**Question 1 (5 marks)**

Table 1: Cross tabulation between Gender and Education level

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Gender \* Education Level Crosstabulation** | | | | | | |
| Count | | | | | | |
|  | | Education Level | | | | Total |
| Diploma | Bachelor | Master | PhD |
| Gender | Female | 22 | 24 | 20 | 30 | 96 |
| Male | 37 | 44 | 31 | 52 | 164 |
| Total | | 59 | 68 | 51 | 82 | 260 |

(a) How many variable (s) are involved in the above table? Define also the types of variable (s) involved.

(b) State an appropriate chart to represent the above information? Why?

**Question 2 (5 marks)**

A research was carried out to study the relationship between inflation rate and unemployment rate.

(a) Explain what is meant by independent and dependent variables in a research study.

(b) Identify the independent and dependent variable for the above study.

**Question 3 (5 marks)**

Table 2: Descriptive statistics of annual taxes

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Descriptive Statistics** | | | | | | | | | |
|  | N | Range | Minimum | Maximum | Mean | Std. Deviation | Variance | Skewness | |
| Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Annual taxes | 362 | 5470 | 1000 | 6470 | 3390.91 | 890.435 | 792875.111 | .519 | .128 |
| Valid N (listwise) | 362 |  |  |  |  |  |  |  |  |

Explain the above table in terms of central tendency measure, variability measure and shape of the distribution.

**Question 4 (6 marks)**

A researcher had conducted a survey on three different groups of consumers (A, B and C) to determine the level of satisfaction for a particular product. The results (in percent) were summarized as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Statistical Measures** | **A** | **B** | **C** |
| Mean | 80 | 60 | 60 |
| Median | 70 | 60 | 70 |
| Mode | 60 | 60 | 80 |
| Standard deviation | 12 | 8 | 10 |

State the skewness for each groups and explain what you observe from the above information.

**Question 5 (3 marks)**

One item on a survey of recent college graduates asks students to indicate if they plan to live within a 15 km radius of the university. Responses to the question include “yes” or “no.” The researcher who gathers these data computes the variance of this variable. Is this appropriate given the measurement scale of this variable? Why?

**Question 6 (10 marks) - use SPSS to answer the question**

A sample of 25 students were given a diagnostic test before attending a special module and then they will be given another test after completing the module. At 0.05 level of significance, we want to find out if, in general, the special module teaching leads to improvement in students’ knowledge. Run the test by using SPSS and interpret the output.

|  |  |  |
| --- | --- | --- |
| **Student** | **Pre-module marks** | **Post-module marks** |
| 1 | 71 | 73 |
| 2 | 55 | 60 |
| 3 | 70 | 89 |
| 4 | 44 | 40 |
| 5 | 68 | 70 |
| 6 | 59 | 60 |
| 7 | 62 | 62 |
| 8 | 66 | 70 |
| 9 | 52 | 60 |
| 10 | 57 | 61 |
| 11 | 62 | 65 |
| 12 | 55 | 62 |
| 13 | 73 | 78 |
| 14 | 51 | 50 |
| 15 | 41 | 48 |
| 16 | 64 | 68 |
| 17 | 50 | 55 |
| 18 | 62 | 79 |
| 19 | 73 | 80 |
| 20 | 60 | 66 |
| 21 | 66 | 70 |
| 22 | 54 | 60 |
| 23 | 50 | 57 |
| 24 | 62 | 58 |
| 25 | 63 | 71 |

**Question 7 (2 marks)**

A physical education teacher is conducting a research related to elementary children’s time spent in physical activity. As part of his research, he collects data from schools related to the number of minutes that they require children to participate in physical education classes. He finds that the most frequently occurring number of minutes required for children to participate in physical education classes is 20 minutes. Which measure of central tendency does this statement represent? Why?

**Question 8 (4 marks)**

Two researchers *A* and *B* are conducting a research to test the claim whether the average length of full-term babies at birth is 50 cm. By using the same dataset and the same method of analysis, the following hypotheses are tested.



Researcher *A* uses the 0.05 level of significance, and Researcher *B* uses the 0.01 level of significance.

1. If Researcher *B* rejects *H*0, what is the conclusion of Researcher *A*?
2. If Researcher *A* fails to reject *H*0, what is the conclusion of Researcher *B*?