LESSON 6.6 Skills Practice

Name _____ Date _____

A Series of Fortunate Events

Applications of Arithmetic and Geometric Series

Problem Set

Determine whether each situation is best modeled by an arithmetic or geometric series. Explain your reasoning.

1. Shania loves to run. Currently she is running about 20 miles per week and decides to increase her weekly mileage by 3 miles per week.

   The situation is arithmetic because Shania's mileage is increasing by a constant amount of 3 miles per week.

2. Production of muffins at Puffery's Bakery continues to increase from month to month. The bakery increases production by a factor of 1.5 each month.

3. Claudette bought stock in new high tech company. The table shows the dividends she received at the end of each year.

Year	Dividends (dollars)
1	84.00
2	86.52
3	89.12
4	91.79
5	94.54

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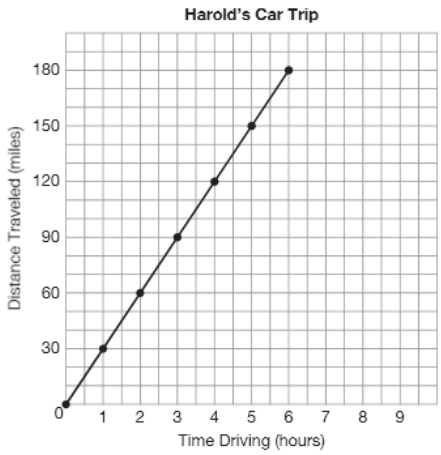
4. A local call center has an opening for a new associate that pays $14.50 per hour with a quarterly increase of $0.10 per hour.

5. Neddy ran a regression analysis on some data, whose domain is positive integers, using his graphing calculator. The equation of best fit, according to the calculator, is $y = 3 \cdot 1.01^x$.

6. The graph shows the relationship between the number of hours Harold drove his car and the distance he traveled during a 6-hour trip.



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7. Shawana is considering the following two data plans for her mobile phone.

Data Plan 1	
Year	Cost (dollars)
1	148.00
2	153.00
3	158.00
4	163.00
5	168.00

Data Plan 2	
Year	Cost (dollars)
1	120.00
2	124.80
3	129.79
4	134.98
5	140.38

8. Chloe opened a clothing store. During the first 4 years the store's net revenue has been "flat," meaning that the net revenue remained the same during each of the 4 years.

Use your knowledge of arithmetic and geometric series to solve each problem.

9. Billy Kidd owns a horse ranch. Initially the number of horses in his herd was small but over time the number increased. In the spring of the first year he had 42 horses, in the spring of the second year he had 60 horses, and in the spring of the third year he had 78 horses. If the pattern continues, write an explicit formula to predict the number of horses Billy has in his herd any given spring.

The sequence is arithmetic.

I can use the formula, $a_n = a_1 + d(n - 1)$, where $a_1 = 42$ and $d = 18$.

$a_n = a_1 + d(n - 1)$

$a_n = 42 + 18(n - 1)$

$a_n = 18n + 24$

An explicit formula to predict the number of horses in Billy's herd any given spring is $a_n = 18n + 24$.

10. Jimmy does not like to write short stories. His teacher, Ms. Mundy, told him that he can become a better writer and enjoy writing more if he starts out limiting the number of words in his stories. As he writes more stories, he can increase the number of words per story. The table shows an overview of Ms. Mundy's suggestion. Determine how many words Jimmy uses in his first 5 stories.

Story	Number of Words per Story
1	75
2	150
3	300
4	600
5	1200

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11. When Kodda received her first paycheck she opened a savings account and deposited $10 in the account. Upon receiving her second paycheck she deposited $12 in the account, and after receiving her third paycheck she deposited $14 in the account. If this pattern continues, determine how much money Kodda deposits in her account when she receives her twelfth paycheck.

12. Grace buys a powerboat with a 90 horsepower motor. She learns that the wear on the motor is measured by the number of hours the motor has been running. The table shows the number of hours the powerboat was used during the first six months. Determine how many hours the motor has been used in the first six months.

Month	Number of Hours Motor Used
1	21
2	32
3	43
4	54
5	65
6	76

13. Malinda and Otto are a song writing team. During their first year of collaboration they wrote only 3 songs but in each succeeding year they were able to triple the number of songs written each year. Determine how many songs they were able to write in the fourth year.

14. Mr. Greenwell, Maxwell's math teacher, challenged him to determine the sum of the following infinite sequence:

$$2, \frac{2}{5}, \frac{2}{25}, \frac{2}{125}, \ldots$$

Maxwell thought about the challenge and then smiled. What did Maxwell know?

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15. At six years old, Tanya is a prolific block builder. Her mother walked into the playroom to find that Tanya had built a wall with blocks. On further inspection her mother realized that there was a pattern to how the wall was built. The top row contained 1 block, the next row contained 7 blocks, the next row contained 13 blocks, and the bottom row contained 55 blocks. In total, there were 10 rows. Determine how many blocks Tanya used to build her wall.

16. Turner just learned to count by fives. Determine the fifteenth number in Turner's recitation of the multiples of 5.

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