

# Geometric Sequences Worksheet

A **geometric sequence** is a sequence of numbers in which each term is found by **multiplying the previous term by the same number**. This number is called the **common ratio (r)**.

**Formula for the nth Term**

$$a_n = a_1(r)^{n-1}$$

Where:

- $a_n$  = nth term
- $a_1$  = first term
- $r$  = common ratio
- $n$  = term number

## Example 1 - Find the Next Three Terms

Find the next three terms in the sequence: **3, 6, 12, 24, ...**

**Step 1.** Find the common ratio.  $\frac{6}{3} = 2$

The common ratio is 2.

**Step 2.** Multiply each term by 2.

$$24 \times 2 = 48$$

$$48 \times 2 = 96$$

$$96 \times 2 = 192$$

**Answer**

**48, 96, 192**

## Example 2 - Find the Common Ratio

Find the common ratio of the sequence: **81, 27, 9, 3, ...**

**Step 1.** Divide consecutive terms.  $\frac{27}{81} = \frac{1}{3}$

The common ratio is:  $r = \frac{1}{3}$

## Example 3 - Find the 8th Term

Find the 8th term of the sequence: **5, 10, 20, 40, ...**

**Step 1.** Identify the values.

- $a_1 = 5$
- $r = 2$
- $n = 8$

**Step 2.** Use the formula.  $a_n = a_1(r)^{n-1}$

Substitute the values.  $a_8 = 5(2)^7$

**Step 3.** Evaluate the exponent.  $2^7 = 128$

**Step 4.** Multiply.  $5(128) = 640$

**Answer: The 8th term is 640.**

### Part A – Find the Next Three Terms

1. 2, 4, 8, 16, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

2. 5, 15, 45, 135, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

3. 64, 32, 16, 8, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

4. 1, 3, 9, 27, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

5. 160, 80, 40, 20, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

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### Part B – Find the Common Ratio - Find the common ratio.

6. 4, 12, 36, 108  $r =$  \_\_\_\_\_

7. 100, 50, 25, 12.5  $r =$  \_\_\_\_\_

8. 7, 14, 28, 56  $r =$  \_\_\_\_\_

9. 243, 81, 27, 9  $r =$  \_\_\_\_\_

10. 6, 18, 54, 162  $r =$  \_\_\_\_\_

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### Part C – Find the Missing Term

11. 3, 9, \_\_\_\_\_, 81, 243

12. 128, 64, \_\_\_\_\_, 16, 8

13. 2, 10, \_\_\_\_\_, 250

14. 1, 4, \_\_\_\_\_, 64

15. 200, 100, \_\_\_\_\_, 25

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### Part D – Find the $n$ th Term

Use the formula:  $a_n = a_1(r)^{n-1}$

16. Find the **6th term**.

Sequence: 2, 6, 18, 54, ...

Answer: \_\_\_\_\_  $(3)^5 =$  \_\_\_\_\_

17. Find the **7th term**.

Sequence: 3, 9, 27, 81, ...

Answer: \_\_\_\_\_  $(3)^6 =$  \_\_\_\_\_

18. Find the **5th term**.

Sequence: 100, 50, 25, 12.5, ...

Answer: \_\_\_\_\_  $\left(\frac{1}{2}\right)^4 =$  \_\_\_\_\_

19. Find the **8th term**.

Sequence: 1, 2, 4, 8, ...

Answer: \_\_\_\_\_  $(2)^7 =$  \_\_\_\_\_

20. Find the **6th term**.

Sequence: 64, 32, 16, 8, ...

Answer: \_\_\_\_\_  $\left(\frac{1}{2}\right)^5 =$  \_\_\_\_\_

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### Part E – Identify the Sequence: Write **Arithmetic**, **Geometric**, or **Neither**.

21. 5, 10, 20, 40, 80 \_\_\_\_\_

22. 8, 13, 18, 23, 28 \_\_\_\_\_

23. 2, 6, 12, 20, 30 \_\_\_\_\_

24. 81, 27, 9, 3, 1 \_\_\_\_\_

25. 100, 90, 81, 73 \_\_\_\_\_