MASSACHUSETTS MATHEMATICS LEAGUE
MARCH 2006
ROUND 6: PROBABILITY & BINOMIAL THEOREM
ANSWERS

A)_____

B)_____

C)_____

A) Suppose "numerical key" refers to: 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9 and "operation key" refers to: ^(raise to a power), ÷(divide), x(multiply), +(add) or –(subtract)

I pressed 4 keys on my TI-84: a numerical key, then an operation key, then a numerical key and then ENTER. The answer displayed on the screen was 16. If each key sequence that could generate this answer is equally likely, what is the probability that I pressed the 4 key twice?

B) If $(\sqrt{2}+\sqrt{3})^6 = a + b\sqrt{6}$, where a and b are integers, find the value of $a + b$.

C) Suppose we call a^n the <u>first</u> term in the expansion of $(a + b)^n$. Find both values of n, if the coefficients of the fifth, sixth and seventh terms in the expansion form an arithmetic sequence.