**Question : Regression**  
A researcher is investigating whether hours of study per week can predict exam scores. A simple linear regression was conducted using SPSS.

SPSS Output: R=0.832, R Square= 0.692

Coefficients

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | Unstandardized Coefficients | Std. Error | Beta | t | Sig. |
| (Constant) | 48.321 | 3.156 |  | 15.31 | .000 |
| Hours\_Study | 3.221 | 0.333 | .832 | 9.65 | .000 |

a) Write the regression equation based on the output.  
b) What is the value of correlation coefficient? Interpret it.

c) Write down the hypothesis steps for the significance of the slope coefficient.

d) How much variance in exam scores is explained by hours of study?

Answer: About **69.2% (Adjusted R-square) of the variability** in students’ exam scores can be explained by their hours of study per week. The remaining 30.8% is due to other factors not included in this model.

## Question 2: Chi-Square Test of Independence

An education researcher wants to know whether gender is associated with preference for learning style (Visual, Auditory, or Kinesthetic).

SPSS Output:

Crosstabulation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Visual | Auditory | Kinesthetic | Total |
| Male | 20 | 15 | 10 | 45 |
| Female | 10 | 25 | 20 | 55 |
| Total | 30 | 40 | 30 | 100 |

Chi-Square Tests

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 9.417 | 2 | 0.009 |

a) State the null and alternative hypotheses for the Chi-Square test.  
b) What is the value of the chi-square statistic and the degrees of freedom?  
c) Is there a statistically significant association between gender and learning style preference? Explain.  
d) Which learning style appears to be preferred by females? Support your answer using the table.

## Question: Independent Samples T-Test

Scenario:  
A researcher wants to determine if there is a significant difference in exam scores between male and female students. An independent samples t-test was conducted using SPSS, and the results are shown below.

Group Statistics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gender | N | Mean | Std. Deviation | Std. Error Mean |
| Male | 25 | 76.40 | 8.32 | 1.66 |
| Female | 25 | 81.60 | 7.14 | 1.43 |

Independent Samples Test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Levene's Test for Equality of Variances | F | Sig. | t | df | Sig. (2-tailed) |
| Equal variances assumed | 1.234 | .272 | -2.31 | 48 | .025 |
| Equal variances not assumed |  |  | -2.31 | 47.12 | .025 |

a) State the null and alternative hypotheses for this test.  
b) What is the mean difference in exam scores between male and female students?  
c) Is the difference in exam scores statistically significant at the 0.05 level?  
d) Interpret the results in the context of the research question.

## Question: One-Sample T-Test

Scenario:  
A teacher claims that the average score of students in a statistics exam is 75. A random sample of 10 students produced the following exam scores:  
  
Scores: 72, 78, 74, 69, 80, 77, 73, 76, 70, 75 mean=74.4 s = 32.5  
  
Using a 0.05 level of significance, test whether the sample provides sufficient evidence to reject the teacher’s claim.