

MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2009
ROUND 6 ALG 2: SEQUENCES AND SERIES

ANSWERS

A) _____

B) _____

C) (_____ , _____)

- A) Find the nonnegative difference between the 8th number in the 3rd row and the 3rd number in the 8th row.

Assume the gap between consecutive terms across each row and down each column. increases by the same constant amount.

Note: 6 is the 2nd number in row 1.

2	6	12	20	30	42	56	72
4	10	18	28				
8	16	26					
14	24						
22							

- B) Find the 4th term in all possible geometric sequences whose first three terms are:

$$x + 2, \quad 5x, \quad 13x + 6$$

- C) Given: $a_1 = 4$, $a_2 = 5$ and $a_{n+2} = 2a_{n+1} - 3a_n$

For some minimum value of $k > 2$, $a_k > 0$. Determine the ordered pair (k, a_k) .