Algebra 2 Honors Ch. 11 Review Name_____

Give exact fractional or decimal answers—do not round off !!

1. Write the first 5 terms of each sequence.

(a) $\sum_{n=1}^{\infty} \frac{n^2}{n+1}$ (b) $\sum_{n=1}^{\infty} (-10)\left(\frac{1}{5}\right)^{n-1}$ (c) $a_1 = 4, a_2 = 6$
$a_n = 2(a_{n-2} + a_{n-1})$

2. Write the series $5 + \frac{5}{4} + \frac{5}{16} + \frac{5}{64} + \ldots + \frac{5}{4096}$ in sigma notation.

3. Arithmetic, geometric or neither? Give the next term and write an explicit rule for the *n*th term.

(a) $\frac{3}{8}, \frac{4}{27}, \frac{5}{64}, \ldots$ (b) 4, 6, 9, 13.5, . . . (c) 49, 41, 33, 25, . . .

4. 141 is which term of the sequence 1, 5, 9, 13, . . . ?

5. In an arithmetic sequence, $a_5 = 23$ and $a_{38} = 155$. Find an explicit rule for the *n*th term and a_{57}.

6. Find the 7th term of the sequence $8, -2, \frac{1}{2}, \ldots$ and an explicit rule for the *n*th term.

7. In a geometric sequence, $a_3 = \frac{1}{4}$ and $a_9 = 16$. Find a rule for the *n*th term and a_6.

8. 5120 is which term of the sequence 5, 20, 80, . . . ?

9. Given the series $97 + 92 + 87 + 82 + \ldots$
(a) Find the sum when n = 60.
(b) Find n when the sum = 624.

10. Find the sum of the series $-9 + 3 - 1 + \ldots + \frac{1}{243}$.

11. Find the number of terms in the series $3 + 6 + 12 + \ldots$ when the sum is 12,285.

12. Arithmetic, geometric, or neither? Find each sum.

(a) $\sum_{m=2}^{5} (m-1)^2$ (b) $\sum_{k=1}^{16} -76 + 7k$ (c) $\sum_{n=1}^{18} 2^{n-1}$ (d) $\sum_{n=0}^{\infty} 3\left(\frac{1}{8}\right)^n$

13. Find the sum of the series $7 + 3 + \frac{9}{7} + \ldots$

14. Find the common ratio for an infinite geometric series where $a_1 = 25$ and $S = \frac{125}{9}$.

15. Use a series to find a common simplified fraction for 1.227227227 . . .

16. Write a recursive rule for each sequence:

(a) 2, 8, 14, 20, . . . (b) 77, 11, $\frac{11}{7}, \frac{11}{49}, \ldots$ (c) 1, 1, 5, 9, 17, 29, . . .

17. Mike is starting a fitness program. During the first week he will do 20 sit-ups each day. Each week he will increase his daily sit-ups by 3.
   (a) How many sit-ups will he do each day of the 20th week?
   (b) Assuming he does sit-ups 7 days a week, how many sit-ups will Mike have done by the end of the 20th week?

18. Mrs. Bryant is making a family tree. Her 2 parents are the first generation back, her 4 grandparents are the second generation back, her 8 great-grandparents are the third generation back, and so on. Assuming no single parents, second marriages, etc:
   (a) How many ancestors in the eighth generation back?
   (b) Find the total number of ancestors through ten generations.

19. In its first month of operation, an oil well produced 25,000 barrels of oil. For each month thereafter, monthly production dropped by 5%. Assuming it never stops producing, what is the total maximum production for the oil well?

20. Find the sum of the multiples of 7 between 100 and 1000.

21. Find the sum of the positive integer powers of 3 less than 10,000.

22. Insert 3 geometric means between $\frac{1}{7}$ and $\frac{1}{1792}$.

23. Insert 5 arithmetic means between 6 and 34.8.

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Answers: 1(a) $\frac{1}{2}, \frac{4}{3}, \frac{9}{4}, \frac{16}{5}, \frac{25}{6}$; (b) $-10, -2, \frac{-2}{5}, \frac{-2}{25}, \frac{-2}{125}$; (c) 4, 6, 20, 52, 144 2. $\sum_{n=0}^{6} \frac{5}{4^n}$

3. (a) neither, $\frac{6}{125}$, $a_n = \frac{n+2}{(n+1)^3}$; (b) geometric, 20.25, $a_n = 4(1.5)^{n-1}$;(c) arithmetic, 17, $a_n = 57 - 8n$

4. 36th term 5. $a_n = 4n + 3$, $a_{57} = 231$ 6. $a_7 = .001953125$, $a_n = 8(-.25)^{n-1}$ 7. $a_n = \frac{1}{16}(2)^{n-1}$, $a_6 = 2$ or $a_n = \frac{1}{16}(-2)^{n-1}$, $a_6 = -2$ 8. 6th term 9. (a) -3030; (b) 32 10. $\frac{-1640}{243}$

11. 12 terms 12. (a) neither, 30; (b) arithmetic, -264; (c) geometric, 262,143; (d) geometric, $\frac{24}{7}$

13. $\frac{49}{4}$ 14. $\frac{-4}{5}$ 15. $\frac{1226}{999}$ 16. (a) $a_1 = 2, a_n = a_{n-1} + 6$; (b) $a_1 = 77, a_n = \frac{a_{n-1}}{7}$;
(c) $a_1 = 1, a_2 = 1, a_n = a_{n-1} + a_{n-2} + 3$ 17. (a) 77; (b) 6,790 18. (a) 256; (b) 2,046 19. 500,000 barrels

20. 70,336 21. 9,840 22. $\frac{1}{28}, \frac{1}{112}, \frac{1}{448}$ 23. 10.8, 15.6, 20.4, 25.2, 30

or $-\frac{1}{28}, \frac{1}{112}, -\frac{1}{448}$