**Sequences Review** Name Key

**Write an explicit rule and a recursive rule using the sequence.**

1. 2, 6, 18, 54, 162

$a_n = 2(3)^{n-1}$ or $a_n = \frac{2}{3}(3)^n$

$a_1 = 2$ $a_n = a_{n-1} \cdot 3$

2. 94, 87, 80, 73, 66

$a_n = 94 - 7(n-1)$ or $a_n = 101 - 7n$

$a_1 = 94$ $a_n = a_{n-1} - 7$

**Each rule represents a geometric sequence. If the given rule is recursive, write it as an explicit rule. If the rule is explicit, write it as a recursive rule.**

3. $a_n = 11(2)^{n-1}$

$a_1 = 11$ $a_n = a_{n-1} \cdot 2$

4. $f(1) = 2.5; f(n) = f(n-1) - 3.5$

$f(n) = 2.5 - 3.5(n-1)$ or $f(n) = 6 - 3.5n$

5. $a_1 = 27; a_n = a_{n-1} \cdot 3$

$a_n = 27(3)^{n-1}$ or $a_n = 9(3)^n$

6. $f(n) = -4 + 5(n-1)$

$f(1) = -4$ $f(n) = f(n-1) + 5$

7. Write an explicit rule for a geometric sequence where $a_1 = 16$ and $a_3 = 4$

$16 \xrightarrow{\times\frac{1}{2}} 8 \xrightarrow{\times\frac{1}{2}} 4$

$a_n = 16\left(\frac{1}{2}\right)^{n-1}$ $a_n = 32\left(\frac{1}{2}\right)^n$

8. Write an explicit rule for an arithmetic sequence where $a_5 = 20$ and $a_{10} = 32$

$\frac{32-20}{10-5} = \frac{12}{5}$

$a_n = 10.4 + 2.4(n-1)$ $a_n = 8 + 2.4n$

**Find the indicated term of each sequence.**

9. 12th term: 7, 14, 28, 56, …

$f(n) = 7(2)^{n-1}$

$f(12) = 7(2)^{11} = 14{,}336$

10. 9th term: 2, 8.5, 15, 21.5, …

$f(n) = 2 + 6.5(n-1)$

$f(9) = 2 + 6.5(8) = 54$

**Find the explicit formula and recursive formula for each sequence:**

11. 1, 2.5, 6.25, 15.625…

$a_n = (2.5)^{n-1}$ $a_n = 0.4(2.5)^n$

$a_1 = 1$ $a_n = a_{n-1} \cdot 2.5$

12. 25, 55, 85, 115…

$a_n = 25 + 30(n-1)$ $a_n = 30n - 5$

$a_1 = 25$ $a_n = a_{n-1} + 30$

13. 20, 200, 2000, 20000…

$a_n = 20(10)^{n-1}$ $a_n = 2(10)^n$

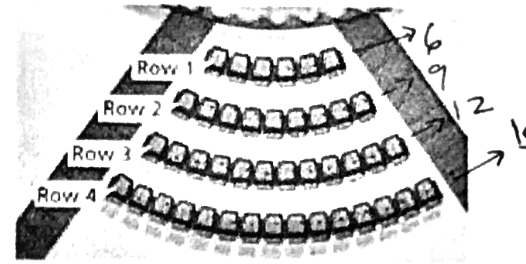
$a_1 = 20$ $a_n = a_{n-1} \cdot 10$

14. $\frac{3}{2}, \frac{6}{2}, \frac{9}{2}, \frac{12}{2}, \ldots$

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

$a_1 = \frac{3}{2}$ $a_n = a_{n-1} + \frac{3}{2}$

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




a. Write a rule for the arithmetic sequence.

$a_n = 6 + 3(n-1)$

or

$a_n = 3 + 3n$

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

$a_{15} = 3 + 3(15) = 48$ 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.

$6 + 9 + 12 + 15 + 18 + 21 + 24 + 27 + 30 + 33 =$

$81 + 114 = 195$

195 seats $\times 40 = \boxed{\$7800}$

16. 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.

45, 180, 720, 2880

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

$a_n = 45(4)^{n-1}$ or $a_n = 11.25(4)^n$

$a_1 = 45$ $a_n = a_{n-1} \cdot 4$

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

$a_n = 45(4)^{10}$

$a_{10} = 47,185,920$ squirrels.

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

$a_n = 25(3)^{n-1}$ or $a_n = 8\frac{1}{3}(3)^n$

18. 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.

$a_4 = 55$ $a_9 = 90$

$\frac{90-55}{9-4} = \frac{35}{5} = 7$

$d = 7$

34, 41, 48, 55

subtract the terms from each other the divide by the difference of the position numbers.

$a_n = 34 + 7(n-1)$ or $a_n = 27 + 7n$