***Chapter 2***

**6.3** The daily amount of coffee, in liters, dispensed by a machine located in an airport lobby is a random variable X having a continuous uniform distribution with A = 7 and B = 10. Find the probability that on a given day the amount of coffee dispensed by this machine will be:

(a) at most 8.8 liters;

(b) more than 7.4 liters but less than 9.5 liters;

(c) at least 8.5 liters.

X~Uniform(7,10) ,

**6.4** A bus arrives every 10 minutes at a bus stop. It is assumed that the waiting time for a particular individual is a random variable with a continuous uniform distribution.

(a) What is the probability that the individual waits more than 7 minutes?

(b) What is the probability that the individual waits between 2 and 7 minutes?

X~Uniform(0,10) ,

**6.45** The length of time for one individual to be served at a cafeteria is a random variable having an exponential distribution with a mean of 4 minutes. What is the probability that a person is served in less than 3 minutes?

What is the probability that a person is served in less than 3 minutes on at least 4 of the next 6 days?

First , calculate the probability of served less than 3 min .

Consider “served less then 3” is success thus, p=0.5276.

Now, let Y be the number of success in 6 days.

Y~Bin(n=6,p=0.5276)

H.W

Q2. Suppose that the random variable X has the following uniform distribution:

1) p(0.33< x <0.5 )=

2) p(x >1.25)=

(3) The variance of X is

Q2. Suppose that the failure time (in hours) of a certain electrical device is distributed with a probability density function given by:

f(x) ex/70 , x 0

1) the probability that a randomly selected device will fail within the first 50 hours is:

2) the probability that a randomly selected device will last more than 150 hours is:

3) the average failure time of the electrical device is:

4) the variance of the failure time of the electrical device is:

***Chapter 3***

If we have then

**8.17** If all possible samples of size 16 are drawn from a normal population with mean equal to 50 and standard deviation equal to 5, what is the probability that a sample mean will fall in the interval from

To ?

Assume that the sample means can be measured to any degree of accuracy.

**8.20** Given the discrete uniform population

Find the probability that a random sample of size **54**, selected with replacement, will yield a **sample mean** greater than 4.1 but less than 4.4. Assume the means are measured to the nearest tenth.

Because then

**8.23** The random variable *X*, representing the number of cherries in a cherry puff, has the following probability distribution:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | 4 | 5 | 6 | 7 |
| P(X=x) | 0.2 | 0.4 | 0.3 | 0.1 |

(a) Find the mean *μ* and the variance *σ*2 of *X*.

(b) Find the mean and the variance of the mean for random samples of **36** cherry puffs.

(c) Find the probability that the average number of cherries in **36** cherry puffs will be less than **5.5**.

**8.26** The amount of time that a drive-through bank teller spends on a customer is a random variable with a mean ***μ* = 3*.*2** minutes and a standard deviation ***σ* = 1*.*6** minutes. If a random sample of **64** customers is observed, find the probability that their **mean time** at the teller’s window is

(a) at most 2.7 minutes;

(b) more than 3.5 minutes;

(c) at least 3.2 minutes but less than 3.4 minutes.

***μ* = 3*.*2 , *σ* = 1*.*6 , n=64 ,**

**8.28** A random sample of size **25** is taken from a normal population having a mean of **80** and a standard deviation of **5**. A second random sample of size **36** is taken from a different normal population having a mean of **75** and a standard deviation of **3**. Find the probability that the sample mean computed from the **25** measurements will exceed the sample mean computed from the **36** measurements by at least **3.4** but less than **5.9**. Assume the difference of the means to be measured to the nearest tenth.

if we have and which are independent then

**8.29** The distribution of heights of a certain breed of terrier has a mean of **72** centimeters and a standard deviation of **10** centimeters, whereas the distribution of heights of a certain breed of poodle has a mean of **28** centimeters with a standard deviation of **5** centimeters. Assuming that the sample means can be measured to any degree of accuracy, find the probability that the sample mean for a random sample of heights of **64** terriers exceeds the sample mean for a random sample of heights of **100** poodles by at most **44.2** centimeters.

**8.41** Assume the **sample variances** to be continuous measurements. Find the probability that a random sample of **25** observations, from a normal population with variance ***σ*2 = 6**, will have a sample variance *S*2

(a) greater than 9.1;

(b) between 3.462 and 10.745.

n=25, *σ*2 = 6

we know that

**8.45** Using t-distrbution

(a) Find *P*(*T <* 2*.*365) when *v* = 7.

(b) Find *P*(*T >* 1*.*318) when *v* = 24.

(c) Find *P*(*−*1*.*356 *< T <* 2*.*179) when *v* = 12.

(d) Find *P*(*T > −*2*.*567) when *v* = 17.

**8.51** For an *F*-distribution, find

(a) with *v*1 = 7 and *v*2 = 15;

(b) with *v*1 = 15 and *v*2 = 7:

(c) with *v*1 = 24 and *v*2 = 19;

(d) with *v*1 = 19 and *v*2 = 24;

(e) with *v*1 = 28 and *v*2 = 12.



**ناقص تمارين على جزئية**

Sampling Distribution of Proportions

H.W

**Q13.** The average rainfall in a certain city for the month of March is 9.22 centimeters. Assuming a normal distribution with a standard deviation of 2.83 centimeters, then the probability that next March, this city will receive:

1. less than 11.84 centimeters of rain is: Answer: 0.8238
2. more than 5 centimeters but less than 7 centimeters of rain is: Answer: 0.1496

(3) more than 13.8 centimeters of rain is: Answer: 0.0526

**Q2.** The average life of a certain battery is 5 years, with a standard deviation of 1 year. Assume that the live of the battery approximately follows a normal distribution.

1. The sample mean X of a random sample of 5 batteries selected from this product has a mean equal to: Answer: 5

2) The variance of the sample mean X of a random sample of 5 batteries selected from this product is equal to: Answer: 0.2

3) The probability that the average life of a random sample of size 16 of such batteries will be between 4.5 and 5.4 years is: Answer: 0.9224

4) The probability that the average life of a random sample of size 16 of such batteries will be less than 5.5 years is: Answer: 0.9772

5) The probability that the average life of a random sample of size 16 of such batteries will be more than 4.75 years is: Answer: 0.8413

6) If where X represents the sample mean for a random sample of size 9 of such batteries, then the numerical value of a is: Answer: 5.347

**Q1.** A random sample of size n1 = 36 is taken from a normal population with a mean 1 = 70 and a standard deviation 1 = 4. A second independent random sample of size n2 = 49 is taken from a normal population with a mean 2 = 85 and a standard deviation 2 = 5. Let X1 and X2 be the averages of the first and second samples, respectively.

1. Find E() and Var().
2. Find E() and Var().
3. Find P( 70 < < 71).
4. Find P( > 16).