

**LESSON 6.3** Skills Practice

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

**I Am Having a Series Craving (For Some Math)!**  
**Geometric Series****Vocabulary**

Write the term that best completes the sentence.

1. A \_\_\_\_\_ is the sum of the terms of a geometric sequence.

**Problem Set**

Use Euclid's Method to compute each series.

1.  $2 + 6 + 18 + 54 + 162$   
 $r = 3, \quad g_1 = 2, \quad g_5 = 162$

$$S_n = \frac{g_n(r) - g_1}{r - 1}$$

$$S_5 = \frac{162(3) - 2}{3 - 1}$$
$$= 242$$

2.  $1 + (-4) + 16 + (-64) + 256 + (-1024)$

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3.  $\frac{1}{2} + \frac{1}{10} + \frac{1}{50} + \frac{1}{250} + \frac{1}{1250}$

4.  $-0.2 + (-0.02) + (-0.002) + (-0.0002)$

5.  $\sum_{j=0}^7 2^j$

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6.  $3 \sum_{i=0}^6 (-3)^i$

7.  $5 \sum_{i=0}^8 \left(\frac{1}{2}\right)^i$

8.  $\sum_{i=0}^6 4^i$

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9. A geometric sequence with 7 terms, a common ratio of 3, and a first term of  $-2$ .

10. A geometric sequence with 6 terms, a common ratio of 0.1, and a first term of 6.

Write each geometric series in the form  $g(1 + r^1 + r^2 + r^3 + \cdots + r^{n-1})$  where  $g$  is a constant,  $r$  is the common ratio, and  $n$  is the number of terms. Then, compute each series using the formula  $S_n = \frac{g_1(r^n - 1)}{r - 1}$ .

11.  $7 + 14 + 28 + 56 + 112$

$$= 7(1 + 2 + 4 + 8 + 16)$$

$$= 7(2^0 + 2^1 + 2^2 + 2^3 + 2^4)$$

$$S_n = \frac{g_1(r^n - 1)}{r - 1}$$

$$S_5 = \frac{7(2^5 - 1)}{2 - 1}$$

$$= 217$$

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12.  $-3 + (-9) + (-27) + (-81)$

13.  $\frac{-1}{4} + \frac{1}{16} + \left(\frac{-1}{64}\right) + \frac{1}{256} + \left(\frac{-1}{1024}\right)$

14.  $\sum_{i=0}^5 2(3)^i$

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15.  $\sum_{j=0}^4 4(0.2)^j$

16.  $\sum_{j=0}^5 -\frac{1}{2}\left(\frac{1}{3}\right)^j$

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Use Euclid's Method to solve each problem.

17. A rubber ball is dropped from a height of 600 centimeters and bounces on the ground. The table shows the height reached by the ball after each successive bounce. What is the total distance traveled by the ball on the first five return bounces?

Bounce	Height (centimeters)
1	300
2	150
3	75
4	37.5
5	18.75

$$n = 5, g_5 = 18.75, g_1 = 300, r = \frac{1}{2}$$

$$S_n = \frac{g_n(r) - g_1}{r - 1}$$

$$S_5 = \frac{18.75\left(\frac{1}{2}\right) - 300}{\frac{1}{2} - 1}$$

$$= 581.25 \text{ cm}$$

The ball traveled 581.25 centimeters on the first five return bounces.

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18. A small local grocery store reviewed their net profits for the past 7 years and observed that profits increased by 2% per year. The table shows the net profits. What is the grocery store's total net profit for the past 7 years?

Year	Net Profit (dollars)
1	20,000
2	20,400
3	20,808
4	21,224.16
5	21,648.64
6	22,081.62
7	22,523.25

19. A soccer tournament has 64 participating teams. In the first round of the tournament, 32 games are played, with the winning team from each game moving on to the next round. In the second round, 16 games are played, with the winning team from each game moving on to the next round. This pattern continues until one team emerges as the winner of the tournament. How many games are played in the tournament to determine the winner?

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20. Serena paid \$8700 to attend college her freshman year, then found out that her cost would increase by 8% each year she stayed in college. If it takes Serena 6 years to graduate, how much will it cost her to complete college?

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21. A manufacturing company has an available position in its accounting department. The company advertises that the job will pay \$40,000 the first year with an annual raise of 3%. How much money will the new accounting hire earn over 10 years?
22. A pile driver is a mechanical device used to drive poles into the ground to provide support for a structure. Each time the device is used, the pole is driven further and further into the ground. Suppose on the first drive the pole is driven 6 feet into the ground and on each successive drive the pole is driven 80% of the distance achieved on the previous drive. How far has the pole been driven into the ground after 6 drives?

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