**MASSACHUSETTS MATHEMATICS LEAGUE**
**CONTEST 6 - MARCH 2012**
**ROUND 6 ALG 2: PROBABILITY AND THE BINOMIAL THEOREM**

**ANSWERS**

A) _____

B) _____

C) _____

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

A) Two fair cubical dice are tossed. The sum of the dice is considered.
Find the ratio of the probability of getting a sum larger than nine to the probability of not getting a sum of three or four.

B) Alice, Ben, Carol, David and Ethan are seated on stage in 6 seats arranged in a row. One seat remains empty. In how many of these arrangements is at least one person seated between Alice and Carol, but no seats between Alice and Carol are empty?

C) The ratio of the constant term in the expansion of $\left(x^3+\frac{1}{x^2}\right)^{15}$ to the constant term in the expansion of $\left(x^4+\frac{1}{x^3}\right)^{n}$ is $\frac{5}{3}$.
If $n$ is a positive integer, compute the value of $n$.
Note: The constant term in each of these binomial expansions is the term with no $x$'s.