Statistics

Name of the Writer

Name of the University

Statistics

**Chapter 8**

1. True
2. Mean= 3.3
3. The sample size has an avid effect on the standard error of the mean. This is because sample size or (n) is considered the denominator in the standard error formula (Hamaker & Ryan, 2019). So as the sample size increases leading to less variation in the results and showing a decrease in the standard error.
4. Mean = $35420

Standard Deviation = $2399

Standard Error=$\frac{σ}{√N}$

 = $\frac{2399}{√287}$

 = 141.61 = 142

**Chapter 9**

1. Z-score for 95% confidence

 Subtracting confidence level from and then dividing by 2 = $\frac{(1-0.95)}{2}$ = 0.025

 Subtracting value from 1 = 1 – 0.025 = 0.975

 Z-score = 1.96

**b)** At 95% confidence interval

= $Z\*\frac{σ}{√N}$

 = $1.96\*\frac{25}{ √250}$

 = 3.10

 Lower end of range = (20 - 3.10) = 16.90

 Upper end of range = (20 + 3.10) = 23.10

 Confidence interval = (16.90, 23.10)

1. Subtracting confidence level from and then dividing by 2 = $\frac{(1-0.90)}{2}$ = 0.05

Subtracting value from 1 = 1 – 0.05 = 0.95

Z-score = 1.65

At 90% confidence interval

= $Z\*\frac{σ}{\sqrt{N}}$

= $1.65\*\frac{3}{ \sqrt{33}}$

= 0.86

Lower end of range = (10.7 – 0.86) = 9.84

Upper end of range = (10.7 + 0.86) = 11.56

Confidence interval = (9.84, 11.56)

**Chapter 10**

|  |
| --- |
| **7.** |

1. This is a two-tailed test. The reason for this is that this test is using a significance level of 0.05 and the testing is done in the direction of the relationship hypothesized on both sides (Kock, 2015). This is because a two-tailed test allocates one half of alpha to one side and one to the other.
2. Z-score at 0.05 significance level is 1.64

= 1.6+0.04 = 1.64

1. Z-statistic = $\frac{x-μ\_{o}}{\frac{σ}{\sqrt{N}}}$

Z-statistic = $\frac{215-220}{\frac{15}{\sqrt{64}}}$

Z-statistic = -2.67

1. According to the z-table, the p-value is 0.0038
2. According to the p-value obtained, we reject the null hypothesis as the value is less than 0.05 level of significance.

**8.**

1. Null hypothesis: $H\_{0}=90 min$

Alternative hypothesis: $H\_{1}>90 min$

1. Z-statistic = $\frac{x-μ\_{o}}{\frac{σ}{\sqrt{N}}}$

Z-statistic = $\frac{96-90}{\frac{12}{\sqrt{18}}}$

Z- statistic = 2.12

1. P-value using the test statistic above was found to be 0.0170
2. We reject the null hypothesis that typical park visitor spends around 90 mins in the park but we accept the alternative hypothesis which states that visitors stay longer than 90 mins in the park.

**Chapter 12**

**9.**

**a)** The dependent variable is the number of sales.

**b)** Mean of x (Number of airings) = 4

Mean of y (Number of sales) = 17

Standard deviation of x = 1.58

Standard deviation of y = 6.12

Sum of Corresponding standardized value ($z\_{x}z\_{y})$= 3.72

Correlation Coefficient = $\frac{3.72}{5-1}$

Correlation Coefficient = 0.93

**Calculations:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Locations**  | **X** | **Y** | **(Zx)** | **(Zy)** | **(ZxZy)** |
| Providence | 4 |  15 | 0.00 | -0.33 | 0.00 |
| Springfield | 2 | 8 | -1.26 | -1.47 | 1.86 |
| New Haven | 5 | 21 | 0.63 | 0.65 | 0.41 |
| Boston | 6 | 24 | 1.26 | 1.14 | 1.45 |
| Hartford | 3 | 17 | -0.63 | 0.00 | 0.00 |
|  | mean= 4 | mean = 17 |  |  | sum= 3.72 |
|  | Std dev=1.58 | Std dev= 6.12 |  | Correlation coeff | 0.93 |

**c)** A positive value for the correlation coefficient shows that as the value of x increases so does the value of y. Similarly, even x decreases then the values for y would also decrease (Emerson, 2015).

**10. The following sample observations were randomly selected.**

**X 5 3 6 3 4 4 6 8**

**Y 13 15 7 12 13 11 9**

**a)** Value for x-bar = 4.88

 Value for y-bar = 11.43

 **Calculations:**

|  |  |
| --- | --- |
| **X** | **Y** |
| 5 | 13 |
| 3 | 15 |
| 6 | 7 |
| 3 | 12 |
| 4 | 13 |
| 4 | 11 |
| 6 | 9 |
| 8 |  |
| x-bar=4.88 | y-bar=11.43 |

**b)** Value for x-bar = 4.88

 Value for y-bar = 11.43

 standard deviation of x = 1.73

standard deviation of y = 3.38

Sum of Corresponding standardized value ($z\_{x}z\_{y})$= -8.89

Correlation Coefficient = $\frac{-8.89}{8-1}$

Correlation Coefficient = -1.27

**Calculations:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X** | **Y** | **Zx** | **Zy** | **(ZxZy)** |
| 5 | 13 | 0.07 | 0.46 | 0.03 |
| 3 | 15 | -1.08 | 1.06 | -1.15 |
| 6 | 7 | 0.65 | -1.31 | -0.85 |
| 3 | 12 | -1.08 | 0.17 | -0.18 |
| 4 | 13 | -0.51 | 0.46 | -0.24 |
| 4 | 11 | -0.51 | -0.13 | 0.06 |
| 6 | 9 | 0.65 | -0.72 | -0.47 |
| 8 |  | 1.81 | -3.38 | -6.11 |
| X-bar=4.88 | Y-bar=11.43 |  |  | Sum=-8.89 |

**c)** Slope =$\frac{y\_{2}-y\_{1}}{x\_{2}-x\_{1}}$

 Slope =$\frac{13-11}{5-4}$

 Slope = 2

**d)** y=a+bx

 Taking (4,11) and putting it in the equation

 11=a+2(4)

 11=a+8

 a=3

**e)** The equation of the regression line is as follows: yhat=3+2x

References

Emerson, R. W. (2015). Causation and Pearson's correlation coefficient. *Journal of visual impairment & blindness*, *109*(3), 242-244.

Hamaker, E. L., & Ryan, O. (2019). A squared standard error is not a measure of individual differences. *Proceedings of the National Academy of Sciences*, *116*(14), 6544-6545.

Kock, N. (2015). One-tailed or two-tailed P values in PLS-SEM?. *International Journal of e-Collaboration (IJeC)*, *11*(2), 1-7.