Name _____ Date _____

AP Statistics Period _____

Binomial Distribution

1) Sixty-five percent of all divorce cases cite incompatibility as the underlying reason. If four couples file for a divorce, what is the probability that exactly two will state incompatibility as the reason?

(A) .104
(B) .207
(C) .254
(D) .311
(E) .423

2) An inspection procedure at a manufacturing plant involves picking three items at random and then accepting the whole lot if at least two of the three items are in perfect condition. If in reality 90% of the whole lot are perfect, what is the probability that the lot will be accepted?

(A) .600
(B) .667
(C) .729
(D) .810
(E) .972

3) In November 1994, Intel announced that a "subtle flaw" in its Pentium chip would affect 1 in 9 billion division problems. Suppose a computer performs 20 million divisions (a not unreasonable number) in the course of a particular program. What is the probability of no error? Of at least one error?

(A) .99778, .00222
(B) .000000000111, .00222
(C) .000000000111, .999999999889
(D) .999999999889, .000000000111
(E) .999999999889, .00222

4) Suppose we have a random variable X where the probability associated with the value $\binom{10}{k}(.37)^k(.63)^{10-k}$ for $k = 0, \ldots, 10$. What is the mean of X?

(A) 0.37
(B) 0.63
(C) 3.7
(D) 6.3
(E) None of the above

5) According to a CBS/*New York Times* poll taken in 1992, 15% of the public have responded to a telephone call-in poll. In a random group of five people, what is the probability that exactly two have responded to a call-in poll?

(A) .138
(B) .165
(C) .300
(D) .835
(F) .973

6) The yearly mortality rate for American men from prostate cancer has been constant for decades at about 25 of every 100,000 men. (This rate has not changed in spite of new diagnostic techniques and new treatments.) In a group of 100 American men, what is the probability that at least 1 will die from prostate cancer in a given year?

(A) .00025
(B) .0247
(C) .025
(D) .9753
(E) .99975

7) Which of the following lead to binomial distributions?

I. An inspection procedure at an automobile manufacturing plant involves selecting a sample of cars from the assembly line and noting for each car whether there are no defects, at least one major defect, or only minor defects.
II. As students study more and more during their AP Statistics class, their chances of getting an A on any given test continue to improve. The teacher is interested in the probability of any given student receiving various numbers of A's on the class exams.
III. A committee of two is to be selected from among the five teachers and ten students attending a meeting. What are the probabilities that the committee will consist of two teachers, of two students, or of exactly one teacher and one student?

(A) I only
(B) II only
(C) III only
(D) II and III
(E) None of the above gives the complete set of true responses.

8) Which of the following are true statements?

I. The histogram of a binomial distribution with $p = .5$ is always symmetric no matter what n, the number of trials, is.
II. The histogram of a binomial distribution with $p = .9$ is skewed to the right.
III. The histogram of a binomial distribution with $p = .9$ is almost symmetric if n is very large.

(A) I and II
(B) I and III
(C) II and III
(D) I, II, and III
(E) None of the above gives the complete set of true responses.

9) Alan Dershowitz, one of O. J. Simpson's lawyers, has stated that only 1 out of every 1000 abusive relationships ends in murder each year. If he is correct, and if there are approximately 1.5 million abusive relationships in the United States, what is the expected value for the number of people who are killed each year by an abusive partner?

(A) 1
(B) 500
(C) 1000
(D) 1500
(E) None of the above

10) Of the coral reef species on the Great Barrier Reef off Australia, 73% are poisonous. If a tourist boat taking divers to different points off the reef encounters an average of 25 coral reef species, what are the mean and standard deviation for the expected number of poisonous species seen?

(A) $\mu_x = 6.75$, $\sigma_x = 4.93$
(B) $\mu_x = 18.25$, $\sigma_x = 2.22$
(C) $\mu_x = 18.25$, $\sigma_x = 4.93$
(D) $\mu_x = 18.25$, $\sigma_x = 8.88$
(E) None of the above gives a set of correct answers.