

**MASSACHUSETTS MATHEMATICS LEAGUE**  
**CONTEST 6 - MARCH 2016**  
**ROUND 6 ALG 2: PROBABILITY AND THE BINOMIAL THEOREM**

**ANSWERS**

A) \_\_\_\_\_ : \_\_\_\_\_

B) \_\_\_\_\_

C) \_\_\_\_\_

A) Two fair 6-sided dice are tossed. Compute the ratio of the probability of the sum showing being a 3, 4 or 5 to the probability of sum showing being a 7, 8 or 9.

B) A binomial expansion with an even exponent will always have an odd numbers of terms.

Determine the value of the middle term of  $\left(\frac{1}{x} - x^3\right)^8$ .

C) Jar #1 has 4 black and 6 white marbles. Jar #2 has 3 black and 5 white marbles. Two marbles are randomly taken, without replacement, from Jar #1 and put into Jar #2. Then, a marble is randomly taken from Jar #2. Compute the probability that the marble taken from Jar #2 is black.