MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 2 – NOVEMBER 2013
ROUND 1 COMPLEX NUMBERS (No Trig)

ANSWERS

A) (_____ , _____)

B) _____

C) (_____ , _____)

A) Given: $4i^{199} - 5i^{365} + 25i^{68} - (4i)^3 = x + yi$ for constants x and y
Compute the ordered pair (x, y).

B) For k and c real, if $(2+i)^2 + k(1+2i) + c = (1-i)^3$, compute $\frac{k+c}{k-c}$.

C) The expanded product $(4-4i)^{100} \cdot (8+8i)^{60} = A^k$, where A and k are positive integers, k is as small as possible, and A is the largest possible power of 2 less than 1000. Compute the ordered pair (A, k).