

Sequences and Series Review

Find the first five terms of the sequence.

Identify each formula as recursive or explicit.

1. $a_n = \frac{1}{3^n}$ $1/3, 2/3, 1, 4/3, 5/3$

2. $a_n = \frac{1}{2}(n-1)$ $0, 1/2, 1, 3/2, 2$

3. $a_1 = 5, a_n = 3a_{n-1} - 7$ $5, 8, 17, 44, 125$

4. $a_1 = -4, a_n = 2a_{n-1}$ $-4, -8, -16, -32, -64$

For the sequence given below, find each of the following.

- a) An explicit formula
- b) Find the 9th term
- c) Find the sum of 7 terms

5. 6, 10, 14,

$d=4$ $a_n = 4n + 2$

$a_9 = 38$

$S_7 = \frac{7}{2}(6 + 30) = 126$

7. 7, 12, 17,

$d=5$ $a_n = 5n + 2$

$a_9 = 47$

$S_7 = \frac{7}{2}(7 + 37) = 154$

6. 3, 6, 12, 24,

$a_n = 3 \cdot 2^{n-1}$

$a_9 = 768$

$S_7 = \frac{3(1-2^7)}{1-2} = 381$

8. 5, 15, 45,

$a_n = 5 \cdot 3^{n-1}$

$a_9 =$

$S_7 = \frac{5(1-3^7)}{1-3}$

$S_7 = 5465$

Does the following series converge or diverge? If it converges, find the sum.

9. $2 + 6 + 18 + \dots$

$r=3$ diverge - no sum

10. $5 + 1 + \frac{1}{5} + \frac{1}{25} + \dots$ $r = 1/5$

Converge - has a sum $S = \frac{5}{1-1/5}$

$S = 6.25$

11. $90 + 30 + 10 + \dots$

$r=1/3$ Converge - has a sum

$S = \frac{90}{1-1/3} = 135$

12. $\frac{1}{32} + \frac{1}{16} + \frac{1}{8} + \frac{1}{4} + \dots$

$r=2$ $2 > 1$

diverge - no sum