Exam

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) Write the first four terms of the sequence $a_n = n[9 + 8(-1)^n]$. 1) _____

2) Find the general term of a sequence whose first four terms are $\frac{3}{5}, \frac{6}{6}, \frac{9}{7}, \frac{12}{8}$. 2) _____

3) Write $\sum_{k=1}^{4} \frac{k}{k+13}$ without summation notation. Do not evaluate. 3) _____

4) Write the following sum using summation notation: $\frac{1}{2} - \frac{2}{3}a + \frac{3}{4}a^2 - \frac{4}{5}a^3 \ldots + \frac{15}{16}a^{14}$ 4) _____

5) Find the 300th term and the sum of the first 300 terms for the arithmetic sequence 8, 11, 14, . . . 5) _____

6) Indicate by letter which of the following sequences can be the first three terms of an arithmetic sequence and state the common difference for those that are.
(A) 9, 3, -3, . . . (B) 2, 6, 10, . . . (C) 5, 8, 12, . . . 6) _____

7) Indicate by letter which of the following sequences can be the first three terms of a geometric sequence and state the common ratio for those that are.
(A) 1, -4, 16, . . . (B) 14, 2, $\frac{2}{7}$, . . . (C) 1, -8, -64, . . . 7) _____

8) If a person borrows $13,200 and agrees to repay the loan by paying $200 per month to reduce the loan and 1% of the unpaid balance each month for using the money, what is the total cost of the loan over 66 months? 8) _____

9) Evaluate: $\frac{46!}{38!8!}$ 9) _____

10) Expand: $(3x + y)^4$ 10) _____

11) Find the sixth term in the expansion of $(p - 2q)^{12}$. 11) _____

12) Evaluate: $C_{40, 37}$ 12) _____

13) Find the sum of the first 25 terms of the geometric sequence 250, 250(1.05), $250(1.05)^2$, . . . 13) _____

14) Find the common ratio of a geometric sequence if the first term is 5 and the 12th term is 30. 14) _____

15) Find the sum of the infinite geometric sequence (if it exists): $7, \frac{7}{5}, \frac{7}{25}, \ldots$ 15) _____

16) Find the sum of the infinite geometric sequence (if it exists): $4, -\frac{8}{3}, \frac{16}{9}, -\frac{32}{27}, \ldots$ 16) _____

17) Find the sum of all the odd integers between 52 and 346. 17) _____

18) Write the alternating series $-\frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6}$ using summation notation with the summing index k starting at k = 1. 18) _____

19) Find the 67th term of the sequence defined by $a_n = \frac{n + 3}{n - 1}$. 19) _____

20) Find the first five terms of the sequence defined by the recursive formula $a_1 = 2$, $a_n = 4a_{n-1} - 1$ for $n \geq 2$. 20) _____

1) 1, 34, 3, 68

2) $\frac{3n}{n+4}$

3) $\frac{1}{14} + \frac{2}{15} + \frac{3}{16} + \frac{4}{17}$

4) $\sum_{k=1}^{15} (-1)^{n+1} \frac{n}{n+1} a^{n-1}$

5) $a_{300} = 905$, $s_{300} = 136{,}950$

6) (A) Common difference = -6 (B) Common difference = 4

7) (A) Common ratio = -4 (B) Common ratio = $\frac{1}{7}$

8) $4,422

9) 260,932,815

10) $81x^4 + 108x^3y + 54x^2y^2 + 12xy^3 + y^4$

11) $-25{,}344p^7q^5$

12) 9,880

13) 11,931.77

14) 1.18

15) $\frac{35}{4} = 8.75$

16) $\frac{12}{5} = 2.4$

17) 29,253

18) $\sum_{k=1}^{5} \frac{(-1)^k}{k+1}$

19) $\frac{35}{33}$

20) 2, 7, 27, 107, 427