Name _____ Date _____
Mr. Schlansky Algebra II

Modeling Series

1. Your parents want you to do some work around the house. You get them to agree to pay you $.01 on the first day, $.02 on the second day, $.04 on the third day, and so on.
Write a geometric series formula, S_n, for your total earnings over *n* days.

At the end of the 30-day month, how much money will your parents have paid you, to the *nearest cent*?

2. This year, public parks in New York State will receive funds of $2.4 million. Every year afterward, New York State park funding will be improved by 3%. Write an expression in summation notation to represent how much funding New York State parks will receive in n years. Use your expression to determine the total amount of money, to the *nearest million dollars,* New York State parks will receive in funding for the first four years?

3. The men's U.S. Open tennis tournament is held annually in Flushing Meadow in NYC. In the first round of the tournament, 64 matches are played. In each successive round, the number of matches played decreases by one half until the final match is played. If there are seven rounds in the tournament, how many total matches will be played?

4. 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*.

5. Ross has a hobby of collecting comic books. He currently has 50 comic books and each year, he will increase his collection by 15%. Write an expression in summation notation for the amount of comic books Ross will have after *n* years. Use this expression to approximate how many comic books Ross will have 3 years from now.

6. Dee is planning on decreasing the amount of time she eats fast food per month. After the first month, she ate fast food 42 times. Each month, she eats at fast food restaurants 10% less than the previous month. How many times does she eat fast food in the first four months?

7. A fisherman harvests 350 kilograms of crab on Monday. From Monday to Friday, the fisherman harvests 8% less kilograms of crab per day. To the *nearest tenth of a kilogram*, what is the total amount of crab harvested between Monday and Friday?

8. Kina earns a $27,000 salary for the first year of work at her job. She earns annual increases of 2.5%. What is the total amount, to the *nearest cent*, that Kina will earn for the first eight years at this job?

9. Kristin wants to increase her running endurance. According to experts, a gradual mileage increase of 10% per week can reduce the risk of injury. If Kristin runs 8 miles in week one, which expression can help her find the total number of miles she will have run over the course of her 6-week training program?

1) $\sum_{n=1}^{6} 8(1.10)^{n-1}$

2) $\sum_{n=1}^{6} 8(1.10)^{n}$

3) $\frac{8-8(1.10)^{6}}{0.90}$

4) $\frac{8-8(0.10)^{n}}{1.10}$

10. In his first year running track, Usain earned 8 medals. He increases his amount of medals by 25% each year. Which of the following expressions *cannot* be used to determine how many medals Usain will have after four years of high school?

1) $\frac{8-8(1.25)^{4}}{-.25}$

2) $8(1.25)^{0}+8(1.25)^{1}+8(1.25)^{2}+8(1.25)^{3}$

3) $\sum_{n=1}^{4} 8(1.25)^{n-1}$

4) $\frac{8-8(.25)^{4}}{1-.25}$

11. Jake wants to buy a car and hopes to save at least $5000 for a down payment. The table below summarizes the amount of money he plans to save each week.

Week	1	2	3	4	5
Money Saved, in Dollars	2	5	12.5	31.25	...

Based on this plan, which expression should he use to determine how much he has saved in *n* weeks?

1) $\frac{2-2(2.5^{n})}{1-2.5}$

2) $\frac{2-2(2.5^{n-1})}{1-2.5}$

3) $\frac{1-2.5^{n}}{1-2.5}$

4) $\frac{1-2.5^{n-1}}{1-2.5}$

12. 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 20th 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

13. A ball is dropped from a height of 32 feet. It bounces and rebounds 80% of the height from which it was falling. What is the total downward distance, in feet, the ball traveled up to the 12th bounce?

1) 29
2) 58
3) 120
4) 149

14. Jasmine decides to put $100 in a savings account each month. The account pays 3% annual interest, compounded monthly. How much money, *S*, will Jasmine have after one year?

1) $S = 100(1.03)^{12}$

2) $S = \frac{100-100(1.0025)^{12}}{1-1.0025}$

3) $S = 100(1.0025)^{12}$

4) $S = \frac{100-100(1.03)^{12}}{1-1.03}$