**Review Chapter 3**

1)The Ski Patrol at Criner Mountain Ski Resort has determined the following probability distribution for the number of skiers that are injured each weekend:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Injured skiers | 0 | 1 | 2 | 3 | 4 |
| Probability | 0.05 | 0.15 | 0.4 | 0.3 | 0.1 |

Based on this information, what is the expected number of injuries per weekend?

1. 2.50 B) 1.00 C) 2.25 D) 3.50

2)Based on the information from exercise 1, find F(3)

1. 0.85 B) 0.55 C) 0.45 D) None of the others.

3)The following probability distribution has been assessed for the number of accidents that occur in a mid western city each day:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accidents | 0 | 1 | 2 | 3 | 4 |
| Probability | 0.25 | 0.2 | 0.3 | 0.15 | 0.1 |

Based on this probability distribution, the standard deviation in the number of accidents per day is:

A) None of the others. B) 2.65 C) 2 D) 0.12

4) Based on the data from exercise 3, find the probability that there are at least two accidents per day.

A) 0.25 B) 0.55 C) 0.45 D) None of the others

5)An office has three telephone lines. At any given time, the probability that at least one line is in use is 0.8. Find the probability that, at any given time, all three are in use. **Answer: 0.07157**

6) The components in the system are regarded as independent trials. We have a system with 100 independent components. The probability that a component will fail during a prescribed period of time is 0.005. What is the probability that the system is operating at the end of the period, which requires that no component fail? **Answer: 0.606**

7) Compute the probability of obtaining three defectives in a sample of size 10 taken without replacement from a box of twenty components containing four defectives. **Answer: 0.2477**

8) Messages arrive at a computer at an average rate of 15 messages/second. The number of messages that arrive in 1 second is known to be a Poisson random variable.

a. Find the probability that no messages arrive in 1 second. **(answer: 3.06\*10^-7);**

b. Find the probability that more than 10 messages arrive in a 4-second period.

9) Let X be a discrete uniform random variable on the interval [2; 20]. Find the mean and standard deviation of X.

A) 0 & 30 B) 11 & 30 C) 11 & 5.477 D) None of the others

10) The number of industrial injuries per working week in a particular factory is known to follow a Poisson distribution with variance is 0.5.

a) Find the probability that there will be no accidents in a three-week period. **0.223**

b) Find the standard deviation of the number of accidents in a eight-week period. **Answer: 2**

11) An urn contains 30 red and 20 green balls. A sample of 5 balls is selected at random, without replacement. Find the mean and standard deviation of the number of red balls in the sample. **Answer: 3; 1.05**

12) From past experience it is known that 3% of accounts in a large accounting population are in error.

a) What is the probability that 5 accounts are audited before an account in error is found? **Answers: 0.027**

b) What is the probability that the first account in error occurs in the first five accounts audited? **0.141**

13) a) Find the probability that a man flipping a coin gets the fourth head on the ninth flip.

b) How many times on average does that man have to flip to get four heads?

c) Find standard deviation of the number of flips until that man gets four heads.  
**Answer: 0.109; 8; 2.83**

14**)**  The number of misprints on a page of the Daily Mercury has Poisson distribution with mean 1.2. Find the probability that the number of errors

a) on page four is 2 (0.216) b) on page three is less than 3. (0.879) c) on the first ten pages totals 5 (0.013);

d) on all forty pages adds up to at least 3 (1)

e) find the standard deviation of the number of error in thirty pages. (6)

15) Let X = the number of days in the past week in which a randomly selected person felt anxious

and tense. According to a recent General Social Survey, the probabilities for the potential values of X for adult Americans are approximately:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| P(x) | 0.28 | 0.2 | 0.15 | 0.11 | 0.07 | 0.07 | 0.02 | 0.1 |

a.Does this refer to a discrete or a continuous random variable?

b.Find the mean of this probability distribution. Interpret.

16) A candy company claims that its jelly bean mix contains 15% blue jelly beans. Suppose that the candies are packaged at random in small bags containing about 200 jelly beans. What is the probability that a bag will contain more than 20% blue jelly beans? (0.022)

17) Researchers believe that 7% of children have a gene that may be linked to a certain childhood disease. In an effort to track 50 of these children, researchers test 950 newborns for the presence of this gene. What is the probability that they do not find enough subjects for their study? (0.0126)

18) The probability that a radish seed will germinate is 0.7. A gardener plants seeds in batches of 11. find the standard deviation for the random variable X, the number of seeds germinating in each batch. (1.52)

19) From past experience it is known that 3% of accounts in a large accounting population are in error.

A) What is the probability that 5 accounts are audited before two accounts in error are found? (0.0033)

B) What is the standard deviation of the number of accounts audited until 3 accounts in error occur? (56.86)

c) Find the mean of the number of account audited before two accounts in error are found. (66.67)