

Name \_\_\_\_\_

Date \_\_\_\_\_

State the first 3 terms of the sequence whose  $n$ th term is given by  $a_n$ .

1.  $a_n = \frac{(-1)^n}{n^3}$

1. \_\_\_\_\_

State the first 5 terms of the sequence whose  $n$ th term is given by  $a_n$ .

2.  $a_1 = 2, a_2 = 3; \text{ for } n > 2, a_n = (a_{n-1})^2 + (a_{n-2})^2$

2. \_\_\_\_\_

State the next 2 terms of the sequence and give a formula for the  $n$ th term.

3. 72, 70, 68, 66, 64

3. \_\_\_\_\_

4. 6, 18, 54, 162, 486

4. \_\_\_\_\_

5.  $\frac{1}{2}, \frac{1}{5}, \frac{1}{10}, \frac{1}{17}, \frac{1}{26}$

5. \_\_\_\_\_

Find the sum.

6.  $\sum_{k=2}^6 (9 - 3k)$

6. \_\_\_\_\_

Express using sigma notation.

7.  $1 + 4 + 7 + 10 + 13$

7. \_\_\_\_\_

8.  $-\frac{2}{5} + \frac{4}{25} - \frac{8}{125} + \frac{16}{625} - \frac{32}{3125}$

8. \_\_\_\_\_

Determine whether the sequence is arithmetic, geometric, or neither. Find  $d$  or  $r$  if possible.

9.  $27\sqrt{5}, 33\sqrt{5}, 39\sqrt{5}, 45\sqrt{5}$

9. \_\_\_\_\_

10.  $\frac{7}{36}, \frac{7}{6}, 7, 42, 252$

10. \_\_\_\_\_

11. Find the 43rd term of the arithmetic sequence  $-124, -122, -120, \dots$

11. \_\_\_\_\_

12. Find the common difference if the first term of an arithmetic sequence is  $-14$  and the 8th term is  $1.4$ .

12. \_\_\_\_\_

13. Find the number of terms in the arithmetic sequence  $-6, -2, 2, \dots, 158$ .

13. \_\_\_\_\_

14. Which term is  $39$  if an arithmetic sequence begins  $-37, -33, -29, \dots$ ?

14. \_\_\_\_\_

15. In an arithmetic series,  $a_1 = 42$  and  $a_{13} = -66$ . Find the sum of the first 13 terms.

15. \_\_\_\_\_

16. What is the sum of the series  $\frac{1}{4} + \frac{5}{12} + \frac{7}{12} + \dots + 2\frac{7}{12}$ ?

16. \_\_\_\_\_

17. Find the sum of the first 31 terms of the sequence  $15, 13, 11, \dots$

17. \_\_\_\_\_

18. How many terms of the arithmetic series  $(-15) + (-10) + (-5) + \dots$  must be added for the sum to be  $7950$ ?

18. \_\_\_\_\_

19. If  $a_5 = 16$  and  $a_{11} = 4$  in an arithmetic sequence, find the sum of the first 20 terms.

19. \_\_\_\_\_

20. Find the sum of the even integers  $-82$  through  $-44$ .

20. \_\_\_\_\_

21. Find the 12th term of the geometric sequence  $-2, 4, -8, \dots$

21. \_\_\_\_\_

22. Find the common ratio and the 10th term for the geometric progression  $-2, -2\sqrt{5}, -10, \dots$

22. \_\_\_\_\_

44. A ball is dropped from a height of  $32$  feet. Each time it strikes the ground it rebounds three-eighths of the distance from which it last fell. Approximately how far will the ball travel before coming to rest?

44. \_\_\_\_\_

23. Which term is  $\frac{1}{64}$  in the geometric progression 64, 32, 16, ...? 23. \_\_\_\_\_
24. In a geometric progression, the 5th term is  $\frac{9}{4}$  and the 11th term is 144. Find the first 3 terms. 24. \_\_\_\_\_
25. Write the next 4 terms of the geometric progression whose first term is  $\sqrt[3]{3}$  and whose 2nd term is  $\sqrt{3}$ . 25. \_\_\_\_\_
26. Find the sum of the geometric series  $\frac{1}{9} + \frac{1}{3} + 1 + \dots + 2187$ . 26. \_\_\_\_\_
27. The sum of the first  $n$  terms of the geometric sequence  $-1, -3, -9, \dots$  is  $-3280$ . Find the value of  $n$ . 27. \_\_\_\_\_
28. In a geometric progression, the 2nd term is 8 and the 7th term is  $\frac{1}{4}$ . Find the sum of the first 10 terms. 28. \_\_\_\_\_
29. In a geometric sequence, the common ratio is  $-3$  and the sum of the first 5 terms is 244. Find the first term of the sequence. 29. \_\_\_\_\_
- Find the sum.
30.  $6 + 8 + \frac{32}{3} + \dots$  30. \_\_\_\_\_
31.  $\frac{1}{3} + (-\frac{1}{9}) + \frac{1}{27} + \dots$  31. \_\_\_\_\_
32. Rewrite using sigma notation:  $\frac{2}{5} + \frac{4}{25} + \frac{8}{125} + \dots$  32. \_\_\_\_\_
33. Find the sum:  $\sum_{c=-2}^3 (-2)^c$  33. \_\_\_\_\_
34. What is the sum of the series  $5.68 + 5.64 + 5.6 + \dots + 3.76$ ? 34. \_\_\_\_\_
35. Find the sum:  $\sum_{k=1}^{\infty} 8(-\frac{1}{2})^{k-1}$  35. \_\_\_\_\_
36. Simplify:  $\frac{(x+5)!}{(x+4)!}$  36. \_\_\_\_\_
37. Fred is on a sled coasting down a snowy hill. He covers 4 feet in the first second, 7 feet in the next second, 10 feet in the third second, and in general, 3 feet more each second than the previous second. If Fred arrives at the bottom of the hill at the end of 12 seconds, how far did he coast? How many feet did he cover in the last second? 37. \_\_\_\_\_
38. A log pile has 61 logs in the bottom layer, 58 in the second layer, 55 in the third layer, and so on. If there are 639 logs in the pile, how many layers are there? 38. \_\_\_\_\_
39. The Smith Homebuilding Corporation has agreed to pay a penalty for each extra day needed to build a home beyond a certain completion date. The penalty for being one day late is \$32. Each day after that, the penalty is increased by \$8, and it is cumulative! If 41 extra days are needed to complete a home, what will be the Smith Corporation's total penalty? 39. \_\_\_\_\_
40. While training for a marathon, Donna ran 0.5 km more each day than she did the previous day. If her training program lasted 4 weeks, and she ran a total of 623 km during that time, how far did she run on the first and last days? 40. \_\_\_\_\_
41. In a high school biology lab, 2000 bacteria are present at the start of a controlled experiment. If the number of bacteria doubles every 3 hours, find the number of bacteria after 24 hours. 41. \_\_\_\_\_
42. A famous statue is first sold for \$5000 and then resold 7 times. What is the price at the final sale if, at each resale, the price is 25% higher than the previous price? 42. \_\_\_\_\_
43. The length of the arc travelled by the tip of a pendulum on the first swing is 45 cm and the length of each succeeding swing is four-fifths of the preceding swing. What distance does the tip of the pendulum travel on the 8th swing? 43. \_\_\_\_\_