**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 7

**Working Expression:**

**t = mean of first sample – mean of second sample**

**standard error**

**Working Procedure:**

Define variables in variable view → put value manure 1 and manure 2

(string) → go to analyze → compare means → independent sample t –test → put values of manure in test variables and manure in grouping variable → go to options give level of confidence 95% → continue → ok

**SPSS OUTPUT:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Independent Samples Test | | | | | | | | | | |
|  | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| Lower | Upper |
| value of manure 1 & 2 | Equal variances assumed | .756 | .399 | .571 | 14 | .577 | 3.00000 | 5.25107 | -8.26242 | 14.26242 |
| Equal variances not assumed |  |  | .601 | 13.797 | .558 | 3.00000 | 4.99404 | -7.72599 | 13.72599 |

**Setting of Hypothesis:**

Ho: There is no significant difference between the mean yields

H1: There is no significant difference between the mean yields (two tailed test)

For Levene’s test for equality of variances,

p- value = 0.399 > α = 0.05, we accept Ho

Hence, equal variances assumed

**Decision:**

Since 2p = 0.577 > α = 0.05, we accept Ho

**Conclusion:**

We conclude that there is no significant difference between the mean yields.

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Lab QN 8

**Working Expression:**

**t = mean of first sample – mean of second sample**

**standard error**

**Working Procedure:**

Define variables in variable view → put value company A and company B

(string) → go to analyze → compare means → independent sample t –test → put values of company in test variables and company in grouping variable → go to options give level of confidence 95% → continue → ok

**SPSS OUTPUT:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Independent Samples Test | | | | | | | | | | |
|  | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| Lower | Upper |
| values of company A & B | Equal variances assumed | 3.361 | .097 | .735 | 10 | .479 | 1.00000 | 1.36067 | -2.03177 | 4.03177 |
| Equal variances not assumed |  |  | .804 | 9.759 | .441 | 1.00000 | 1.24403 | -1.78117 | 3.78117 |

**Setting of Hypothesis:**

Ho: There is no significant difference in the RAM produced by company A and B.

H1: There is no significant difference in the RAM produced by company A and B. (two tailed test)

For Levene’s test for equality of variances,

p- value = 0.097> α = 0.05, we accept Ho

Hence, equal variances assumed

**Decision:**

Since 2p = 0.479 > α = 0.05, we accept Ho

**Conclusion:**

We conclude that there is no significant difference in the RAM produced by company A and B.

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Lab QN 9

**Working Expression:**

The regression line of Y on X1 and X2 is

Y = a + b1x1 + b2x2

Where, Y= dependent variable

a = y-intercept

b1 and b2 are regression coefficients

x1 and x2 are independent variable

**Working Procedure:**

Define variables Rent, Room, Distance in variable view → Assign type as Numeric → Label them as Rent (Constant), Room, Distance from downtown → Assign measure as Scale →Put data in data view → Analyze → Regression → Linear → Put rent in dependent list → Put room and distance in independent → Go to statistics→ Level of confidence interval 95% →continue → ok

**SPSS OUTPUT:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Summary | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .957a | .916 | .859 | 97.08638 |
| a. Predictors: (Constant), Distance from town, Number of Rooms | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | 96.458 | 118.121 |  | .817 | .474 | -279.454 | 472.371 |
| Number of Rooms | 136.485 | 26.864 | .943 | 5.081 | .015 | 50.991 | 221.978 |
| Distance from town | -2.403 | 14.171 | -.031 | -.170 | .876 | -47.502 | 42.695 |
| a. Dependent Variable: Rent in dollar | | | | | | | | |

**Calculation:**

i. Here, a= 96.458

b1 = 136.485

b2 = -2.403

The multiple regression is

Y = a+b2 x1+b2 x2

Y= 96.458+136.485x1-2.403x2

ii. When x1 =2, x2 = 2

Ye = ?

Ye = 96.45 + 136.18\*1 – 2.4\*2

= 96.45 + 136.18\*2 – 2.4\*2

= 364.01

Hence, if someone is looking for a two bed apartment 2 miles from downtown, he

should expect to pay 364.01 $ rent.

iii. **Multiple determination (R)** = 0.196

= 91. 6%

which means that 91.6% of variation of dependent variable rent is explained by two independent variable rooms and distance.

**Standard error of estimation is** 97.08

**Conclusion:**

In general, we can obtain the estimated value of rent, coefficient of determination and standard error from the given data.

**Name:** Saugat Bikram Thapa

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Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 10

**Working Expression:**

The regression line of Y on X1 and X2 is

Y = a + b1x1 + b2x2

Where, Y= dependent variable

a = y-intercept

b1 and b2 are regression coefficients

x1 and x2 are independent variable

**Working Procedure:**

Define variables expenditure, income, family in variable view → Assign type as Numeric → Label them as expenditure on foods, income (in thousands), family members (size in number) → Assign measure as Scale → Put data in data view → Analyze → Regression → Linear → Put expenditure on foods in dependent list →

income (in thousands), family members (size in number) in independent → Go to statistics → Level of confidence interval 95% →continue → ok

**SPSS OUTPUT:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .733a | .537 | .228 | .96239 |
| a. Predictors: (Constant), family members (size in number), income (in thousands) | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | -2.739 | 3.102 |  | -.883 | .442 | -12.611 | 7.134 |
| income (in thousands) | .405 | .230 | .692 | 1.761 | .176 | -.327 | 1.138 |
| family members (size in number) | .192 | .284 | .265 | .675 | .548 | -.712 | 1.095 |
| a. Dependent Variable: expenditure on foods | | | | | | | | |

**Calculation:**

Here, a= -2.739

b1 =0.405

b2 = 0.192

The multiple regression is

Y = a+b2 x1+b2 x2

Y= -2.739+0.405x1+0.192x2

ii. When x1 =18, x2 = 5

Ye = ?

Ye = a+b2 x1+b2 x2

= -2.739+0.405\*18+0.192\*5

= 5.511

=5511

Hence, the expenditure on food of a family with annual income RS. 20 thousand and having 5 family members is RS.5.111 thousands.

iii. **Multiple determination(R)=**0 .537

= 53.7%

which means that 53.7% of variation of dependent variable expenditure on foods is explained by two independent variable family members (size in number) and income (in thousands).

**Adjusted R2=** 0.228

**Standard error of the estimation is** 0.96239

**Conclusion:**

In general, we can obtain the estimated value of expenditure, coefficient of determination, adjusted R2 and standard error from the given data.

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Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 11

**Working Expression:**

The regression line of Y on X1 and X2 is

Y = a + b1x1 + b2x2

Where, Y= dependent variable

a = y-intercept

b1 and b2 are regression coefficients

x1 and x2 are independent variable

**Working Procedure:**

Define variables y, x1, x2 in variable view → Assign type as Numeric → Label them as Y, X1, X2→ Assign measure as Scale → Put data in data view → Analyze → Regression → Linear → Put Y in dependent list → X1, X2 in independent → Go to statistics → Level of confidence interval 95% →continue → ok

**SPSS OUTPUT:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Summary | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .907a | .823 | .705 | 1.01616 |
| a. Predictors: (Constant), X1, X2 | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | -7.862 | 4.169 |  | -1.886 | .156 | -21.130 | 5.406 |
| X2 | .278 | .082 | 1.041 | 3.396 | .043 | .017 | .538 |
| X1 | -.049 | .058 | -.257 | -.839 | .463 | -.233 | .136 |
| a. Dependent Variable: Y | | | | | | | | |

**Calculation:**

Here, a= -7.862

b1 =0.278

b2 = -0.049

The multiple regression is

Y = a+b2 x1+b2 x2

Y= -7.862+0.278x1-0.049x2

ii. When x1 =50, x2 = 100

Ye =?

Ye = a+b2 x1+b2 x2

= -7.862+0.278\*50-0.049\*100

= 1.138

Hence, when x1=50 and x2= 100 then Y will be 1.138.

iii. **Multiple determination(R)=**0 .823

= 82.3%

which means that 82.3% of variation of dependent variable Y is explained by two independent variables X1 and X2.

**Adjusted R2=** 0.705

**Standard error of the estimation is** 1.01616

**Conclusion:**

In general, we can obtain the estimated value of Y, coefficient of determination, adjusted R2 and standard error from the given data.