Name KEY Date Class

*Use a different color to grade + fix mistakes!

Sequences Review Homework

Find the indicated term of each sequence.

1. 12th term: 7, 14, 28, 56, ... (×2, ×2, ×2)

$7 \cdot 2^{11}$ 14,336

2. 9th term: 2, 8.5, 15, 21.5, ... (+6.5, +6.5, +6.5)

$2 + 6.5(8)$ 54

Find the explicit formula and recursive formula for each sequence:

3. 1, 2.5, 6.25, 15.625...

Explicit: $a_n = 1 \cdot 2.5^{n-1}$ or $a_n = 2.5^{n-1}$

Recursive: $\begin{cases} a_1 = 1 \\ a_n = 2.5 \cdot a_{n-1} \end{cases}$

4. 25, 55, 85, 115...

Explicit: $f(n) = 25 + 30(n-1)$

Recursive: $\begin{cases} f(1) = 25 \\ f(n) = f(n-1) + 30 \end{cases}$

5. 20, 200, 2000, 20000...

Explicit: $f(n) = 20 \cdot 10^{n-1}$

Recursive: $\begin{cases} f(1) = 20 \\ f(n) = 10 \cdot f(n-1) \end{cases}$

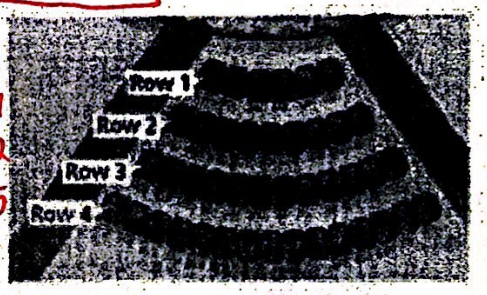
6. $\frac{3}{2}, \frac{6}{2}, \frac{9}{2}, \frac{12}{2}$, ... $+\frac{3}{2}$ each term

Explicit: $a_n = \frac{3}{2} + \frac{3}{2}(n-1)$

Recursive: $\begin{cases} a_1 = \frac{3}{2} \\ a_n = a_{n-1} + \frac{3}{2} \end{cases}$

7. Seats in a concert hall are arranged in the pattern shown. The number of seats in the rows form an arithmetic sequence.

6, 9, 12, 15



a. Write a rule (either type) for the arithmetic sequence.

$a_n = 6 + 3(n-1)$ or $\begin{cases} a_1 = 6 \\ a_n = a_{n-1} + 3 \end{cases}$

b. How many seats are in the 15th row?

$a_{15} = 6 + 3(14)$ $a_{15} = 48$ 48 seats

c. A ticket costs $40. Suppose every seat in the first 10 rows is filled. What is the total revenue from those seats? Show all of your work.

Row 1: 6 + Row 2: 9 + Row 3: 12 + Row 4: 15 + Row 5: 18 + Row 6: 21 + Row 7: 24 + Row 8: 27 + Row 9: 30 + Row 10: 33 = 195 seats total

× $40 per ticket

$7800 total revenue

8. The growth of Vanderbilt's squirrel population approximates a geometric sequence. After 4 years there are 2,880 squirrels and after 6 years there are 46,080 squirrels.

a. Write an explicit formula and a recursive formula to model this situation.

Year 4: 2880

Year 6: 46080

$46080 \div 2880 = 16$ ← ×16 for 2 years

Each year is ×4

Y1 45
Y2 180
Y3 720
Y4 2880
Y5 11520
Y6 46080

Explicit: $a_n = 45 \cdot 4^{n-1}$

Recursive: $\begin{cases} a_1 = 45 \\ a_n = 4 \cdot a_{n-1} \end{cases}$

b. How many squirrels will there be in 11 years?

$45 \cdot 4^{10}$ 47,185,920 squirrels

9. The recursive formula for a sequence is $a_1 = 25$; $a_n = 3 \cdot a_{n-1}$. What is the explicit formula?

Start w/ 25 ↓ ; ↙ 3 to get the next term

25, 75, 225, 675, etc

$a_n = 25 \cdot 3^{n-1}$

10. Stephen knows the fourth term in an arithmetic sequence is 55 and the ninth term in the sequence is 90. Explain how Stephen can find the common difference. Then find the first term of the sequence and write the explicit formula for the sequence.

4th = 55
9th = 90) +35 for 5 terms
↓
+7 for 1 term

Since it increased by 35 for 5 terms, it would increase by 7 for each term. $(90-55) \div 5$

4th = 55
3rd = 48
2nd = 41
1st = 34

Explicit Formula

$a_n = 34 + 7(n-1)$