Honors Algebra II

Notes Section 7.2

Analyze Arithmetic Sequences and Series

Arithmetic Sequence: the difference of consecutive terms is constant;

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

Common Difference: difference of an arithmetic sequence; d

Arithmetic Series: expression formed by adding the terms of an arithmetic sequence.

Sum of a Finite Arithmetic Series: $S_n = n\left(\frac{a_1 + a_n}{2}\right)$

EXAMPLE 1 Tell whether the sequence is arithmetic.

a) -4, 1, 6, 11, 16 , . . .

b) 3, 5, 9, 15, 23, . . .

EXAMPLE 2 Write a rule for the nth term of the sequence. Then find a_{15}.

a) 4, 9, 14, 19, . . .

d = _____

b) 60, 52, 44, 36, . . .

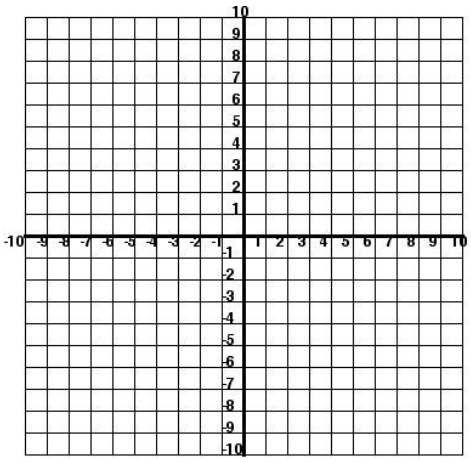
d = _____

EXAMPLE 3 One term of an arthmetic sequence is $a_{19} = 48$. The common difference is $d = 3$.

a) Write a rule for the nth term by finding the 1st term

b) Graph

n	a_n



* Points should form a line for any arithmetic sequence *

EXAMPLE 4 Two terms of an arithmetic sequence are $a_8 = 21$ and $a_{27} = 97$. Find a rule for the nth term.

STEP 1 Write a system of equations: $a_n = a_1 + (n-1)d$, then solve for d

STEP 2 Substitute d into either equation and solve for a_1.

STEP 3 Substitute d & a_1 into sequence.

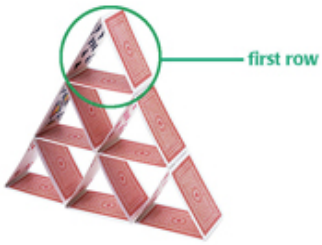
EXAMPLE 5 What is the sum of the arithmetic series $\sum_{i=1}^{20}(3+5i)$?

STEP 1 Find first term: a_1

STEP 2 Find last term: a_{20}

STEP 3 Use Sum of Finite Arithmetic Series Formula

EXAMPLE 6 You are making a house of cards similar to the one shown.



a) Write a rule for the number of cards in the nth row if the top row is row 1?

Row 1 = _____

Row 2 = _____

Row 3 = _____

d = _____

b) What is the total number of cards if the house of cards has 14 rows?

a_1 = _____