

1.3.2 Geometric Series Homework 1

Name: _____

1. Find S_5 for 3, 6, 12, 24, 48.
2. Find S_7 for 5, 2.5, 1.25, ...
3. Find the sum of -4, -12, -36, -108.
4. Find S_5 for $u_n = 81 \times \left(\frac{2}{3}\right)^{n-1}$.
5. Find S_6 given $u_n = 20 \left(-\frac{1}{2}\right)^{n-1}$.
6. Given that $S_n = 189$, and $u_n = 3 \times 2^{n-1}$, find n .
7. A geometric series has the general term $u_n = A \left(\frac{1}{3}\right)^{n-1}$. Given that $S_6 = 364$, find A (the first term).

8. Evaluate the following:

$$\sum_{n=0}^4 6 \times 2^n$$

$$\sum_{n=1}^6 160 \left(\frac{3}{4}\right)^{n-1}$$

$$\sum_{n=2}^7 9 \left(-\frac{1}{3}\right)^n$$

1.3.2 Geometric Series HW #2

Name:

1. The first term is $a = 3$ and the common ratio is $r = 2$. Find the sum of the first 6 terms.
2. A geometric series has $a = 5$ and $r = 1/2$. Find the sum of the first 8 terms.
3. The first term is 100 and the common ratio is $r = 0.9$. Find the sum of the first 10 terms.
4. A geometric series has $a = 7$ and $r = -3$. Find the sum of the first 5 terms.
5. The 5th term of a geometric series is 81, and the 8th term is 2187. Find the sum of the first 10 terms.
6. In a geometric series, the 3rd term is 12 and the 7th term is 768. Find the sum of the first 8 terms.
7. A geometric series has its 2nd term equal to 18 and its 5th term equal to 486. Find the sum of the first 6 terms.
8. A geometric series has $a = 6$ and common ratio r . The sum of the first 5 terms is 186. Find r .
9. A geometric series has $r = 3$. If the sum of the first 4 terms is 120, find a .
10. The sum of the first 7 terms of a geometric series is 254. If the first term is $a = 2$, find r .
11. A geometric series has a first term of 5 and a common ratio r . If the sum of the first three terms is 155, find the value of r .
12. The sum of the first 8 terms of a geometric series is 765. The common ratio is $r = 2$. Find the first term.

Routine Practice (Direct Applications)

1. The first term of a geometric sequence is 4 and the common ratio is 3. Find the 8th term.
2. A geometric sequence has $u_1 = 256$ and $u_5 = 16$. Find the common ratio and u_7 .
3. A medicine dose is 200 mg and decreases by 20% each hour. How much remains after 6 hours?
4. A population doubles every 5 years. If the starting population is 5,000, find the population after 20 years.

Series & Summation

5. Find the sum of the first 10 terms of the sequence: 2, 6, 18, 54, ...
6. The value of a laptop is \$1,500 and depreciates by 30% each year. Find the total value lost after 3 years.
7. A scholarship starts at \$500 and increases by 8% each semester. Find the total scholarship received over 6 semesters.
8. Evaluate the geometric series with $u_1 = 7$, $r = -2$, and $n = 5$.

IB-Style Questions (Layered / Contextual)

9. A tree grows by 4% each year. Its initial height is 2.5 m.
- Write a formula for its height after n years.
 - Estimate its height after 12 years.
 - Show that its growth is geometric and explain why the graph is curved, not linear.
10. A bacteria culture has 600 cells at the start and triples every 2 hours.
- Write an expression for the number of bacteria after n two-hour periods.
 - How many bacteria are there after 12 hours?
 - Find the total number of bacteria in the first 6 two-hour periods (sum of the first 6 terms).
11. A car is valued at \$40,000. Each year it loses 18% of its value.
- Write an expression for its value after n years.
 - Find its value after 5 years, correct to the nearest dollar.
 - Find the total depreciation over the first 5 years.
12. A streaming channel has 1,200 subscribers. The number of subscribers increases by 25% each month.
- Write an expression for the number of subscribers after n months.
 - Find the number of subscribers after 8 months.
 - Calculate the total number of subscribers gained in the first 8 months.

Mixed Practice Assignment – Unit 1.1–1.3
Scientific Notation, Arithmetic Sequences, and Geometric Sequences

Name: _____

Part A – Scientific Notation (6 Questions)

1. Write the number 72,500 in scientific notation.
2. Write 0.000094 in scientific notation.
3. Convert 3.6×10^{-3} into standard decimal form.
4. A virus has a diameter of 2.2×10^{-7} m. A hair is 7.5×10^{-5} m thick. How many viruses across equal the width of a hair? Express your answer in scientific notation.
5. Simplify $(2.5 \times 10^3)(4 \times 10^{-2}) \div (5 \times 10^2)$. Write in scientific notation.
6. The area of a rectangle is $(3.2 \times 10^3)(7.8 \times 10^2)$. Calculate the area in standard form, then express in scientific notation.

Part B – Arithmetic Sequences & Series (7 Questions)

7. An arithmetic sequence has first term $u_1 = 12$ and common difference $d = 5$. Write the formula for u_n .
8. Using your formula from Q7, find u_{25} .
9. An arithmetic sequence has $u_4 = 18$ and $u_{10} = 36$. Find the common difference and u_{20} .
10. A student saves \$40 in the first week, and increases savings by \$15 each week. How much will they have saved after 12 weeks?
11. Find the sum of the first 25 terms of the sequence: 6, 13, 20, 27, ...
12. The n th term of a sequence is $u_n = 7n - 5$. Show this is arithmetic and find S_{30} .

13. In an arithmetic sequence, the sum of the 1st and 7th terms is 30, and the sum of the 3rd and 9th terms is 50. Find u_1 and d .

Part C – Geometric Sequences & Series (7 Questions)

14. A geometric sequence has $u_1 = 5$ and $r = 3$. Find u_7 .
15. A medicine dose of 120 mg decreases by 25% each hour. How much remains after 4 hours?
16. A tree is 12 ft tall and grows by 8% each year. Estimate its height after 6 years.
17. A geometric series has $u_1 = 2$, $r = 4$, and $n = 5$. Find the sum of the first 5 terms.
18. A phone valued at \$800 loses 30% of its value each year. Write an expression for its value after n years. Find the value after 3 years.
19. A sequence has $u_1 = 2000$ and $u_4 = 250$. Find the common ratio and u_6 .
20. A scholarship pays \$1500 in the first semester, and each semester increases by 12%. Find the total received over 4 semesters.