MDM 4U
**BINOMIAL DISTRIBUTIONS**

where X = random variable
B = binomial distribution
n = number of trials
p = probability of success
q = probability of failure (q = 1-p)
E(x) = expectation
P(X=x) = probability of a set number of
successes in n trials

1.   Consider the experiment of rolling a die 4 times.
The tree diagram to the right indicates the options
of rolling or not rolling a 5.

Determine the probability distribution of the
number of 5's that appear.
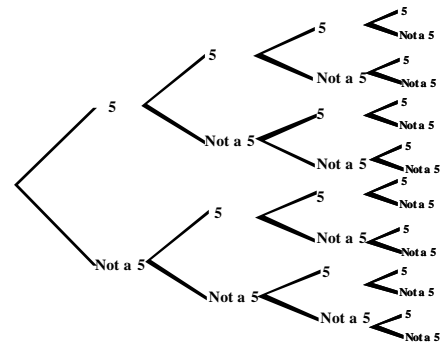
2.   A die is rolled 6 times. Let X = number of 4's that appear.
A)   What is the expected number of 4's?
B)   Determine the probability of the expected number of 4's.

3.   A die is rolled 60 times. Let X = number of 4's that appear.
A)   What is the expected number of 4's?
B)   Determine the probability of the expected number of 4's.

4.   If the manufacturing plant of M&Ms produces 40% red candies and randomly distributes
all candies into different sized bags,
A)   what is the expected number of red candies in a bag of 10 candies?
B)   what is the expected number of red candies in a bag of 200 candies?
C)   what are the probabilities of these expected number of candies in a bag?
D)   what is the probability of getting at least 2 red candies in a bag of 10 candies?

5.   Given $X \sim B(n, p)$ and the table of probabilities, determine the values of n, E(x), and p.

X	0	1	2	3	4
$P(X = x)$	$\frac{17}{125}$	$\frac{26}{125}$	$\frac{43}{125}$	$\frac{21}{125}$	$\frac{18}{125}$

ANSWERS: 2) 1; .4019, 3) 10; .1370, 4) 4; 80; .251; .058, 5) 125; 1.976; .0158