

Objectives: By the end of this lesson, I will be able to:

1. Use appropriate vocabulary when discussing geometric and arithmetic sequences & series

Sequence	Arithmetic	Common Difference	Domain	Sigma
Series	Geometric	Ratio	Range	Term

2. Identify if a situation is arithmetic or geometric.

(a) 4, 1.9, -0.2, -2.3, ...

(b) -60, 30, -15, 7.5, ... 0.1171875

(c) Jared has a 4 year old car that is currently worth \$15,000. The value of his car is projected to decline by 12% per year.

3. Create a rule for an arithmetic or geometric sequence.

Use the following table for questions (a) and (b)

Year	1	2	3	4	5	6
Visitors	2900	3350	3800	4250	4700	5150
Revenue	\$50,000	\$55,000	\$60,500	\$66,500	\$73,205	\$80,525.50

(a) Create a rule for the sequence of the number of visitors each year.

(b) Create a rule for the sequence of the revenue each year.

(c) The taxi fare in a certain city consists of an initial charge of \$2.50 and a charge of \$2.00 for every mile traveled. What is a rule for the sequence representing a taxi fare, where n is the number of miles traveled?

(d) Create a rule for an arithmetic sequence with a 5th term of 289 and a 12th term of 170.

4. Calculate some n^{th} term in an arithmetic or geometric sequence.

(a) Monica deposited \$40 in a savings account at the end of January. She increases the amount she deposits by the same amount each month. She deposited \$69.75 at the end of August. How much will she deposit at the end of December?

(b) The second term in an arithmetic sequence is 3, and the common difference is 5. What is the value of the 18th term?

(c) A cracker was accidentally dropped along a sidewalk by a pedestrian. During the first hour, 4 ants found the cracker, and during the fourth hour, 500 ants found the cracker. The number of ants that have found the discarded cracker after n hours can be modeled by a geometric sequence. How many ants found the cracker in the 7th hour?

5. Calculate the sum of an arithmetic or geometric sequence.

(a) $\sum_{k=1}^9 (5 - 3k)$

(b) Monica deposited \$40 in a savings account at the end of January. She increases the amount she deposits by the same amount each month. She deposited \$69.75 at the end of August. How much will be in her bank account at the end of December?

(c) Find the sum of the first 46 terms of the following series: {12, 15, 18, ... }

(d) What is the sum of the first 15 terms of the sequence $a_n = (-1)^n(n + 4)$?

Practice Problem Set (On Your Own - answer key on next page):

- What is the 100th term of the arithmetic sequence $\{-8, -5, -2, 1, \dots\}$
(a) 103 (b) 289 (c) 292 (d) 305
- The function $a_n = a_{n-1} \cdot 4$ is a geometric sequence where $a_1 = 7$. What is a_3 ?
(a) 12 (b) 28 (c) 112 (d) 448
- What is the sum $\sum_{k=1}^5 k(k + 3)$?
(a) 100 (b) 60 (c) 51 (d) 40
- The 5th term of an arithmetic sequence is 18, and the 11th term is 60. What is a rule for the sequence?
(a) $f(n) = -10 + 7(n - 1)$
(b) $f(n) = -6 + 6(n - 1)$
(c) $f(n) = 6 - 6(n - 1)$
(d) $f(n) = 6 - 10(n - 1)$
- What is the rule in sigma notation for the series 2, 5, 8, 11, 14?
(a) $\sum_{n=1}^5 (n + 3)$ (b) $\sum_{n=1}^5 (3n - 1)$ (c) $\sum_{n=-2}^{14} (n + 3)$ (d) $\sum_{n=2}^{14} (3n - 1)$
- Given the sequence $a_n = 4 - 6(n - 2)$, what is the sum of the first 15 terms?
- Bethany saved 10 cents for the first day of last month and then doubled her daily savings each day for 11 straight days.
 - Would a geometric sequence or series give the total daily savings for the 12 days?
 - What are the first three terms of the model?
 - Create a rule to determine how much did Bethany save on the 12th day.
 - What were her total savings over the 12 days?

ANSWER KEY:

1. What is the 100th term of the arithmetic sequence $\{-8, -5, -2, 1, \dots\}$

- (a) 103 **(b) 289** (c) 292 (d) 305

2. The function $a_n = a_{n-1} \cdot 4$ is a geometric sequence where $a_1 = 7$. What is a_3 ?

- (a) 12 (b) 28 **(c) 112** (d) 448

3. What is the sum $\sum_{k=1}^5 k(k + 3)$?

- (a) **100** (b) 60 (c) 51 (d) 40

4. The 5th term of an arithmetic sequence is 18, and the 11th term is 60. What is a rule for the sequence?

- (a) $f(n) = -10 + 7(n - 1)$**
(b) $f(n) = -6 + 6(n - 1)$
(c) $f(n) = 6 - 6(n - 1)$
(d) $f(n) = 6 - 10(n - 1)$

5. What is the rule in sigma notation for the series 2, 5, 8, 11, 14?

- (a) $\sum_{n=1}^5 (n + 3)$ **(b) $\sum_{n=1}^5 (3n - 1)$** (c) $\sum_{n=-2}^{14} (n + 3)$ (d) $\sum_{n=2}^{14} (3n - 1)$

6. Given the sequence $a_n = 4 - 6(n - 2)$, what is the sum of the first 15 terms? **-480**

7. Bethany saved 10 cents for the first day of last month and then doubled her daily savings each day for 11 straight days.

- Would a geometric sequence or series give the total daily savings for the 12 days?
- What are the first three terms of the model?
- Create a rule to determine how much did Bethany save on the 12th day.
- What were her total savings over the 12 days? **\$409.50**