Name ____________ Date _____________

Mr. Schlansky Algebra II

Sequence/Series Practice

1. Given $f(9) = -2$, which function can be used to generate the sequence $-8, -7.25, -6.5, -5.75, \ldots$?

1) $f(n) = -8 + 0.75n$
2) $f(n) = -8 - 0.75(n-1)$
3) $f(n) = -8.75 + 0.75n$
4) $f(n) = -0.75 + 8(n-1)$

2. The sequence $a_1 = 6$, $a_n = 3a_{n-1}$ can also be written as

1) $a_n = 6 \cdot 3^n$
2) $a_n = 6 \cdot 3^{n+1}$
3) $a_n = 2 \cdot 3^n$
4) $a_n = 2 \cdot 3^{n+1}$

3. A recursive formula for the sequence $18, 9, 4.5, \ldots$ is

1) $g_1 = 18$
   $g_n = \frac{1}{2} g_{n-1}$
2) $g_n = 18\left(\frac{1}{2}\right)^{n-1}$
3) $g_1 = 18$
   $g_n = 2g_{n-1}$
4) $g_n = 18(2)^{n-1}$

4. The recursive formula $f(1) = 500$ and $f(n) = 0.92 f(n-1)$ can be used to model which scenario below?

1) Adela took a 500-mg dose of medicine and the amount of the medicine in her body decreased by 92% each hour.
2) The value of Michele's bank account was $500 when she initially put her money in the bank and she earns an additional $0.92 per day in interest.
3) A school with an enrollment of 500 students experiences a decline in enrollment by 92 students per year.
4) A lake with 500 fish is depleted by 8% every year due to a factory dumping pollution in the lake.

5. Cassie has been trying to improve her cardiovascular health. On the first of the month she is able to run 1.3 miles. Every day after that she plans on running 0.2 miles further than the day before. Which formula is not able to be used to determine the number of miles Cassie runs on the *n*th day of the month?

(1) $f(n) = 1.1 + 0.2n$

(2) $a_1 = 1.3$, $a_n = 0.2 + 1.3a_{n-1}$

(3) $f(n) = 1.3 + 0.2(n-1)$

(4) $a_1 = 1.3$, $a_n = 0.2 + a_{n-1}$

6. The population of a small town was 10,000 people in the year 2004. The town has been experiencing growth of approximately 2.5% every year since. Which sequence models the population of the town *n* years after 2004.

(1) $P_0 = 10{,}000$, $P_n = 0.025P_{n-1}$

(2) $P_0 = 10{,}000$, $P_n = P_{n-1} + 0.025$

(3) $P_0 = 10{,}000$, $P_n = 1.025P_{n-1}$

(4) $P_0 = 10{,}000$, $P_n = P_{n-1} + 1.025$

7. Max plans to eat more vegetables and decides that next week, he will start off eating 2 servings of vegetables and increase that amount by 50% each day. Which expression will approximate how many vegetables Max will eat next week?

1) $\dfrac{2-2(.50)^7}{.50}$

3) $\sum_{n=1}^{7} 2(1.5)^{n-1}$

3) $\dfrac{2-2(150)^7}{50}$

4) $\sum_{n=1}^{7} 2(1.5)^{n}$

8. A microbiologist determined the number of bacteria in a culture at noon, 1 pm, 2 pm, and 3 pm and recorded the data in the table below.

Hours after Noon (n)	0	1	2	3
Number of Bacteria (B)	450	488	529	574

Which formula best represents the situation above?

(1) $B_n = 450 + (1.085)^n$

(2) $B_n = 450(1.085)^{n-1}$

(3) $B_0 = 450$, $B_n = B_{n-1} + 1.085$

(4) $B_0 = 450$, $B_n = 1.085B_{n-1}$

9. The Rickerts decided to set up an account for their daughter to pay for her college education. The day their daughter was born, they deposited \$1000 in an account that pays 1.8% compounded annually. Beginning with her first birthday, they deposit an additional \$750 into the account on each of her birthdays. Which expression correctly represents the amount of money in the account *n* years after their daughter was born?

1) $a_n = 1000(1.018)^n + 750$

2) $a_n = 1000(1.018)^n + 750n$

3) $a_0 = 1000$
$a_n = a_{n-1}(1.018) + 750$

4) $a_0 = 1000$
$a_n = a_{n-1}(1.018) + 750n$

10. Brian deposited 1 cent into an empty non-interest bearing bank account on the first day of the month. He then additionally deposited 3 cents on the second day, 9 cents on the third day, and 27 cents on the fourth day. What would be the total amount of money in the account at the end of the 20^{th} day if the pattern continued?

1) \$11,622,614.67
2) \$17,433,922.00
3) \$116,226,146.80
4) \$1,743,392,200.00

11. At her job, Pat earns \$25,000 the first year and receives a raise of \$1000 each year. The explicit formula for the nth term of this sequence is $a_n = 25,000 + (n-1)1000$. Which rule best represents the equivalent recursive formula?

1) $a_n = 24,000 + 1000n$
2) $a_n = 25,000 + 1000n$
3) $a_1 = 25,000,\ a_n = a_{n-1} + 1000$
4) $a_1 = 25,000,\ a_n = a_{n+1} + 1000$

12. Write an explicit formula for a_n, the *n*th term of the recursively defined sequence below.

$$a_1 = x + 1$$
$$a_n = x(a_{n-1})$$

For what values of *x* would $a_n = 0$ when $n > 1$?

13. Alexa earns $33,000 in her first year of teaching and earns a 4% increase in each successive year. Write a geometric series formula, S_n, for Alexa's total earnings over *n* years. Use this formula to find Alexa's total earnings for her first 15 years of teaching, to the *nearest cent*.

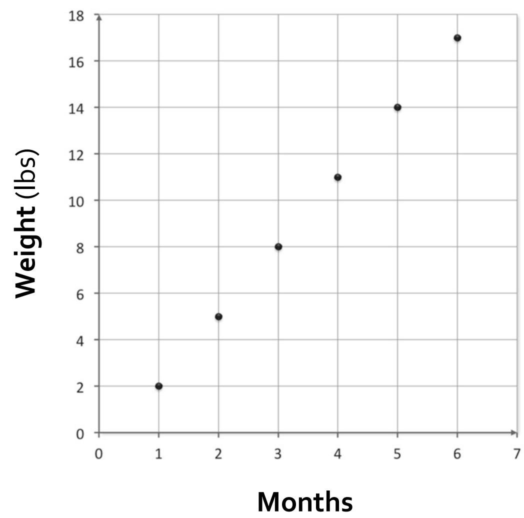
14. When Eli and Daisy arrive at their cabin in the woods in the middle of the winter, the interior temperature is 40°F.

a) Eli wants to turn up the thermostat by 2°F every hour. Find an explicit formula for the sequence that represents the thermostat settings using Eli's plan.

b) Daisy wants to turn up the thermostat by 4% every hour. Find an explicit formula for the sequence that represents the thermostat settings using Daisy's plan.

c) Which plan gets the thermostat to 72°F most quickly? Show how you arrived at your answer.

15. The graph to the right shows the weight, in pounds, of a newborn puppy over the course of the first few months after a family adopted it.



a) Can an arithmetic or a geometric pattern be used to model the weight of this puppy? Explain your answer.

b) Write a recursive formula to represent the puppy's weight, in pounds, after *n* months.

c) Write an explicit formula, in simplest form, to represent the puppy's weight, in pounds, after *n* months.

16. Simon lost his library card and has an overdue library book. When the book was 5 days late, he owed $2.25 to replace his library card and pay the fine for the overdue book. When the book was 21 days late, he owed $6.25 to replace his library card and pay the fine for the overdue book. Suppose the total amount Simon owes when the book is *n* days late can be determined by an arithmetic sequence. Determine a formula for a_n, the *n*th term of this sequence. Use the formula to determine the amount of money, in dollars, Simon needs to pay when the book is 60 days late.