1 = 4 _____

- $a(n) = a(n-1) + 4$, $a(1) = 5$. Find $a(5)$:
☐ A. 21 ☐ B. 25 ☐ C. 17 ☐ D. 20
- $a(n) = 2 \cdot a(n-1) + 1$, $a(1) = 1$. Find $a(4)$:
☐ A. 15 ☐ B. 7 ☐ C. 8 ☐ D. 31
- Fibonacci with $a(1)=1$, $a(2)=1$. Find $a(8)$:
☐ A. 21 ☐ B. 13 ☐ C. 34 ☐ D. 8
- Without a base case, a recurrence:
☐ A. has nothing to build from ☐ B. still works
☐ C. gives 0 ☐ D. is geometric



Section B • Problem Solving

• INTERMEDIATE

2 + 3 × 3 = 11 _____

- A recurrence defines each term from _____ terms.
- For $a(n)=a(n-1)+4$, $a(1)=5$, $a(5) =$ _____.
- $a(n) = a(n-1) + 4$, $a(1) = 5$. Find $a(5)$.

- $a(n) = 2 \cdot a(n-1) + 1$, $a(1) = 1$. Find $a(4)$.

- Fibonacci with $a(1)=1$, $a(2)=1$. Find $a(8)$.



Section C • Challenge

• CHALLENGE

5 _____

- $a(n) = a(n-1) - 2$, $a(1) = 20$. Find $a(6)$.

Reflection — the most useful thing I learned: _____

A ___/4 B ___/11 C ___/5 Total ___/20

Teacher's Signature _____

Parent's Signature _____

ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1-A 2-A 3-A 4-A | 5 previous 6 21 7 = 21 (5, 9, 13, 17, 21) 8 = 15 (1, 3, 7, 15) 9 = 21 | 10 = 10 (20, 18, 16, 14, 12, 10)