

Unit 1: Sequences and Functions

ADVANCED

Name: _____ Date: _____

Show all work. Give each answer as an exact value (integer, fraction like $\frac{3}{4}$, or coordinate pair). Use a^n for exponents.

1. An arithmetic sequence has $a_4 = 19$ and $a_9 = 49$. Find the common difference d .

Answer: _____

2. An arithmetic sequence has $a_4 = 19$ and $a_9 = 49$. Find the first term a_1 .

Answer: _____

3. For the arithmetic sequence with $a_1 = 1$ and $d = 6$, write it as a linear function $f(n) = a_1 + d(n - 1)$ and find $f(20)$, the 20th term.

Answer: _____

4. A geometric sequence has $a_2 = 12$ and $a_5 = 324$. Find the common ratio r .

Answer: _____

5. A geometric sequence has $a_2 = 12$ and $a_5 = 324$. Find the first term a_1 .

Answer: _____

6. A geometric sequence is modeled by the exponential function $g(n) = 4 \times 3^{(n-1)}$. Find $g(6)$, the 6th term.

Answer: _____

7. The sum of the first 30 terms of an arithmetic sequence with $a_1 = -8$ and $d = 5$ is found using $S_n = \frac{n}{2}(2a_1 + (n-1)d)$. Compute S_{30} .

Answer: _____

8. An arithmetic sequence models a linear function $f(x) = mx + b$ passing through the points $(2, 7)$ and $(6, 23)$. Find the slope m (the common difference).

Answer: _____

9. A geometric sequence has first term 5 and common ratio $\frac{2}{3}$. Find the 4th term. Give an exact fraction.

Answer: _____

10. The sum of the first 8 terms of a geometric sequence with $a_1 = 3$ and $r = 2$ is found using $S_n = \frac{a_1(r^n - 1)}{r - 1}$. Compute S_8 .

Answer: _____

11. A geometric sequence has $a_1 = 96$ and $a_4 = 12$. Written as $g(n) = a_1 \cdot r^{(n-1)}$, find r and then compute a_7 . Give a_7 as an exact fraction.

Answer: _____