

**LESSON 6.5** Skills Practice

Name \_\_\_\_\_ Date \_\_\_\_\_

**The Power of Interest (It's a Curious Thing)**  
**Geometric Series Applications****Problem Set**

Write an explicit formula for the  $n$ th term of the geometric sequence that models each problem situation. Identify and interpret the meaning of the first term,  $g_1$ , and the common ratio,  $r$ .

- Henry invested \$500 in a bank account which earns 3% interest annually.  
The first term,  $g_1$ , is \$500 and represents the amount of money Henry initially invests in the bank account. The common ratio,  $r$ , is 1.03 which represents the factor by which Henry's investment will increase each year.

$$g_n = 500 \cdot 1.03^{n-1}$$

- Gamble's Manufacturing makes widgets. The table shows the number of widgets produced by the company over a period of 5 years.

Year	Widgets Produced (thousands)
1	10
2	11
3	12.1
4	13.31
5	14.641

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3. Panna initially invested \$1500 in her 401K plan. Due to the slow economy, her investment began to decrease by 1.5% per year.

4. The table shows the population of a city at the end of four consecutive decades.

Decade	Population (thousands)
1	11
2	13.2
3	15.84
4	19.008

5. Monty Maris is a professional baseball player whose end of the year batting averages have recently been declining. In the past 4 seasons his consecutive batting averages have been: 0.340, 0.306, 0.275, and 0.248.

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6. Juanita is offered a job that pays \$50,000 the first year with an expected annual increase of 5%.

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

7. Aiden takes a job paying \$34,000 dollars a year with a guaranteed increase of 5% per year. If he knows that he will earn \$45,916.31 in his 20th year of employment, what is the total amount of money he earns over 20 years?

I can use Euclid's Method,  $S_n = \frac{g_n(r) - g_1}{r - 1}$ , where  $n = 20$ ,  $g_{20} = 45,916.31$ ,  $r = 1.05$ , and  $g_1 = 34,000$ , to determine how much money Aiden earns in 20 years.

$$\begin{aligned} S_{20} &= \frac{g_{20}(r) - g_1}{r - 1} \\ &= \frac{45,916.31(1.05) - 34,000}{1.05 - 1} \\ &= 284,242.51 \end{aligned}$$

Aiden earns \$284,242.51 over 20 years.

8. When Madie got her first job. She opened a savings account and deposited \$14. With each paycheck she increased the amount of money she deposited in her savings account by 2%. If she deposited \$18.11 in her account with her 14th paycheck, how much money does she have in her account after making her 14th deposit?

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9. Contagious diseases like the flu can spread rather rapidly. Suppose in a large community initially 3 people have the flu. By the end of the 1st week, 12 people have the flu. If this pattern continues 786,432 will have the flu by the end of the 10th week. What is the total number of people who will have the flu during the 10-week period?

10. Each month Gil withdraws 10% of the total amount of money he has invested in his savings account. He gives 60% of what he withdraws to charity and spends the rest. Complete the table.

Month	Savings Account	Amount Withdrawn (10%)	Amount Given to Charity (60%)	Amount Spent (40%)
1	\$1000			
2				
3				
4				
$n$				

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11. Del Corn, a canning company, processes canned vegetables. In the fall they harvest corn from the 10,000 acres of corn planted in the spring. The table shows the number of acres remaining to be harvested at the beginning of any given week. If this pattern continues, write a formula to predict the number of acres remaining to be harvested at the beginning of any given week. Use your formula to predict the number of acres remaining to be harvested at the beginning of the 9th week.

Week	Acres Remaining to be Harvested
1	10,000
2	8000
3	6400
4	5120

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12. At the end of each year, Wendy withdraws 20% of the total amount of money she has invested in her savings account. She gives 50% of what she withdraws to charity and uses the other 50% to buy gifts for her friends and relatives. Complete the table. Determine how much money she has given to charity over the period of 5 years. How much money did she spend on gifts over the same time period?

Year	Savings Account	Amount Withdrawn (20%)	Amount Given to Charity (50%)	Amount Spent on Gifts (50%)
1	\$8000			
2				
3				
4				
5				
$n$				

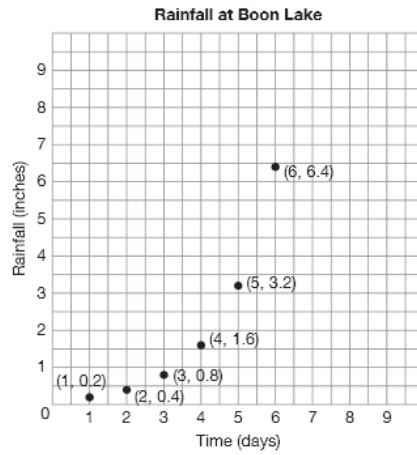


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13. Tanya lives on the shore of Boon Lake. This summer was particularly rainy, and the water level of Boon Lake began to rise so quickly that Tanya thought her cottage was going to flood. The graph shows the amount of rainfall over 6 consecutive days. Determine the total rainfall at Boon Lake over the 6 days.



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14. Santiago began collecting coins. At the end of the first year, his collection had 12 coins. At the end of the second year he added 24 more coins, and at the end of the third year he added 48 more coins. This pattern continued and at the end of the seventh year he added 768 more coins to his collection. How many total coins does Santiago have in his collection at the end of his seventh year?

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