

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

MATH 23 (JP)
Fall 2017

THIRD EXAM
Due Date: 11/15/2017

- (5 points) Explain with your own words what we understand by a random variable. What is the difference between discrete and continuous random variables?
- The following probability distribution represents the claim sizes (x) for an auto insurance policy.

x	1	2	3	4
$P(x)$.1	.2	.25	

- (5 points) Complete the be to be a discrete probability distribution.
 - (5 points) Sketch the bar graph of the distribution.
 - (5 points) Calculate the expected value of the distribution.
 - (5 points) Calculate the standard deviation.
- (5 points) Explain what we understand by Binomial experiment. Give an example of a variable following a binomial distribution.
 - Suppose that the probability of a hurricane in a calendar year is $p = .05$. Find the probability that, in a 10-year period, we have:
 - (5 points) Exactly 1 hurricane.
 - (5 points) At least 3 hurricanes.
 - (5 points) At most 2 hurricanes.
 - (10 points) Assuming that the probability of having a daughter is of the 50%.
 - (5 points) What is the probability of having exactly 1 daughter in a family with 5 kids?
 - (5 points) What is the expected value of the number of daughters in families with 5 kids?
 - (5 points) What is the standard deviation ?
 - Sketch a graph that represents the following probabilities, when Z is distributed standard normal and find the actual probabilities
 - (5 points) $P(z < 1.75)$
 - (5 points) $P(z > 1.83)$
 - (5 points) $P(-0.41 < z < 1.32)$
 - (5 points) Explain with your words what we understand by a sampling distribution.
 - The average salary for first-year teacher is 28,340. If the distribution is approximately normal with $\sigma = 3250$, what is the probability that a randomly selected first-year teacher makes these salaries?
 - (5 points) More than 30,000 a year
 - (5 points) Between 20,000 and 35,000 a year.

- (c) (5 points) Suppose that random samples of 10 teachers are selected to obtain a statistic \bar{X} . What can you say about the \bar{X} -distribution? What would be the approximated values of the mean $\mu_{\bar{X}}$ and the standard deviation $\sigma_{\bar{X}}$?
- (d) (5 points) Suppose that 10 teachers are selected at random, what is the probability that the mean salary \bar{x} is more than 30,000?