MGT 233 - Homework #2
FALL 2017

This homework assignment is due at the beginning of class on Monday, October 9, 2017.

Instructions: Use proper probability notation for all parts of each problem. Show all work in order to receive full credit. For all normal distribution include a graph indicating the mean and shade the area under investigation. For your own sake, be neat.

Problem #1 –

CDC.gov - Obesity-related conditions include heart disease, stroke, type 2 diabetes and certain types of cancer, some of the leading causes of preventable death. Obesity rates in America prove astounding in that 35% of adults in the U.S. are considered obese.

In a sample of 15 adults in the United States:

a. How many people do you expect, of those surveyed, are obese?
b. Compute the variance and standard deviation of adults in the U.S. who are obese.
c. What is the probability that ten of these adults are obese?
d. What is the probability that six or fewer U.S. of these adults are obese?
e. What is the probability that at least thirteen U.S. of these adults are obese?
f. What is the probability that ten, eleven, or twelve of these adults are obese?
g. Suppose the rate of obesity in adults in the U.S. increases to 42%. What is the probability that of the 15 people sampled, exactly 5 adults are obese? (Calculate using the equation)

Problem #2 –

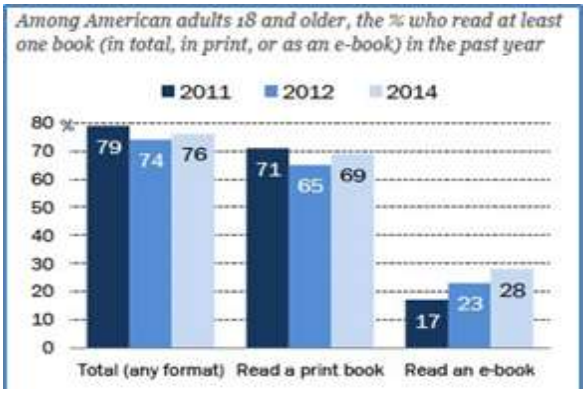
NCES.ed.gov - In fall 2017, some 20.4 million students are expected to attend American colleges and universities, constituting an increase of about 5.1 million since fall 2000. This includes 2-year and 4-year institutions and post-baccalaureate programs. Increases in the traditional college-age population and rising enrollment rates have contributed to the increase in college and university enrollment. Between 2000 and 2015, the 18- to 24-year-old population rose from approximately 27.3 million to some 31.2 million. The percentage of 18- to 24-year-olds enrolled in college and university also was higher in 2015 (40 percent) than in 2000 (35 percent).

Assume the samples below include only individuals between ages 18 and 24. Use the 2015 percentage of 18- to 24-year-olds enrolled in colleges and universities.

a. In a sample of 10 individuals, what is the probability that exactly 4 attend college?
b. In a sample of 12 individuals, what is the probability that at least 8 attend college?
c. In a sample of 15 individuals, what is the probability that no more than 10 attend college?
d. In a sample of 9 individuals, what is the probability that 3, 4, 5, or 6, attend college?

Problem #3

pewinternet.org (Jan 16, 2014) - *E-Reading Rises as Device Ownership Jumps* - The proportion of Americans who read e-books is growing, but few have completely replaced print books for electronic versions. The percentage of adults who read an e-book in the past year has risen to 28%, up from 23% at the end of 2012. At the same time, 69% of Americans reported reading a book in print, up four percentage points after a slight dip in 2012, and 14% of adults listened to an audiobook in 2014.



Use EXCEL **binom.dist.range** functions to solve the following probabilities. Show proper probability notation, show the Excel formula used, and carry your work to 5 decimal places.

a) In a sample of 10 individuals in 2014, what is the probability exactly 4 adults read e-books?

b) In a sample of 12 individuals in 2012, what is the probability at least 3 adults read e-books?

c) In a sample of 15 individuals, in 2011, what is the probability that 8 or fewer adults read books in print?

d) In a sample of 19 individuals in 2014, what is the probability that 3 to 9 of adults listened to an audiobook?

e) Using the binom.inv function, when 18 adults are asked, there is a 95% probability that less than or equal to how many adults listen to audiobooks in 2014?

Problem #4

Himanchal.org, nepalconnection.org.*np - The Himanchal Education Foundation is a non-profit organization that exists to promote and advance Mahabir Pun's vision for extended educational opportunities in rural Nepal. HEF originally was founded to support growth of the Nangi school in Nepal. HEF also supports economically sustainable business opportunities and a computer network in Nangi and surrounding villages. Our goal remains to improve the health and life situations for villagers in rural Nepal.*

Dr. Mahabir Pun earned bachelor and master degress from UNK. The University of Nebraska Kearney also awarded him with a doctorate of letters for his great accomplishments to advance life in rural Nepal.

To help fund schools and health clinics in the mountains of rural Nepal, Dr. Pun opened a wildly successful restaurant in Kathmandu, the capital of Nepal. During trekking/tourist season, the restaurant averages 60 customers during the evening peak hours between 7:00pm and 9:00pm.

Use the tables in the textbook for the probabilities.

a) How many customer visits are expected in 15 minutes?

b) What is the probability of no customers in 3 minutes?

c) What is the probability of 5 or fewer customers in 10 minutes?

d) What is the probability of 7 or more customers in 5 minutes?

e) What is the probability of 6, 7, 8, or 9 customers in 20 minutes?

Problem #5

The Trekking Agencies' Association of Nepal (TAAN), launched new treks which will benefit the schools in and around Nangi village. Mahabir Pun has always had the vision of a trekking route close to home. This dream became a reality when the Borderlands Resort's Director Megh Ale agreed to team with the Himanchal Educational Foundation to create this new route.

Eco-Trekking Lodge in Nangi Nepal

These treks focus on using eco-lodges, conservation, and environmentally sustainable travel. Trekkers will travel for seven days to six villages, whose elevations range from 2,700 feet at the starting point in Beni along the Kali Gandaki River to over 9,000 on the Mohare Ridge. On a clear day you can see over 30 snow clad mountains including three mountains over eight thousand meters (26,000 feet). For a comparison, Pikes Peak in Colorado is 14,114 feet (8,075 feet above Colorado Springs).

In addition to the grandeur of Nepal, these trek are eco-friendly and the lodges are owned and operated by their local schools: all proceeds after expenses go back to the schools for educational purposes and lodges are run by local villagers.

On average, 35 individuals visit the TAAN website each week to learn about future Himalayan treks.

a) How many visits to the TAAN website are expected in 21 days?

b) What is the probability of 4 or fewer website visits in 2 days?

c) What is the probability of more than 7 website visits in one day?

d) What is the probability of 15 to 19 visits to the website in four days?

Problem #6

CBSLA.com -What Is the Busiest Highway in the USA? a new report shows people drove more than 84.7 billion miles overall on California highways in 2015 — more than 900 times the distance from Earth to the Sun. The Los Angeles I-405 from Interstate 5 down to Long Beach serves an estimated 379,000 vehicles per day, making it the busiest interstate in America.

Use the following information and timeframe for the questions below. There were 3,600 vehicles that exited the Long Beach I-405 exit last Monday between 4:00pm to 6:00pm.

a) How many vehicles are expected to exit at Long Beach in four seconds on Monday?

b) What is the probability that no vehicles are expected to exit at Long Beach in four seconds?

c) What is the probability that 8 or fewer vehicles exit at Long Beach in forty seconds?

d) What is the probability that 16 or more exit at Long Beach in forty seconds?

e) What is the probability that 16 to 20 exit at Long Beach in forty seconds?

f) What is the probability that exactly 18 exit at Long Beach in forty seconds?

Problem #7

NepalWireless.net - The following story is told by Dr. Mahabir Pun, the Team Leader of Nepal Wireless Networking Project.

The Beginning

It started with a wish. In 1996. I wished to get Internet in my village for the first time after Himanchal High School got four used computers as presents from the students of a school in Australia. Internet and e-mail were quite new terms then.

Turning Point

kept on asking people for ideas. I also wrote a very short e-mail to the BBC in 2001, asking if they knew anybody who could give me ideas (if there were any) to get a cheaper Internet connection to my remote village in Nepal. They took my interview and wrote the articles "Village in the Clouds Embraces Computers" and "Praise for 'Inspirational' Web Pioneer" about my school and the computers we had built in wooden boxes. That article changed everything: I got many responses with ideas from people all over the world. That was the first time I heard about Wi-fi (802.11b) wireless technology.

The Network Now

Starting in 2002, it has been already 14 years since Nepal Wireless is working in to bring broadband Internet in the rural areas. Our focus is to bring broadband Internet in the rural areas where no commercial Internet Service Providers would like to go. The ultimate goal is to maximize the benefit of the technology to the rural population. Nepal Wireless has built a network spanning 15 districts of Nepal. Altogether, 175 villages are now connected.

The Investigation

The Nepal Wireless network continually updates the technology while expanding connection to rural mountain villages. Of concern, is the network capacity at the Harmi Relay tower. On average, during peak times the Harmi Relay receives 55 megabytes of digital information per second with a standard deviation of 15 megabytes per second. The Harmi Relay can handle up to 85 megabytes of digital information per second before the system starts buffering. When the more than 97 megabytes are received in 1 second, the tower starts dropping data packets. Assume the data arrivals to the Harmi Relay are random and **normally distributed.**

During peak times:

a) What is the probability that the Harmi Relay will receive no more than 49 megabytes in one second?

b) What is the probability that the Harmi Relay will receive between 22 and 67 megabytes in one second?

c) In a one second period, what is the probability that the Harmi Relay will need to buffer information?

d) In any one second, what is the probability that the Harmi Relay will start dropping packets?

Problem #8 -

nextgenstats.nfl.com - Fastest Ball Carriers shows the maximum speed, measured in Miles Per Hour (mph), a player achieves on a given play when carrying the ball on offense (rusher, passer or receiver) or special teams (punt or kick returner). This stat highlights many of the fastest players in the league.

A list of NFL players who carried the ball in the first two weeks of the season was compiled. The average speed of these players was 20.35 mph. The standard deviation of this same sample is .47 mph.

Assuming that the times are normally distributed and all participants are randomly selected:

a. What is the probability that a ball carrier runs 19.80 mph or slower?
b. What is the probability that a ball carrier will run 20.05 mph or faster?
c. In order to run faster than 99% of the ball carriers, how fast would a player need to run?
d. How slow would the ball carrier have to run to be in the bottom 10%?

Problem #9 -

Projects.propublica.org/emergency - In Nebraska patients on average spend 19 minutes in the emergency room before being seen by a doctor. The standard deviation is 6.8 minutes. Assume the waiting time in the ER is normally distributed.

a. What is the probability that it takes more than 24 minutes in the ER before a patient is seen?

b. What is the probability that it takes 9 minutes or less in the ER before a patient is seen?

c. What is the probability that it will take between 15 and 25 minutes for a patient to be seen?