## Due:Oct.27.2016

## Statistics Assignment #4

**1.** We are given the following probability distribution

Х	0	1	2	3
P(X)	0.4	0.3	0.2	0.1

- a. Find the mean, variance and standard deviation for the probability distribution X.
- b. Determine the probability distribution of Y where Y=3X+2
- c. Use the probability distribution in part (b) to compute the mean, variance and standard deviation of Y.
- d. Use the laws of expected value and variance of Y from the parameters of X.
- 2. The joint probability distribution of X and Y is shown in the following table.

	Х				
Y	1	2	3		
1	.42	.12	.06		
2	.28	.08	.04		

- a. Determine the marginal distribution of X and Y.
- b. Compute the covariance and coefficient of correlation between X and Y.
- c. Develop the probability distribution of X+Y.
- 3. Two investments, X and Y, have the following characteristics:

$$E(X) = $50, E(Y) = $100, \sigma_X^2 = 9,000,$$

$$\sigma_Y^2 = 15,000$$
, and  $\sigma_{XY} = 7,500$ .

If the weight of portfolio assets assigned to investment X is 0.4, compute the

- a. portfolio expected return.
- b. portfolio risk. (standard deviation of the returns on the portfolio)
- **4.** The U.S. Department of Transportation reported that in 2009, Southwest led all domestic airlines in on-time arrivals for domestic flights, with a rate of 0.825. Using the binomial distribution, what is the probability that in the next six flights
- a. four flights will be on time?
- b. all six flights will be on time?
- c. at least four flights will be on time?
- d. What are the mean and standard deviation of the number of on-time arrivals?

- 5. Investment advisors agree that near-retirees, defined as people aged 55 to 65, should have balanced portfolios. Most advisors suggest that the near-retirees have no more than 50% of their investments in stocks. However, during the huge decline in the stock market in 2008, 22% of nearretirees had 90% or more of their investments in stocks (P. Regnier, "What I Learned from the Crash," Money, May 2009, p. 114). Suppose you have a random sample of 10 people who would have been labeled as near-retirees in 2008. What is the probability that during 2008
- a. none had 90% or more of their investment in stocks?
- b. exactly one had 90% or more of his or her investment in stocks?
- c. two or fewer had 90% or more of their investment in stocks?
- d. three or more had 90% or more of their investment in stocks?
- 6. When a customer places an order with Rudy's On-Line Office Supplies, a computerized accounting information system (AIS) automatically checks to see if the customer has exceeded his or her credit limit. Past records indicate that the probability of customers exceeding their credit limit is 0.05. Suppose that, on a given day, 20 customers place orders. Assume that the number of customers that the AIS detects as having exceeded their credit limit is distributed as a binomial random variable.
- a. What are the mean and standard deviation of the number of customers exceeding their credit limits?
- b. What is the probability that zero customers will exceed their limits?
- c. What is the probability that one customer will exceed his or her limit?
- d. What is the probability that two or more customers will exceed their limits?
- 7. The quality control manager of Marilyn's Cookies is inspecting a batch of chocolate-chip cookies that has just been baked. If the production process is in control, the mean number of chip parts per cookie is 6.0. What is the probability that in any particular cookie being inspected
- a. fewer than five chip parts will be found?
- b. exactly five chip parts will be found?
- c. five or more chip parts will be found?
- d. either four or five chip parts will be found?
- **8.** Snowfalls occur randomly and independently over the course of winter in a Minnesota city. The average is one snowfall every 3 days.
- a. What is the probability of five snowfalls in 2 weeks?
- b. Find the probability of a snowfall today.