

NAME \_\_\_\_\_

MATH 185  
CHAPTER 7 REVIEW

Write out the first five terms of the sequence.

1.  $\left\{ (-1)^n - 1 \left( \frac{n+1}{2n-1} \right) \right\}$

The given pattern continues. Write down the  $n$ th term of the sequence suggested by the pattern.

2. 6, 14, 22, 30, 38, ...

3.  $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}, \dots$

The sequence is defined recursively. Write the first four terms.

4.  $a_1 = 1$  and  $a_n = a_{n-1} - 1$  for  $n \geq 2$

**Solve the problem.**

5. Suppose that certain bacteria can double their size and divide every 30 minutes. Write a recursive sequence that describes this growth where each value of  $n$  represents a 30-minute interval. Let  $a_1 = 425$  represent the initial number of bacteria present.

**Write out the sum. Do not evaluate.**

6.

$$\sum_{k=1}^6 (5k - 2)$$

**Express the sum using summation notation.**

7.  $2 + 4 + 6 + \dots + 12$

**Find the  $n$ th term and the indicated term of the arithmetic sequence whose initial term,  $a$ , and common difference,  $d$ , are given.**

8.  $a = 9$ ;  $d = 2$

$a_n = ?$ ;  $a_{15} = ?$

**Find the indicated term of the sequence.**

9. The twenty-third term of the arithmetic sequence  $-13, -10, -7, \dots$

**Find the first term, the common difference, and give a recursive formula for the arithmetic sequence.**

10. 8th term is 42; 13th term is 2

**Find the indicated term using the given information.**

11.  $a = 3, d = -5; a_n$

**Find the sum of the arithmetic sequence.**

12.  $(-6) + (-1) + 4 + 9 + \dots + 39$

**Solve the problem.**

13. A theater has 26 rows with 26 seats in the first row, 29 in the second row, 32 in the third row, and so forth. How many seats are in the theater?

Find the fifth term and the  $n$ th term of the geometric sequence whose initial term,  $a$ , and common ratio,  $r$ , are given.

14.  $a = 5$ ;  $r = 2$

Use the formula for the general term (the  $n$ th term) of a geometric sequence to find the indicated term of the sequence with the given first term,  $a_1$ , and common ratio,  $r$ .

15. Find  $a_{10}$  when  $a_1 = 3$ ,  $r = 3$ .

Find the  $n$ th term of the geometric sequence.

16.  $a = 3$ ;  $r = -2$

17. 3, 9, 27, 81, 243

18.  $3, \frac{3}{5}, \frac{3}{25}, \frac{3}{125}, \frac{3}{625}$

**Solve the problem.**

19. Find the 10th term of the geometric sequence  $\frac{1}{3}, 1, 3, \dots$

20. A particular substance decays in such a way that it loses half its weight each day. How much of the substance is left after 8 days if it starts out at 32 grams?

**Find the sum.**

21. 1, 3, 9, 27, 81

22.  $\sum_{k=1}^5 \left(\frac{1}{3}\right)(2)^k$

**Solve the problem.**

23. A small business owner made \$40,000 the first year he owned his store and made an additional 7% over the previous year in each subsequent year. Find how much he made during his fourth year of business. Find his total earnings during the first four years. (Round to the nearest cent, if necessary.)

Find the sum of the infinite geometric series.

24.  $4 + 1 + \frac{1}{4} + \dots$

25.

$$\sum_{k=1}^{\infty} 4 \left( \frac{2}{3} \right)^{k-1}$$

## Answer Key

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1.  $2, -1, \frac{4}{5}, -\frac{5}{7}, \frac{2}{3}$

2.  $a_n = 2(4n - 1)$

3.  $a_n = \frac{1}{n^2}$

4.  $1, 0, -1, -2$

5.  $a_1 = 425; a_n = 2a_{n-1}$  for  $n > 1$ .

6.  $3 + 8 + 13 + 18 + 23 + 28$

7.

$$\sum_{k=1}^6 2k$$

8.  $a_n = 7 + 2n; a_{15} = 37$

9. 53

10.  $a_1 = 98, d = -8, a_n = a_{n-1} - 8$

11. -32

12. 165

13. 1651 seats

14.  $a_5 = 80; a_n = 5 \cdot (2)^{n-1}$

15. 59,049

16.  $a_n = 3 \cdot -2^{n-1}$

17.  $a_n = 3 \cdot 3^{n-1}$

18.  $a_n = 3 \cdot \left(\frac{1}{5}\right)^{n-1}$

19. 6561

20.  $\frac{1}{8}$  gram

21. 121

22.  $\frac{62}{3}$

23. \$49,001.72; \$177,597.72

24.  $\frac{16}{3}$

25. 12