Algebra 3 – 4   Chapter 12 Test   Name_____

You may use a calculator on this test.

Formulas you may need are listed directly below.

$$\sum_{i=1}^{n} i = \frac{1}{2}(n)(n+1) \qquad \sum_{i=1}^{n} a_i = n\left(\frac{a_1 + a_n}{2}\right) \qquad \sum_{i=1}^{n} i^2 = \frac{1}{6}(n)(n+1)(2n+1)$$

$$\sum_{i=1}^{n} 1 = n \qquad \sum_{i=1}^{n} a_1 r^{i-1} = a_1\left(\frac{1-r^n}{1-r}\right) \qquad \sum_{n=1}^{\infty} a_1 r^{n-1} = \frac{a_1}{1-r} \qquad \binom{n}{m} = \left(\frac{n!}{(n-m)!\,m!}\right)$$

1. Write the first five terms of $a_n = n^2 + 3$. Start with n = 1.	2. Write the series represented by the summation notation, then evaluate the sum. $$\sum_{i=1}^{6} i!$$
3. Find the ninth term of a arithmetic sequence with a common difference of -4 and a first term of 17.	4. Find the first four terms of an arithmetic sequence whose eighth term is 2 and nineteenth term is 101.
5. Evaluate the sum. $$\sum_{i=1}^{49} (2i - 9)$$	6. Write a formula for the nth term of the geometric sequence. $$4, 6, 9, \frac{27}{2}, \ldots$$

Formulas you may need are listed here.

$\sum_{i=1}^{n} i = \dfrac{1}{2}(n)(n+1)$	$\sum_{i=1}^{n} a_i = n\left(\dfrac{a_1 + a_n}{2}\right)$	$\sum_{i=1}^{n} i^2 = \dfrac{1}{6}(n)(n+1)(2n+1)$
$\sum_{i=1}^{n} 1 = n$ $\quad$ $\sum_{i=1}^{n} a_1 r^{i-1} = a_1\left(\dfrac{1-r^n}{1-r}\right)$	$\sum_{n=1}^{\infty} a_1 r^{n-1} = \dfrac{a_1}{1-r}$	$\binom{n}{m} = \left(\dfrac{n!}{(n-m)!\,m!}\right)$

7. Find the formula for a_n for a geometric sequence with a common ratio of ½ and first term of 8.	8. Find the tenth term of a geometric sequence with a first term of 16 and a fourth term of 54.
9. Evaluate the sum. $$\sum_{n=0}^{5} 27\left(\frac{2}{3}\right)^n$$	10. Use summation notation to represent the sum. Use i as the index and begin with i = 1. 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23
11. Classify each of the following sequences as Arithmetic, Geometric, or Neither. a) 4, 7, 10, 14, 17, . . . b) 24, 12, 6, 3, . . . c) -4, 4, -4, 4, -4, 4, . . . d) -42, -39, -36, -33, -30, . . .	12. Use summation notation to represent the sum. Use i as the index and begin with i = 1. 2 + 6 + 18 + 54 + 162 + 486
13. Evaluate the sums. A. $$\sum_{i=1}^{53} i$$ B. $$\sum_{i=1}^{24} i^2$$	14. Write the first six terms of the geometric sequence with $a_1 = 4$ and r = ½
	15. Find the common ratio of a geometric sequence with a third term of 64 and a seventh term of ¼.