

PRECALCULUS ADVANCED  
Chapter 9 Review

- Find the first five terms of the infinite sequence defined by  $a_n = 3^n + 2$ .
- Find the first five terms of the sequence given by the recursive formula  $a_1 = -1$  and  $a_n = a_{n-1} + 5$ .
- Write a recursive formula for the sequence 4, 12, 36, 108, ...
- Find the 53<sup>rd</sup> term of the sequence 3, 11, 19, 27, 35, ...
- In an arithmetic sequence,  $a_3 = 15$  and  $a_5 = 50$ . Find an explicit formula for the general term.
- Find an explicit formula for the geometric sequence 120, 60, 30, 15, ..., and use it to find the eighth term.

7. Find four arithmetic means between 1 and  $-89$ .

8. Find three geometric means between 240 and 15.

9. Express  $2 + 5 + 8 + 11 + \dots$  using sigma notation.

10. Express  $2 + 5 + 8 + 11 + \dots + 47$  using sigma notation.

11. Find the sum of  $\sum_{k=1}^{16} (3k - 4)$ .

12. Find  $S_6$  for  $\sum_{k=1}^{\infty} (10k - 6)$ .

13. Find  $S_3$  for the geometric series with  $a_1 = 36$  and  $r = \frac{1}{3}$ .

14. Find  $S_{17}$  for  $14 + 9 + 4 + 1 - \dots$

15. Find the sum of  $\sum_{k=1}^5 k^4$ .

16. The fourth term of a series is  $17x$ , and the sixth term is  $23x$ . Find the sum of the first twenty terms.

17. Find the sum of  $7 + 4 + 1 - 2 - \dots - 26$ .

18. Find the sum of  $96 + 48 + 24 + \dots + \frac{3}{2}$ .

19. Your Aunt Alice sends you \$50 for your eighth birthday. On each birthday after that, she sends you \$25 more. How much will she send you on your eighteenth birthday?

20. You interview for a job where the boss tells you he will pay you \$0.01 the first day, \$0.02 the second day, \$0.04 the third day, \$0.08 the fourth day, etc. If you take the job and start on June 1, how much would you make on the day of June 30?

21. Find the value of each of the following. Do not give answers as decimals.

(a)  $\frac{76!}{77!}$

(b)  $\frac{95!}{93!}$

(c)  $\frac{n!}{(n+2)!}$

Find the sum.

22.  $\frac{2}{3} + \frac{2}{9} + \frac{2}{27} + \frac{2}{81} + \dots$

24.  $\sum_{k=1}^{\infty} 12 \left(\frac{2}{3}\right)^k$

23.  $\frac{2}{3} - \frac{2}{9} + \frac{2}{27} - \frac{2}{81} + \dots$

25.  $\sum_{k=1}^{\infty} \left(-\frac{5}{4}\right)^k$

Use the Binomial Theorem on problems 26–29.

26. Expand and simplify:  $(3x - 2y)^6$ .

27. Expand and simplify:  $(5x^2 + y^2)^4$ .

28. Find the first three terms of  $(a - b)^{20}$ , and simplify.

29. Find the 5<sup>th</sup> term of  $(2x^2 - 3y)^{10}$