	43
 Period	l: No

1.2 Notes Arithmetic Series

Warm-Up: For each of the following sequences, determine whether it is arithmetic, geometric, or neither. If it is arithmetic, find the common difference. If it is geometric, find the common ratio.

Name:

- 2. 23,27,211,215,... geometric

4. 1, 5, 9, 13, 17, ...

ARITHMETIC: starting value of a and a common difference of d.

Recursive:

$$a_1 = a$$

$$a_n = a_{n-1} + d$$

 $q_{n} = q_{1} + (n-1)q$

5. What is the 100th term of the arithmetic sequence that begins 6 11,...?

$$q_{100} = 6 + (100 - 1)(5) = 6 + (99)(5) = 501$$

6. What are the second and third terms of the arithmetic sequence 100, 11, 182, 82

 $a_n = a_1 + (n-1)(d$

B2=100+(4-1)(d) d=-6

GEOMETRIC: a starting value of a and a common ratio of r.

Recursive:

9n=91.00

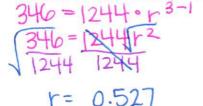
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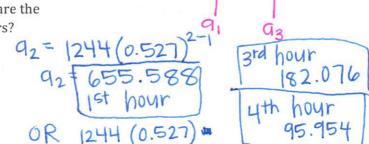
- 7. What is the 10th term of the geometric sequence 4,12,36,...? $a_{10} = 4(3)^{10-1} = 78732$ 8. What are the second and third terms of the geometric sequence 2,6,13

$$-54 = 2 \cdot r^{4-1}$$

$$-54 = 2r^{3} \sqrt[3]{-27} = 7^{3} r^{3}$$

9. When radioactive substances decay, the amount remaining will form a geometric sequence when measured over constant intervals of time. The table shows the amount of Np-240, a radioactive isotope of Neptunium, initially and after 2 hours. What are the amounts left after 1 hour, 3 hours, and 4 hours?





0

Grams of Np-240 1244 m 346

ARITHMETIC SERIES
Series: the SUM of all terms in a seguence
Finite Series: first AND last term
Infinite Series: continues without end
Find the sum of each finite arithmetic series:
4+9+14+19+24++89+94+99 $10 SUMS$ $10 V 103 = 1030$
The Sum of a Finite Arithmetic Series: $a_1 + a_2 + a_3 + + a_n$ $A = \begin{cases} $
Is it necessary to know the common difference when using the formula to find the value of a finite arithmetic series? Explain. You need the common diff. to find the # of terms
Find the sum of this finite arithmetic series: $-3 + -6 + -9 + \dots + -30$ $-30 = +3 + (n-1)(-3)$ $+3 + (n-1)(-3)$ $-21 = $
upper limit (where the series ends) lower limit (where the series starts) What is summation notation for the series: $7 + 11 + 15 + + 203 + 2072$ $a_n = a_1 + (n-1)(4)$ $a_n = 7 + (n-1)(4)$
5' 5'.

Finding the Sum of a Series

What is the sum of the series written in summation notation? $S_n = \frac{n}{2}(q_1 + q_n)$

$$\sum_{n=1}^{70} (5n+3) \quad q_1 = 5(1)+3 = 8$$

$$q_{70} = 5(10)+3 = 353$$

$$q_{70} = \frac{70}{2}(8+353)$$

$$q_{70} = 70$$

$$12035$$

Your turn!

Find the sum of the series written in summation notation.

$$\sum_{n=1}^{40} (3n-8) \quad Q_{10} = 3(10) - 8 = -5$$

$$Q_{10} = 3(10) - 8 = 112$$

$$S_{10} = \frac{100}{2} (-5+112) = \frac{100}{$$

Stamp Question!!

- a. A supermarket displays cans in a triangle, like the one shown, with two cans in the top row. Write an explicit formula for the sequence of the number of cans.
- b. Use summation notation to write the related series for a triangle with 10 cans in the bottom row.
- c. Suppose the triangle had 17 rows. How many cans would be in the 17th row?
- d. Could the triangle have 110 cans total? 140 cans? Explain.

