Q 7.20

The number of pizzas delivered to university students each month is a random variable with the following probability distribution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **x** | 0 | 1 | 2 | 3 |
| **P(x)** | 0.1 | 0.3 | 0.4 | 0.2 |

1. Find the probability that a student has received delivery of two or more pizzas this month. .6
2. Determine the mean and variance of the number of pizzas delivered to students each month. 1.7 , .81

Q 7.30 2.76, 1.517

A shopping mall estimates the probability distribution of the number of stores mall customers actually enter, as shown in the table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| **P(x)** | 0.04 | 0.19 | 0.22 | 0.28 | 0.12 | 0.09 | 0.06 |

Find the mean and standard deviation of the number of stores entered.

Q7.36

The owner of a small firm has just purchased a personal computer, which she expects will serve her for the next 2 years. The owner has been told that she “ must” buy a surge suppressor to provide protection for her new hardware against possible surges or variations in the electrical current, which have the capacity to damage the computer. The amount of damage to the computer depends on the strength of the surge. It has been estimated that there is a 1% chance of incurring $400 damage, a 2% chance of incurring $200 damage, and 10% chance of $100 damage. An inexpensive suppressor, which would provide protection for only one surge can be purchased. How much should the owner be willing to pay if she makes decisions on the basis of expected value? $ 18

Q 7.54

After analyzing several months of sales data, the owner of an appliance store produced the following joint probability distribution of the number of refrigerators and stoves sold daily.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Refrigerators** | |
| **Stoves** | 0 | 1 | 2 |
| 0 | 0.08 | 0.14 | 0.12 |
| 1 | 0.09 | 0.17 | 0.13 |
| 2 | 0.05 | 0.18 | 0.04 |

1. Find the marginal probability distribution of the number of refrigerators sold daily.
2. Find the marginal probability distribution of the number of stoves sold daily.
3. Compute the mean and variance of the number of refrigerators sold daily.

1.07 , .505

1. Compute the mean and variance of the number of stoves sold daily. .93 , .605
2. Compute the covariance and the coefficient of correlation. -.45, -.081

Q 7.62

A portfolio is composed of two stocks. The proportion of each stock, their expected values, and standard deviations are listed next.

|  |  |  |
| --- | --- | --- |
| Stock | 1 | 2 |
| Proportion of Portfolio | 0.3 | 0.7 |
| Mean | 0.12 | 0.25 |
| Standard Deviation | 0.02 | 0.15 |

For each of the following coefficients of correlation, calculate the expected value and standard deviation of the portfolio.

A, p = .5 answer .211, .1081

b. p = .2 answer .211, .1064

c. p = 0 answer .211,.1052

Q 7.70

An investor wants to develop a portfolio composed of shares of Coca Cola, Genentech, and General Electric. Calculate the expected value and standard deviation of the returns for a portfolio with equal proportions of all three stocks.

.0056 , .0545

Q 7.72 .0051 , .0545

Repeat Exercise 7/71 using the following proportions. Compare your results with those of Exercise 7.71

|  |  |
| --- | --- |
| General Electric | 30% |
| General Motors | 10% |
| McDonald's | 40% |
| Motorala | 20% |

Q 7.74

Select the two stocks with the smallest variances and construct a portfolio consisting of equal amounts of both. Determine the expected value and standard deviation of the portfolio. .0232, .1046

Q 7.90

Suppose X is a binomial random variable with n = 25 and p = .7. Use Table 1 to find the following.

1. P (X=18) .1711
2. P(X=15) .0916
3. C.P(X< 20) .9095
4. P(X > 16) .8106

Q 7.92

A sign on the gas pumps of a chain of gasoline stations encourages customers to have their oil checked, claiming that one out of four cars needs to have oil added. If this is true, what is the probability of the following events?

1. One out of the next four cars needs oil.4219
2. Two out of the next eight cars need oil.3114
3. Three out of the next twelve cars need oil.25810

Q 7.98

Most Internet Service providers (ISPs) attempt to provide a large enough service so that customers seldom encounter a busy signal. Suppose that the customers of one ISP encounters busy signals 8% of the time. During the week a customer of this ISP called 25 times. What is the probability that she did not encounter any busy signals? .1244

Q 7.112

The number of accidents that occur at a busy intersection is Poisson distributed with a mean of 3.5 per week. Find the probability of the following events.

1. No accidents in one week. .0302
2. Five or more accidents in one week.2746
3. One accident today.3033

Q 7.118

Flaws in a carpet tend to occur randomly and independently at a rate of one every 200 square feet. What is the probability that a carpet that is 8 feet by 10 feet contains no flaws? .6703

Q 7.122

The number of users of an automatic banking machine is Poisson distributed. The

mean number of users per 5 –minute interval is 1.5. Find the probability of the following events.

a. No users in the next 5 minutes.2231

1. Five or fewer users in the next 15 minutes.7029
2. Three or more users in the next 10 minutes.5768

Q 7.130

An auditor is preparing for a physical count of inventory as a means of verifying its value. Items counted area reconciled with a list prepared by the storeroom supervisor. In one particular firm, 20% of the items counted cannot be reconciled without reviewing invoices. The auditor selects 10 items. Find the probability that 6 or more items cannot be reconciled. .0064

Q 8.34

X is normally distributed with a mean of 100 and a standard deviation of 20. What is the probability that X is greater than 145? .0122

Q 8.36

X is normally distributed with a mean of 1,000 and a standard deviation of 250. What is the probability that X lies between 800 and 1,100? .4435

Q 8.38

The long distance calls made by the employees of a company are normally distributed with a mean of 6.3 minutes and a standard deviation of 2.2 minutes . Find the probability that a call

1. Lasts between 5 and10 minutes.6759
2. Lasts more than 7 minutes.3745
3. Last less than 4 minutes.1469

Q 8.40

The lifetimes of light bulbs that are advertised to last for 5,000 hours are normally distributed with a mean of 5,100 hours an a standard deviation of 200 hours. What is the probability that a bulb lasts longer than the advertised figure? .6915

Q 8.42

Travelbyus is an Internet-Based travel agency wherein customers can see videos of the cities they plan to visit. The number of hits daily is a normally distributed random variable with a mean of 10,000 and a standard deviation of 2,400.

1. What is the probability of getting more than 12,000 hits? .2023
2. What is the probability of getting fewer than 9,000 hits? .3372

Q 8.54

Because of the relatively high interest rates, most consumers attempt to pay off their credit card bills promptly. However, this is not always possible. An analysis of the amount of interest paid monthly by a bank’s Visa cardholders reveals that the amount is normally distributed with a mean of $27 and a standard deviation of $7.

1. What proportion of the bank’s Visa cardholders pay more than $30 in interest? .3336
2. What proportion of the bank’s Visa cardholders pay more than $40 in interest? .0314
3. What proportion of the bank’s Visa cardholders pay less than $15 in interest? .0436
4. What interest payment is exceeded by only 20% of the bank’s Visa cardholder?

$32.88

Q 8.56

How much money does a typical family of four spend at McDonald’s restaurants per visit? The amount is a normally distributed random variable whose mean is $16.40 and whose standard deviation is $2.75.

1. Find the probability that a family of four spends less than $10. .0099
2. What is the amount below which only 10% of families of four spend at McDonald’s? $12.88

Q 8.64

The demand for a daily newspaper at the newsstand at a busy intersection is known to be normally distributed with a mean of 150 and a standard deviation of 25. How many newspapers should the newsstand operator order to ensure that he runs short on no more than 20% of days? 171