MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 2 – NOVEMBER 2009
ROUND 1 COMPLEX NUMBERS (No Trig)

******* NO CALCULATORS IN THIS ROUND *******

ANSWERS

A) _____

B) _____

C) _____

Note: $i = \sqrt{-1}$

A) Simplify completely: $\dfrac{1+2i+3i^2+4i^3}{1-2i+3i^2-4i^3}$

B) Given: $(3+3i)^{40} = r^n$, where r and n are both integers
Determine the <u>smallest</u> possible value of the sum $r + n$.

C) If $\sqrt{-40-9i} = A + Bi$, compute $\left(\dfrac{A}{B}\right)^2$.