**Quiz 2**

|  |  |  |
| --- | --- | --- |
| STAT 105  | Academic year 1441 H  | Send you answer before 2/3/2020 -9:00PM |
| Statistical Methods |  Second Semester | By E-mail for: wemam.c@ksu.edu.sa |

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| --- | --- | --- |
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| **Section No.** |  | **رقم الشعبة** |

Question 1In a certain hospital, the average number of operations performed is 6 per day. If the number of operations performed in this hospital has a Poisson distribution, then:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. The probability that exactly 2 operations will be performed in a given day is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.7227 | B | 0.0648 | C | 0.0446 | D | 0.0008 |

 |
| 1. The probability that at least 1 operation will be performed in a period of one day is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.002 | B | 0.9975 | C | 0.783 | D | 0.0127 |

 |
| 1. The probability that exactly 5 operations will be performed in a period of 2 days is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.0845 | B | 0.5830 | C | 0.783 | D | 0.0127 |

 |
| 1. The average number of operations performed in a period of 3 days is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 18 | B | 50 | C | 12 | D | 2.5 |

 |
| 1. The variance of the number of operations performed in a period of one week is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 6 | B | 50 | C | 42 | D | 7 |

 |

Question 2

If X, the count of red cells in blood, is normally distributed with a mean of 3.6 and a standard deviation of 0.5. Then

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. P(X < 3 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.8849 | B | 0.1151 | C | 0.3218 | D | 0 |

1. P( 3.5 < X < 4.5 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.4207 | B | 0.9641 | C | 0.0218 | D | 0.5434 |

 |
| 1. P(X > 3 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.3218 | B | 0.1151 | C | 0.8849 | D | 0.5 |

 |
| 1. P(X = 0.5 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0 | B | 0.75 | C | 0.8849 | D | 0.1151 |

 |

Question 3

The average length of stay in a hospital is useful for planning purposes. Suppose that the following is the probability distribution of the length of stay (X) in a hospital after a minor operation:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Length of stay (days) | 3 | 4 | 5 | 6 |
| Probability | 0.4 | 0.2 | 0.1 | k |

Then,

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. The value of k is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.0 | B | 1 | C | 0.3 | D | 6 |

1. =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.0 | B | 0.5 | C | 1 | D | 0.75 |

 |
| 1. =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.32 | B | 0.5 | C | 0.7 | D | 0.1 |

 |
| 1. P(X ≤ 5.5) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.7 | B | 0.6 | C | 0 | D | 0.1 |

 |
| 1. The probability that the patient will stay at most 4 days in a hospital after a minor operation is equal to

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.4 | B | 0.1 | C | 0.2 | D | 0.6 |

 |
| 1. The average length of stay in a hospital is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 2.3 | B | 0.7 | C | 1 | D | 4.3 |

 |

Question 4

If Z follows the standard normal distribution N(0,1). Then,

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. P(Z ≤0 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0 | B | 0.8849 | C | 1 | D | 0.5 |

 |
| 1. P(Z > 1.32 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.9066 | B | 0.0934 | C | 0.783 | D | 0.0127 |

 |
| 1. P(-1.32≤Z ≤ 1.32 ) =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.0934 | B | 0.5830 | C | 0.9066 | D | 0.8132 |

 |
| 1. If P(Z ≤ k)=0.975 , then the value of  is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 1.96 | B | 0.025 | C | -1.96 | D | -0.025 |

 |
| 1. If P(Z = 1.50)=

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 1 | B | 0 | C | -1.96 | D | -0.025 |

 |
| Question 5Suppose that the body weight for obese adults has a normal distribution with mean  kg and standard deviation  kg.1. The probability that a randomly selected adult has weight greater than 99.2 kg is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.3945 | B | 0.1056 | C | 0.6686 | D | 0.0729 |

 |
| 1. The probability that a randomly selected adult has a body weight between 97 and 98 kg is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.3345 | B | 0.5073 | C | 0.6826 | D | 0.8722 |

 |
| 1. In a group (sample) of 10000 patients, the expected number of patients who has a body weight between 97 and 98 kg is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 5073 | B | 6826 | C | 3345 | D | 8722 |

 |

Question 6

In a large population, 10% of males are left-handed. Five males will be sampled. Let X be a random variable that represents the number of left-handed males among these five people. Then,

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. The distribution of the random variable X is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | Binomial(5,0.10) | B | Binomial(0.10,5) | C | Normal(5,0.10) | D | Poisson(0.10,5) |

 |
| 1. The probability that there is exactly one left-handed male in the sample is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.1861 | B | 0.3281 | C | 0.4438 | D | 0.75 |

 |
| 1. The probability that there is no left-handed male in the sample is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.590 | B | 0.9712 | C | 0.2780 | D | 0.1443 |

 |
| 1. The probability that there is at most two left-handed males in the sample is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.8554 | B | 0.1563 | C | 0.9620 | D | 0.9910 |

 |
| 1. The probability that there are two or more left-handed males in the sample is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.8554 | B | 0.0819 | C | 0.9620 | D | 0.2553 |

 |
| 1. The expected values of the number of left-handed males in the sample is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 0.5 | B | 0.75 | C | 0.90 | D | 0.67 |

 |
| 1. The standard deviation of the number of left-handed males in the sample is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | 6.7 | B | 0.75 | C | 0.67 | D | 0.45 |

 |

Questions 7The following probability distribution table gives the probabilities that zero, one, two, or three nurses will be injured in an operation room in a certain hospital during a month.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of injured nurses (X) | 0 | 1 | 2 | 3 |
| Probability  | 0.50 | 0.30 | q | 0.05 |

1. The value of the unknown q is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 1
 | 1. 0
 | 1. 0.10
 | 1. 0.15
 |

1. The probability that at least 2 nurses will be injured is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.25
 | 1. 0.20
 | 1. 0.35
 | 1. 0.95
 |

1. The probability that at most 1 nurse will be injured is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.50
 | 1. 0.30
 | 1. 0.80
 | 1. 0.20
 |

1.  is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.20
 | 1. 0.15
 | 1. 0
 | 1. 1
 |

1. The expected number of injuries (mean of X) is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.25
 | 1. 0.75
 | 1. 0.50
 | 1. 1.5
 |

1. The variance of X is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.79
 | 1. 1.35
 | 1. 0.89
 | 1. 0.25
 |

Questions 8 Consider the following cumulative probability distribution table of a random variable X:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 1 | 2 | 3 | 4 | 5 |
|  | 0.25 | 0.60 | 0.80 | 0.95 | *k* |

1. The value of k is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.05
 | 1. 1
 | 1. 0
 | 1. 0.98
 |

1. is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 1
 | 1. 0
 | 1. 0.05
 |  |

1. is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.40
 | 1. 0.85
 | 1. 0.15
 | 1. 0.60
 |

1.  is

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.30
 | 1. 0.25
 | 1. 0.75
 | 1. 1
 |

Questions 9

In a certain population an average of 10 new cases of esophageal cancer are diagnosed each year. If the annual incidence of esophageal cancer follows a Poisson distribution, then:

1. The probability that 13 new cases coming in the next year, is:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.0125
 | 1. 0.0452
 | 1. 0.0729
 | 1. 0.7291
 |

1. The average number of new cases in a two years is:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 20
 | 1. 5
 | 1. 40
 | 1. 10
 |

1. The probability that 15 new cases coming in next two years is:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.4578
 | 1. 0.0236
 | 1. 0.1472
 | 1. 0.0516
 |

1. The probability that there will be one new case in a month is: (the answer is 0.362)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.5126
 | 1. 0.5896
 | 1. 0.4125
 | 1. 0.4345
 |

Questions 10

Based on data collected in a certain large population, an estimate of the percentage of people who have hypertension is 30%. A Sample of 10 people is selected at random from this population. Let X be the number of people in the sample who have hypertension, follows a binomial distribution then:

1. The values of the parameters of the distribution are:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 30, 10
 | (B) 0.1, 0.3 | 1. 10, 0.3
 | 1. 10, 3
 |

1. The probability that we find two persons who have hypertension, is: (the answer is 0.2335)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.2334
 | 1. 0.5511
 | 1. 1.2334
 | 1. 0.0233
 |

1. The probability that we find at most two persons who have hypertension, is: (the answer is 0.3828)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.2468
 | 1. 0.5293
 | 1. 0.2824
 | 1. .0.2334
 |

1. The probability that we find more than two persons who have hypertension, is: (the answer is 0.6172)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0. 4706
 | 1. 0.5223
 | 1. 0.5293
 | 1. 0.7512
 |

1. The probability that we find at least two persons who have hypertension, is: (the answer is 0.8507)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.7512
 | 1. 0.9999
 | 1. 0.4706
 | 1. 0.7040
 |

1. The probability that we cannot find any person who have hypertension, is: (the answer is 0.0282)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 0.4125
 | 1. 0.0134
 | 1. 0.2824
 | 1. 0.2428
 |

Questions 11

Given a standard normal distribution, find the area under the curve which lies:

1. to the left of z = -1.39

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0823 | 1. 0.0838
 | 1. 0.9177
 | 1. 0.9147
 |

1. to the right of z = 1.96

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.9761 | 1. 0.975
 | 1. 0.025
 | 1. 0.9651
 |

1. between z = -2.16 and z = 0.65

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.9771 | 1. 0.2732
 | 1. 0.0297
 | 1. 0.7268
 |

Questions 12 Given the normally distributed random variable X with mean 18 and standard deviation 2.5

1. Find the value of *k* such that.

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 20.075 | 1. 20.275
 | 1. 21.035
 | 1. 14
 |

1. Find 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.7224 | 1. 0.7124
 | 1. 0.5403
 | 1. 0.9651
 |

1. The variance of the distribution is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 2.5  | 1. 5
 | 1. 6.25
 | 1. 20.5
 |

1. The shape of the normal distribution is defined by the

|  |  |  |  |
| --- | --- | --- | --- |
| (A) mean  | 1. median
 | 1. standard deviation
 | 1. mode
 |

Questions 13 The finished inside diameter of a piston ring is normally distributed with mean of 10 cm and a standard deviation of 0.03 cm.

1. What percentage of rings will have inside diameters exceeding 10.075 cm?

|  |  |  |  |
| --- | --- | --- | --- |
| (A)0.0162  | 1. 0.6726
 | 1. 0.6826
 | 1. 0.0062
 |

1. What is the probability that a piston ring will have an inside diameter between 9.97 and 10.03 cm?

|  |  |  |  |
| --- | --- | --- | --- |
| (A)0.6826  | 1. 0.6715
 | 1. 0.0124
 | 1. 0.0224
 |

1. Below what value of inside diameter will 15% of the piston rings fall?

|  |  |  |  |
| --- | --- | --- | --- |
| (A)0.6826  | 1. 0.9969
 | 1. 9.969
 | 1. 0.0969
 |

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|  |
| --- |
| Questions 14 |

Ahmad hits 75% of his free throws in basketball games. He had 6 free independent throws in last week’s game.

1. The average number (expected value / mean) of Ahmad’s hits last week is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.25 | 0.60 | 4.5 | 0.75 |

1. The standard deviation of the number of Ahmad’s hits last week is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 1.06 | 0.50 | 3.07 | 1.75 |

1. The probability that Ahmad made at least 5 hits last week is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.0931 | 0.6748 | 0.1357 | 0.5339 |
| Questions 15 |

Messages arrive at a computer at an average (mean) rate of 1.5 messages per minute. The number of messages that arrive in 1 minute is known to be Poisson random variable.

1. The probability that no messages arrive in 1 minute is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.0555 | 0.2231 | 0.4358 | 0.6391 |

1. The probability that at least 2 messages arrive in 1 minute is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.2929 | 0.4422 | 0.7004 | 0.0666 |

1. The variance of the number of messages arrives in 1 minute is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 3.0 | 1.0 | 1.5 | 0.5 |

1. The average number (mean) of messages arrives in 2 minutes is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 1.5 | 3.0 | 4.5 | 5.5 |

1. The probability that 5 messages arrive in 2 minutes is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.8154 | 0.9612 | 0.0605 | 0.1008 |
| Questions 16 |

**Suppose that the random variable X has a binomial distribution with parameters (n=5 and p=0.3); that is, X~Binomial (5, 0.3).**

1. The expected value (mean) of X is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 2.5 | 4.7 | 5.3 | 1.5 |

1. The value of P(X = 2) is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.3087 | 0.8361 | 0.0746 | 0.4947 |

|  |
| --- |
| Questions 17 |

**Suppose that the random variable Z has a standard normal distribution.**

1. The value of P(Z > -1.03) is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.6452 | 0.3137 | 0.2288 | 0.8485 |

1. The value of $Z\_{0.01}$ is: (Note: P(Z>$Z\_{A}$)=A)

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 1.960 | 1.645 | -1.645 | 2.325 |

1. If P(Z<*k*)=0.2358, then the value of *k* is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| − 0.72 | 1.31 | − 2.08 | − 0.24 |

|  |
| --- |
| Questions 18 |

**The speed of vehicles traveling on a certain highway has a normal distribution with an average (mean) of 95 km per hour with a standard deviation of 5 km per hour.**

1. The probability that a randomly selected vehicle is traveling under 87 km per hour is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.0548 | 0.3438 | 0.6327 | 0.5918 |

1. The percentage of vehicles traveling between 87 and 95 km per hour is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 25.15% | 65.10% | 44.52 % | 52.62% |

1. If the violating speeds are 100 km or more per hour, then the percentage of vehicles violating the speed limit is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 20.14% | 29.58% | 15.87% | 9.24% |

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|  |
| --- |
| Questions 19 |

⏩ The mean life of a certain type of batteries is 8 months, with a standard deviation of 2 months. Assume that the life of the battery follows a normal distribution. Suppose that $\overbar{X}$ is the sample mean of a random sample of 9 batteries.

1. The mean of $\overbar{X}$ , or $μ\_{\overbar{X}}$ is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 9 | 10 | 8 | 18 |

1. The variance of $\overbar{X}$ , or $σ\_{\overbar{X}}^{2}$ is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.2548 | 0.6667 | 1 | 0.4444 |

1. The probability that the mean life of a random sample of size 9 of such batteries will be less than 9.5 months is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.0122 | 0.9878 | 0.6915 | 0.9332 |

1. The probability that the mean life of a random sample of size 9 of such batteries will be more than 7.5 months is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.7734 | 0.2266 | 0.9332 | 0.6915 |

|  |
| --- |
| Questions 20 |

⏩ A random sample of size n1 = 36 is taken from a normal population with a mean µ1 = 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 µ2 = 85 and a standard deviation 2 = 5. Let $\overbar{X}\_{1}$ and $\overbar{X}\_{2}$ be the averages of the first and second samples, respectively.

1. The mean of $(\overbar{X}\_{1}-\overbar{X}\_{2})$ , or $μ\_{\overbar{X}\_{1}-\overbar{X}\_{2}}$ is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| -10 | 15 | -7 | -15 |

1. The variance of $(\overbar{X}\_{1}-\overbar{X}\_{2})$ , or $σ\_{(\overbar{X}\_{1}-\overbar{X}\_{2})}^{2}$ is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 1.01 | 1.014 | 0.9546 | 0.9985 |

1. $P(-15<\overbar{X}\_{1}-\overbar{X}\_{2}<-14)$ is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.3461 | 0.6539 | 0.4767 | 0.4767 |
| Questions 21 |

⏩ Suppose it is known that 80% of the people exposed to the flu virus will contract the flu. Out of a family of six exposed to the virus,

1. The probability that no one will contract the flu is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.0064 | 0.000064 | 0.00073 | 0.00032 |

1. The probability that all will contract the flu is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.2621 | 0.1176 | 0.3277 | 0.7379 |

1. The probability that at least two will contract the flu is:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.9933 | 0.9891 | 0.9984 | 0.0016 |

1. The expected number and the variance for the people who will contact the flu virus are:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 1.26 and 4.2 | 4.2 and 1.26 | 0.96 and 4.8 | 4.8 and 0.96 |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Questions 22

⏩ The weights of the population of the Riyadh follows a normal distribution with mean 80 kg and standard deviation 5 kg, while the weight of population of Dammam follows a normal distribution with mean 75 kg and standard deviation 3 kg. If we select a random sample of 50 persons who live in Riyadh and another random sample of 36 persons who live in Dammam then,:

1. The standard deviation of the difference , , is

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.7499 | 0.8660 | 0.6680 | 0.1141 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.7498 | 0.2502 | 0.8947 | 0.1053 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.3842 | 0.5218 | 0.5000 | 0.4782 |

1. The value of *k* such that, $P\left(-1.333 \leq T\leq k\right)=0.75, $for *T* distribution with degree of freedom 17:

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 0.850 | 2.602 | 0.150 | 1.069 |

1. If  the  is equal

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
| 2.602 | 1.069 | 0.010 | 0.9900 |

Questions 23

► The random variable X has a normal distribution with mean 10 and standard deviation .

21) Find P( 10 -  < X < 10 +  )

 (A) 0.6826 (B) 0.5 ( 0.8413 (D) 0.1587 (E) none is correct

22) Find P( 10 – 2 < X < 10 + 3 )

 (A) 0.9987 (B) 0.0228 (C) 0.9759 (D) 0.3 (E) none is correct

23) Find  such that P( X > 13 ) = 0.0668

 (A) 1 (B) 2 (C) 10 (D) 13 (E) none is correct

24) Find P(X = 10).

 (A) 0.5 (B) 0.0 (C ) 1.0 (D) 0.3 (E) none is correct

Questions 24

⮚⮚⮚ The probability that a lab specimen contains high levels of contamination is 0.10. Three samples are checked, and the samples are independent, then:

the probability that none contains high levels of contamination is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0475 |  (B) 0.001 |  (C) 0.729 | (D) 0. 3 |

the probability that exactly one contains high levels of contamination is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.243 |  (B) 0.081 |  (C) 0.757 | (D) 0. 3 |

Questions 25

⮚⮚⮚ Based on his experience, a student assume that the number of failures on his minicomputer (PC) is random variable following Poisson distribution with mean 2 failures per month, find the probability that:

There will be exactly 3 failures in a month

(A) 0.1804 (B) 0.6767 (C) 0.4060 (D) 0.3233

within a month there will be at most two failures is:

(A) 0.7865 (B) 0.6767 (C) 0.0183 (D) 0.406

within 2 months there will be at least one failures is:

(A) 0.0406 (B) 0.0183 (C) 0.5767 (D) 0.9871

The variance for the number of failure within two months is

(A) 0.8647 (B) 4.0 (C) 40 (D) 0.44

Questions 26

⮚⮚⮚ A manufacture plant received a shipment of circuit boards from a manufacturer, 5 boards randomly chosen for inspection and determine whether they are defective or not. It is known that 8% of the boards in the shipment are defective.

The probability of no defective circuit boards is :

(A) 0.0544 (B) 0.6591 (C) 0.0 (D) 0.6951

The probability that more than 1 of the circuit boards is defective is:

(A) 0.7865 (B) 0.9456 (C) 0.3409 (D) 0.0544

The variance of the number of defective boards is:

(A) 0.2135 (B) 0.368 (C) 0.5767 (D) 0.4

⮚⮚⮚A continuous random variable that can assume values between x=1 and x=3 has a density function given by  . Find .

(A) 0.3 (B) 0.7 (C) 0.6 (D) 0.4

Questions 27

⮚⮚⮚ For any random variable X with mean μ and variance σ2, we have

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | σ2=μ always | (B) | σ2>μ always | (C) | σ2<μ always | (D) | Non of these |

Questions 28

⮚⮚⮚ For the random variable *X* having binomial distribution, we have

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | σ2=μ always | (B) | σ2>μ always | (C) | σ2<μ always | (D) | Non of these |

Questions 29

⮚⮚⮚ For the random variable *X* having Poisson distribution, we have

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | σ2=μ always | (B) | σ2>μ always | (C) | σ2<μ always | (D) | Non of these |

Questions 30

⮚⮚⮚ **Suppose that the marks of the students in a certain course are distributed according to a normal distribution with the mean 65 and the variance 16. A student fails the exam if he obtains a mark less than 60. Then the percentage of students who fail the exam is**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 20.56% | (B) | 90.56% | (C) |  50.56% | (D) | 10.56% |

Questions 31

⮚⮚⮚ If the random variable X has normal distribution with mean 10 and variance 25, and, k is equal to

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 19.8 | (B) | 1.96  | (C) | 1.645  | (D) | 5  |

Questions 32

⮚⮚⮚ **In a certain industrial facility accidents occur infrequently. If the probability of an accident on a given day is p, and accidents are independent of each other. If p = 0.2, then**

Probability that within a week there will be at most two accidents will occur is :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 0.7865 | (B) | 0.4233  | (C) | 0.5767 | (D) | 0.6647 |

Probability that within a week there will be at least three accidents will occur is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 0.7865  | (B) | 0.2135  | (C) | 0.5767 | (D) | 0.1039  |

The expected number of accidents to occur within this week is

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 1.4  | (B) | 0.2135  | (C) | 2.57 | (D) | 0. 59 |

Questions 33

⮚⮚⮚ **If the random variable X has normal distribution with mean  and variance, then  equals to**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 0.8772 | (B) | 0.5772 | (C) | 0.4772  | (D) | 0.9772 |

Questions 34

⮚⮚⮚ If the random variable X has normal distribution with mean  and variance = 4, then P( X > 1) = 0.9332, then  equals to

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (A) | 4 | (B) | 4.1  | (C) | 5  | (D) | 1.
 |

Questions 35

⮚⮚⮚  **Suppose that the marks of the students in a certain course are distributed according to a normal distribution with the mean 70 and the variance 25. If it is known that 33% of the student failed the exam, then the passing mark x is**

 (A) 67.8 (B) 60.8 (C) 57.8 (D) 50.8 (E) 70.8

Questions 36

⮚⮚⮚  **The weight of a large number of fat persons is nicely modeled with a normal distribution with mean of 128 kg and a standard deviation of 9 kg.**

|  |  |
| --- | --- |
|  | The percentage of fat persons with weights at most 110 kg is |
|  | (A) | 0.09 % | (B) | 90.3 % | (C) | 99.82 % | (D) | 2.28 % |
|  | The percentage of fat persons with weights more than 149 kg is |
|  | (A) | 0.09 % | (B) | 0.99 % | (C) | 9.7 % | (D) | 99.82 % |
|  | The weight x above which 86% of those persons will be |
|  | (A) | 118.28 | (B) | 128.28 | (C) | 154.82 | (D) | 81.28 |
|  | The weight x below which 50% of those persons will be |
|  | (A) | 101.18 | (B) | 128 | (C) | 154.82 | (D) | 81 |

Questions 37

⮚⮚⮚  **In a certain industrial factory, there are 7 workers working independently. The probability of accruing accidents for any worker on a given day is 0.2, and accidents are independent from worker to worker.**

|  |  |
| --- | --- |
|  (a) | The probability that at most two workers will have accidents during the day is |
|  | (A) | 0.7865 | (B) | 0.4233  | (C) | 0.5767 | (D) | 0.6647 |
|  (b) | The probability that at least three workers will have accidents during the day is: |
|  | (A) | 0.7865  | (B) | 0.2135  | (C) | 0.5767 | (D) | 0.1039  |
|  (c) | The expected number workers who will have accidents during the day is |
|  | (A) | 1.4  | (B) | 0.2135  | (C) | 2.57 | (D) | 0. 59  |

Questions 38

⮚⮚⮚  **Suppose that Z is distributed according to the standard normal distribution.**

 the area under the curve to the left of  is:

 (A) 0.0764 (B) 0.9236 (C) 0 (D) 0.8133

the area under the curve to the left of z = 1.39 is:

 (A) 0.7268 (B) 0.9177 (C) .2732 (D) 0.0832

the area under the curve to the right of is:

 (A) 0. 7815 (B) 0.8133 (C) 0.1867 (D) 0.0154

the area under the curve between  and  is:

 (A) 0.7576 (B) 0.8665 (C) 0.0154 (D) 0.2424

the value of k such that  is:

 (A) 0.8665 (B) −1.11 (C) 1.11 (D) 1.00

Questions 39

⮚⮚⮚  **Suppose that Z is distributed according to the standard normal distribution. Find:**

 1) P(Z< -3.9) 2) P(Z> 4.5) 3) P(Z< 3.7) 4) P(Z> -4.1)

Questions 40

⮚⮚⮚ **From a box containing 4 black balls and 2 green balls, 3 balls are drawn independently in succession, each ball being replaced in the box before the next draw is made. The probability of drawing 2 green balls and 1 black ball is:**

 (A) 6/27 (B) 2/27 (C) 12/27 (D) 4/27