ALL PROBLEMS MUST BE DONE ON SEPARATE PAPER OTHERWISE; THE REVIEW WILL NOT BE GRADED. SHOW ALL WORK FOR CREDIT. REVIEW IS DUE ON TEST DAY.

Evaluate the factorial expression.

1) $\dfrac{8!}{6!}$

Write out the first five terms of the sequence.

2) $\{s_n\} = \{2(3n - 1)\}$

3) $\{c_n\} = \left\{\dfrac{4^n}{n}\right\}$

The given pattern continues. Write down the nth term of the sequence { a_n } suggested by the pattern.

4) $-1, 1, 3, 5, 7, \dots$

5) $4, -8, 12, -16, \dots$

The sequence is defined recursively. Write the first four terms.

6) $a_1 = 5; \quad a_n = a_{n-1} - 2$

Write out the sum.

7) $\displaystyle\sum_{k=1}^{n} (k + 2)$

Express the sum using summation notation.

8) $3^2 + 4^2 + 5^2 + \cdots + 10^2$

Find the sum of the sequence.

9) $\displaystyle\sum_{k=1}^{5} k$

An arithmetic sequence is given. Find the common difference and write out the first four terms.

10) $\{s_n\} = \{9 - 5n\}$

Find the nth term and the 8$^{\text{th}}$ term of the arithmetic sequence { a_n } whose initial term, a, and common difference, d, are given.

11) $a_1 = 84; \quad d = -10$

Find the indicated term of the arithmetic sequence.

12) The twenty-third term of the arithmetic sequence $0, 10, 20, \dots$

Find the first term, the common difference, and give a recursive formula for the arithmetic sequence.

13) 7th term is 43; 15th term is 3

Find the sum.

14) $1 + 2 + 3 + \dots + 264$

15) $\displaystyle\sum_{n=1}^{44} (5n - 4)$

A geometric sequence is given. Find the common ratio and write out the first four terms.

16) $\{s_n\} = \{3^n\}$

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.

17) $3, -9, 27, -81, 243, \dots$

Find the fifth term and the nth term of the geometric sequence whose initial term, a, and common ratio, r, are given.

18) $a = 4; \quad r = 5$

Find the indicated term of the geometric sequence.

19) 8th term of $1, 2, 4, \dots$

Find the nth term { a_n } of the geometric sequence. When given, r is the common ratio.

20) $7, 14, 28, 56, 112, \dots$

Find the fifth term and the nth term of the geometric sequence whose initial term, a, and common ratio, r, are given.

21) $a_4 = 81; \quad r = 3$

Use a graphing utility to find the sum of the geometric sequence. Round answer to two decimal places, if necessary.

22)

$$\sum_{k=1}^{5} 2(3)^k$$

Determine whether the infinite geometric series converges or diverges.   If it converges, find its sum.

23) $3 + 1 + \frac{1}{3} + \frac{1}{9} + \ldots$

Use the Principle of Mathematical Induction to show that the statement is true for all natural numbers n.

24) $2 + 5 + 8 + \ldots + (3n - 1) = \frac{n}{2}(3n + 1)$

Evaluate the expression.

25) $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$

Expand the expression using the Binomial Theorem.

26) $(5x - 2)^4$

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

27) The 3rd term in the expansion of $(4x + 9)^3$