MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2013
ROUND 6 ALG 2: SEQUENCES AND SERIES

ANSWERS

A) _____

B) _____ : _____

C) _____

A) Let S denote the sum of the 10^{th} and 13^{th} terms of the geometric progression $3, \frac{3}{i}, -3, 3i, \ldots$. Compute S^2.

B) $3,\ y,\ x$ are the first three terms in a geometric progression (GP) and $y \neq 0$.
$3,\ y+2,\ x+1$ are the first three terms in an arithmetic progression (AP).
Compute the ratio of the 12^{th} term of the AP to the 5^{th} term of the GP.

C) We know that the arithmetic mean is always greater than or equal to the harmonic mean. Suppose for some positive value(s) of A, the arithmetic mean and harmonic mean of 2 and A differ by 0.1. Compute <u>all</u> possible positive values of the geometric mean of 2 and A.

FYI: The harmonic mean of x and y is defined to be the reciprocal of the arithmetic mean of $\frac{1}{x}$ and $\frac{1}{y}$.