

Precalculus – Unit 10 Review

Name _____ period _____ date _____ score _____

1. Evaluate the factorial expression: $\frac{7!}{4!}$

2. Write out the first five terms of the sequence:

a) $\{s_n\} = \{4n - 2\}$

b) $\{a_n\} = \{2n^2 + n\}$

3. The sequences are defined recursively. Write the first four terms:

a) $a_1 = 8, a_n = 5a_{n-1} + 2$

b) $a_1 = -15, a_n = 2n + 3a_{n-1}$

4. Write out the sum: $\sum_{k=1}^n (3k - 1)$.

5. Express the sum using summation notation: $4^3 + 5^3 + 6^3 + \dots + 13^3$

6. Find the sum of the sequence: $\sum_{k=6}^{20} 3k^2$

7. Find the indicated term of the sequence: The 37th term of the arithmetic sequence 15, 11, 7, 3, ...

8. Find the n th term and the indicated term of the arithmetic sequence $\{a_n\}$ whose initial term, a_1 , and common difference, d , are given:
 $a_1 = 5$; $d = 3$;
 $a_n = ?$; $a_{18} = ?$
9. **Solve:** A theater has 28 rows with 18 seats in the first row, 20 seats in the second row, 22 in the third row, and so forth. How many seats are in the theater?
10. Find the first term, the common difference, and give a recursive formula for the arithmetic sequence: 7th term is -47 , 13th term is -101 .
11. Find the sum: $(-5) + (-2) + 1 + 4 + \dots + 76$.
12. Find the sum: $\sum_{k=1}^{64} (3k - 5)$
13. Find the indicated term of the geometric sequence: 10th term of $-1, \frac{1}{2}, -\frac{1}{4}, \dots$

14. Find the n th term of the geometric sequence whose initial term, a_1 , and common ratio, r are

given: $a_1 = 3, r = 4$

$$a_n = ?, a_6 = ?$$

15. Find the n th term, a_n , of the geometric sequence: 2, 6, 18, 54, 162, ...

16. Find the sum:

a) $\sum_{k=1}^5 \left(\frac{1}{2}\right)(2)^k$

b) $12 - 8 + \frac{16}{3} + \dots + 12\left(-\frac{2}{3}\right)^9$

17. Solve: Susie is training for a marathon. Each day, she runs 1.2 times as far as she ran the previous day. If she ran 2.5 miles on the first day of her training program, how far did she run on the 7th day? What is the total distance Susie ran in the first 7 days of her training?

18. Determine whether the infinite geometric sequence converges or diverges. If it converges, find its sum:

a) $\sum_{k=1}^{\infty} \frac{2}{3} \cdot 2^{k-1}$

b) $4 - 2 + 1 - \frac{1}{2} + \dots$

19. Solve: A pendulum bob swings through an arc 90 inches long on its first swing. Each swing thereafter, it swings only 80% as far as the previous swing. How far will it swing altogether before coming to a complete stop?

20. Determine whether the given sequence is arithmetic, geometric, or neither. If the sequence is arithmetic, find the common difference; if it is geometric, find the common ratio.

a) $\{-5n+2\}$

b) $\{4n^2+7\}$

c) $\{3^{2n}\}$

21. Evaluate the expression.

a) $\binom{10}{4}$

b) $\binom{6}{5}$

22. Expand the expression using the Binomial Theorem.

a) $(x-3)^5$

b) $(2x+5)^4$

c) $(4x-y^2)^6$

23. Use the Binomial Theorem to find the indicated coefficient or term.

a) The coefficient of x^2 in the expansion of $(3x+2)^6$

b) The 4th term in the expansion of $(7x-2y)^7$