Statistics 13V NAME:____________________________________

Quiz 6 Last six digits of Student ID#:__________________

For multiple choice questions circle the best answer. For other questions provide the information requested. Each problem is worth 10 points. **You are allowed to have one page of notes, covered on both sides.**
The answers on your version may have been in a different order.
Scenario for Questions 1 to 3: Exam scores in a large class are normally distributed with a mean of 60 and standard deviation of 10. The teacher decides to boost the scores by adding 15 points to everyone's score.

1. The mean of the new scores will be:
   A. Higher than the mean of the old scores
   B. Lower than the mean of the old scores
   C. The same as the mean of the old scores

2. The standard deviation of the new scores will be:
   A. Higher than the standard deviation of the old scores
   B. Lower than the standard deviation of the old scores
   C. The same as the standard deviation of the old scores

3. Elizabeth's original score on the exam was 75, so her new score is 90. The z-score corresponding to her new score (relative to the other new scores) will be:
   A. Higher than her z-score for the old scores
   B. Lower than her z-score for the old scores
   C. The same as her z-score for the old scores

4. The formula $\mu = np$ applies to:
   A. All discrete random variables
   B. All discrete and continuous random variables
   C. Binomial random variables only
   D. Normal random variables only

5. In a certain state, 52% of the registered voters actually voted in the election last week. A random sample of 1000 registered voters is to be selected and X = number in the sample who voted in the election last week. Which of the following is true about X?
   A. X will equal 520.
   B. X is a uniform random variable.
   C. X is a normal random variable.
   D. X is a binomial random variable.

6. (2 pts each)The area under a standard normal curve above 1.27 is .102, i.e. $P(Z \geq 1.27) = .102$. Find the following probabilities. (It might help if you draw a normal curve in the space to the right.)

   A. $P(Z \leq 1.27)$ = ***1 - .102 = .898***

   B. $P(Z \geq -1.27)$ = ***.898***

   C. $P(-1.27 \leq Z \leq 1.27)$ = ***1 - .102 - .102 = 1 - .204 = .796***

   D. $P(Z \leq -1.27)$ = ***.102***

   E. $P(0 \leq Z \leq 1.27)$ = ***.5 - .102 = .398***

7. The normal approximation to the binomial distribution is most useful in which one of the following situations?
   A. X is a binomial random variable. There is no normal calculator or table available, but there is a binomial calculator or table available.
   B. X is a binomial random variable. There is no binomial calculator or table available, but there is a normal calculator or table available.
   C. X is a normal random variable. There is no binomial calculator or table available, but there is a normal calculator or table available.
   D. X is a normal random variable. There is no normal calculator or table available, but there is a binomial calculator or table available.

Scenario for Questions 8 to 10: (from CyberStats Unit B5, Uses 1) Businesses use the probability distributions of random variables to plan for staffing. An HMO (health maintenance organization) keeps track of the number of doctor visits for each member of its plan and finds that the proportions shown below hold. For instance, 0.13 or 13% of its members have 0 doctor visits in a year:

HMO Doctor Visits Per Year

0	1	2	3	4	5	6	7	8	9	10
.13	.17	.21	.26	.12	.06	.03	.01	.006	.003	.001

Let X be the number of doctor visits last year for a randomly selected member.

8. Which one of the following statements is true about X?
   A. X is a binomial random variable.
   B. X is a normal random variable.
   C. X is a discrete random variable, but not binomial.
   D. X is a continuous random variable, but not normal.

9. Find $P(X \geq 7)$. Show your work. Then, explain in plain English what this result says about doctor visits for the HMO members. In other words, translate the probability statement into a sentence that someone who doesn't know the notation would understand.

   $P(X \geq 7) = .01 + .006 + .003 + .001 = .02$. This means that about 2% of the members of the HMO visit a doctor 7 or more times a year.

   Other version of quiz: $P(X \geq 6) = .03 + .01 + .006 + .003 + .001 = .05$. This means that about 5% of the members of the HMO visit a doctor 6 or more times a year.

10. The expected value of X is 2.485. Which of the following is the best explanation for what this means?
   A. If we were to record the number of doctor visits in a year for each member of the HMO, the mean would be about 2.485.
   B. 2.485 is the most likely number of visits in a year for a randomly selected HMO member.
   C. We expect each member of the HMO to visit between 2 and 3 doctors a year.
   D. We expect each member of the HMO to choose a doctor and to visit that same doctor between 2 and 3 times a year.