**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Arithmetic and Geometric Sequences**

**For each sequences or story below identify whether it is Arithmetic or Geometric, find the common difference or common ratio, write an explicit and recursive formula, then use your formulas to find the given term.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Representation** | **Arithmetic or Geometric** | **Common Difference or Ratio** | **Recursive Formula** | **Explicit Formula** | **Find each given value** |
| 1. -6, 12, -24, …
 |  |  |  |  | a10 |
| 1. 10, 20, 30, 40, …
 |  |  |  |  | a32 |
| 1. -10, -8, -6, -4, …
 |  |  |  |  | a50 |
| 1. 72, 48, 32, …
 |  |  |  |  | a5 |
| 1. ¾ , -1, 4/3, -16/9, …
 |  |  |  |  | a9 |
| 1. Andrea is collecting bugs for science class. The first day her sister helps her, and she finds 35 bugs. After day 2, she has 52 bugs. On day 3, she has 69 bugs.
 |  |  |  |  | a5 |
| 1. You complain that the hot tub in your hotel suite is not hot enough. The hotel tells you that they will increase the temperature by 8% each hour. The current temperature of the hot tub is 75 oF.
 |  |  |  |  | a3 |
| 1. .

 |  |  |  |  | a15 |
| 1. .
 |  |  |  |  | a7 |

**State whether the sequence represents a linear function, exponential function, or neither. State the common ratio or common difference.**

1. 420, -210, 105, -105/2, …
2. 2/5, 1/10, 1/40, 1/160, …
3. 6.7, 3.5, 0.3, -2.9, …
4. -1, 5, -9, 13, …

**Write the next four terms in the sequence.**

1. 12.3, 33, 53.7, 74.4, …
2. 5/2, -5, 10, -20, …
3. -180, -60, -20, -20/3, …

**Write the first four terms of the sequence with the given rule.**

1. Find the 12th term in the sequence with the rule .
2. Find the 7th term in the sequence with the rule

**Write the explicit and recursive rule for the sequence with the given information.**

1. a1 = 14.2, d = -3.1 Explicit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recursive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a1 = -8, r = ¼ Explicit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recursive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a3 = -8, r = ¼ Explicit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recursive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a4 = -2, r = - 1/3 Explicit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recursive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a3 = 16, a7 = 32 (arithmetic) Explicit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recursive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a2 = 3, a4 = 48 (geometric) Explicit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recursive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A culture of bacteria doubles every hour. If there are 500 bacteria at the beginning, how many bacteria will there be after 24 hours?
2. A museum usually has 4, 000, 000 visitors. They made some changes to increase visitors. The table shows the projected annual visitors to museum (in millions) after the changes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | 1 | 2 | 3 | 4 | n |
| **Visitor (millions)** | 6 | 9 | 13.5 | 20.25 | … |

* 1. What type of function is this situation?
	2. Write an explicit rule for the sequence.
	3. What is the projected number of visitors in 7 years? (Round to the nearest thousandths place)
1. You visit Grand Canyon and drop a penny off the edge of a cliff. The distance the penny will fall is 16 feet the first second, 48 feet the next second, 80 feet the third second, and so on. What is the total distance the object will fall in 6 seconds?
2. A theater has 20 seats in the first row, 22 in the second row, 24 in the third row, and so on for 25 rows.
	1. Write an explicit rule for the sequence.
	2. How many seats in the 13th row?
	3. How many seats in the 25th row?
3. At Bingham High, Savannah, a 10th grader decides to start a rumor that Jordan District is going to declare March 14 a holiday and close school for the day. On the first day of school she tells 3 students the rumor and gives them instructions to repeat the rumor to 3 more students the next day, etc…
4. Write an explicit rule to model this situation.
5. If each student follows these instructions, how many students will hear the rumor on day 6?
6. On what day will 2500 students hear or rehear the rumor?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Day** | 1 | 2 | 3 | 4 | 5 | 6 |
| **# of Students heard the rumor** |  |  |  |  |  |  |