

Lecture # 31

Questions of Marks 3

Question:

Given $\sum XY = 400$, $\bar{X} = 5$, $\bar{Y} = 4$, $S_x = 4$, $S_y = 3$, $n = 15$. Compute the coefficient of correlation between X and Y .

Solution:

$$r = 0.55$$

Question:

Determine whether two variables X and Y are correlated or uncorrelated by using the following table

X	6	3
Y	0	3

Solution:

$$r = 0$$

Question:

To calculate the intercept of the regression line we use equation $\bar{Y} = a + b\bar{X}$ when the slope of the line is 0.5. Determine whether Y intercept is positive or negative.

X	4	6	11	9
Y	5	10	9	12

Solution:

$$a = 5.73$$

Questions of Marks 5

Question:

Using the following table find Y intercept, slope and equation of regression line.

X	3	3	7	7
Y	2	9	6	9

Solution:

Intercept = 4

Slope = 0.5

$Y = 4 + 0.5 X$

Lecture # 32

Questions of Marks 2

Question:

If $Y = 7 + b X$, find the value of b when $Y = 12$ and $X = 3$

Solution:

$b = 1.67$

Question:

If $Y = a + 4 X$, find the value of a when $Y = 15$ and $X = 3$.

Solution:

$a = 3$

Questions of Marks 3

Question:

At any afternoon, the actual and trend values are 210 and 250 respectively; find the seasonal variation at the afternoon

Solution:

Seasonal variation = -40

Question:

If a point (5, 6) lie on the regression line $Y = -4 + b X$, find the slope b of the line

Solution:

$b = 2$

Questions of Marks 5

Question:

The estimated regression line of Y on X is

$Y = a + b X$, it passes through two points $A(7,9)$ and $B(0,0)$. Find the value of a and b .

Solution:

$$a = 0$$

$$b = 9/7$$

Question:

If $Y = 9 + b X$, find the value of b .

a) when $Y = 5$ and $X = 2$.

b) When $Y = -7$ and $X = 4$

Solution:

a)

$$b = -2$$

b)

$$b = -4$$

Lecture # 33

Questions of Marks 3

Question:

From the data below:

Week no.	Actual sales	Forecast
3	7000	7500

Given that $\alpha = 0.3$, find the forecast for the 3rd week.

Solution:

Forecast week 4 = 7350

Questions of Marks 5

Question:

Find the centered average in the data below:

Quarter	Actual	Moving Average	Centered Average
1	72		
2	98		
3	79	355	
4	106	362	
1	79	386	
2	122	408	
3	101	445	
4	143	460	
1	94	479	
2	141	506	
3	128	523	
4	160	554	
1	125	556	
2	143	563	
3	135	590	
4	187		

Solution:

Quarter	Actual	Moving Average	Centered Average
1	72		
2	98		
3	79	355	358.5
4	106	362	----
1	79	386	397
2	122	408	----
3	101	445	452.5
4	143	460	----
1	94	479	----
2	141	506	----
3	128	523	----
4	160	554	555
1	125	556	----
2	143	563	----
3	135	590	
4	187		

Lecture # 41

Questions of Marks 2

Question:

Find the value of standard normal equation where mean is μ and standard deviation is 1

Solution:

$$= \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-\mu)^2}$$

Questions of Marks 3

Question:

What is the Standard Error of Percentages (STEP) if there are 2015 sample items with Mean (P) 57%?

Solution:

Standard Error of Percentages (STEP)= 1.102895%

Question:

If the random variable z has the standard normal distribution, find probability $P(z < 2.03)$.

Solution:

Required area = 0.9788

Questions of Marks 5

Question:

The life of a tube light is normally distributed, with a mean of 5.5 years and a standard deviation of 2 years. If this type of tube light is guaranteed for 12 months. What percentage of the sale will require replacement?

Solution:

Required Area = 0.0122 or 1.22%

Lecture # 42

Questions of Marks 3

Question:

If the two sided $100(1-\alpha)\%$ confidence interval based on random sample taken from $x \sim N(\mu, \sigma^2)$ is $13.15 < \mu < 22.25$. Find \bar{x} .

Solution:

$\bar{x} = 17.7$

Question:

A random sample of size 40 is taken from a normal population with a known variance $\sigma^2 = 25$. If the mean of the sample is 49.6. Find the left confidence limit for the population mean.

Solution:

$$= 48.05$$

Question:

What is value of STEM if we take a random sample of 150 children from a population whose mean IQ is 110 with a standard deviation of 15, where the mean IQ of the sample will be below 95?

Solution:

$$= 1.22$$

Questions of Marks 5**Question:**

A population consists of four numbers 4, 6, 9, 15. Considering all possible samples of size two which can be drawn with replacement from this population, find

- i. The population mean.
- ii. The population standard deviation

Solution:

$$\mu = 8.5$$

$$\sigma = 4.15$$

Lecture # 43**Questions of Marks 3****Question:**

A random sample of size n is drawn from normal population with mean 12 and standard deviation

2.5 ; if $n = 25$, $\bar{x} = 15$, then what is z ?

Solution:

$$=6$$

Question:

A random sample of size n is drawn from normal population with mean 12 and standard deviation

1.5; if $z = 9$, $\bar{x} = 15$ what is n ?

Solution:

$$n = 20.25$$

Questions of Marks 5

Question:

Find the confidence interval of 99%, where $\bar{x} = 15$, $\sigma = 2.5$, $n = 10$.

(Also given that) $Z_{0.005} = 2.576$

Solution:

$$12.965 < \mu < 17.035$$

Question:

A sample of 500 male students is found to have a mean height of 87.47 inches. Can it be regarded as a simple random sample from a large population with mean height 87.24 with standard deviation of 1.3 inches?

Solution:

$$z_c = 3.95$$

Lecture # 44

Questions of Marks 2

Question:

Given: Mean training time for population = 15 days , Sample mean for 9 women = 9 days.

Sample Standard Deviation = 3 days , STEM = 0.81 , STEP = 0.98

Find *t – value* .

Solution:

= - 7.40

Questions of Marks 3

Question:

A group of 30 workers from production department has a mean wage of Rs.120 per day with Standard Deviation = 10. Another group of 50 Workers from Maintenance had a mean of Rs. 130 with Standard Deviation = 12.

Find the difference of two sample means.

Solution:

=11.29

Question:

A group of 40 students from English department has mean score of 110.5 marks per subject with standard deviation=9. Another group of 45 students from Mathematics department has mean score of 125 marks per subject with standard deviation=11.

Solution:

=10.11

Lecture # 45

Questions of Marks 2

Question:

Write down two applications of Linear Programming

Question:

Define Linear Programming.

Questions of Marks 3

Question:

Write down the assumptions of the linear programming model?

Question:

In linear programming, what is meant by feasible region?