Algebra 2H Ch 11 Review HW#_____ HW#_____

Give exact answers as reduced fractions or decimals—do not round off! Simplify answers.

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 summation 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. Which term of the sequence 1, 5, 9, 13, . . . is 141?

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

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

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

8. Which term of the sequence 5, 20, 80, . . . is 5,120?

9. Given the series 97 + 92 + 87 + 82 + . . .
a) Find the sum when *n* = 60.
b) Find *n* when the sum is 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 + . . . 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. During the first week of a fitness program, the participant does 20 sit-ups per day. Each week after the first week, daily sit-ups increase by 3.

a) How many sit-ups will the participant do each day of week 20?

b) Assuming that sit-ups are done 7 days per week, how many sit-ups will the participant have done by the end of week 20?

18. In making a family tree, your 2 parents are the first generation back, your 4 grandparents are the second generation back, the 8 great-grandparents are the third generation back, and so on. Continuing this pattern (and assuming no second marriages):

a) how many ancestors in the eighth generation back?

b) find the total number of ancestors through ten generations back.

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

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. Find all sets of 3 geometric means between $\frac{1}{7}$ and $\frac{1}{1792}$.

23. Find 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. $\frac{1}{28}, \frac{1}{112}, \frac{1}{448}$ or $\frac{-1}{28}, \frac{1}{112}, \frac{-1}{448}$ 23. 10.8, 15.6, 20.4, 25.2, 30