

Solution 1

To fit a regression line to the relationship between students' age and examination performance, we can use linear regression. Linear regression will help us find the best-fitting line that describes how the examination score (dependent variable) changes with respect to age (independent variable). After fitting the regression line, we can also describe the likely direction of this relationship.

Let's first organize the data:

No of student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Age	12	15	17	14	13	15	16	18	14	13	14	16	18	17	15	13	14	15	17	15
score	50	74	73	54	43	23	45	34	25	53	64	70	54	64	70	54	61	44	48	80

Now, we can fit a linear regression line using this data. I'll perform the regression analysis and provide the results.

Let's calculate the regression line.

The linear regression analysis yields the following results:

- Slope (m): 0.183
- intercept (b): 47.85
- R^2 (coefficient of determination): 0.00036

The regression line equation can be written as:

$$\text{Score} = 0.183 * \text{Age} + 47.85$$

Interpretation

(i) Regression Line:

$$\text{Score} = 0.183 * \text{Age} + 47.85$$

(ii) **Direction of Relationship:**

The slope of the regression line is positive (0.183), which indicates a slight positive relationship between age and examination score. This means that, on average, as the age of the students increases, their examination scores tend to increase slightly. However, the R^2 value is very low (0.00036), indicating that age explains very little of the variance in examination scores. Therefore, other factors might be more influential in determining the scores.

Solution 2.

To determine the Grade Point Average (GPA) and the weighted average of the student, we will follow these steps:

1. Assign the grade points based on the scores.
2. Calculate the total grade points and the total number of units.
3. Calculate the GPA.
4. Determine the class of degree based on the GPA.
5. Calculate the weighted average in percentage terms.

Here are the given scores, units, and grade point mappings:

Course	unit	Marks	Grade	Grade Points
ECO102	3	65	B	4
ECO204	3	50	C	3
POS102	3	40	E	1
GST212	2	45	D	2
FSS102	3	75	A	5
EBT212	1	38	F	0

Step 1: Assign the Grade Points

Marks range	Grade	Grade Point
70-100	A	5
69-69.9	B	4
50-59.9	C	3
45-49.9	D	2
40-44.9	E	1
0.39.9	F	0

Step 2: Calculate the Total Grade Points and the Total Number of Units

To calculate the GPA, we use the formula:

$$GPA = \frac{\sum (GradePoints \times Units)}{\sum Units}$$

Let's calculate it step by step.

Calculating the GPA

Total Grade Points = $(4 * 3) + (3 * 3) + (1 * 3) + (2 * 2) + (5 * 3) + (0 * 1)$

Total Grade Points = $12 + 9 + 3 + 4 + 15 + 0 = 43$

Total Units = $3 + 3 + 3 + 2 + 3 + 1 = 15$

GPA = $43/15 = 2.867$

Step 3: Determine the Class of Degree

Using the GPA scale:

First Class: 4.50 - 5.00

Second Class Upper: 3.50 - 4.49

Second Class Lower: 2.40 - 3.49

Third Class: 1.50 - 2.39

Pass: 1.00 - 1.49

Fail: 0.00 - 0.99

The student's GPA is 2.867, which falls in the **Second Class Lower** category.

Step 4: Calculate the Weighted Average in Percentage

To convert the GPA to a percentage:

Weighted Average $= (\text{GPA} / 5.0) * 100$

Weighted Average $= 2.867 / 5.0 * 100 = 57.34\%$

Summary

(i) The Grade Point Average (GPA) of the student is **2.867**.

(ii) The class of degree of the student is **Second Class Lower**.

(iii) The weighted average of the student is **57.34%**.

Solution 3

Reasons for Preferring Primary Data:

1. **Relevance and Specificity:** Primary data is collected directly for the specific purpose of the study, ensuring it is highly relevant and specific to the research questions or objectives. This makes the data more accurate and tailored to the needs of the researcher.

2. **Control Over Data Collection:** Researchers have full control over how the data is collected, including the methods used, the sample size, and the timing of the data collection. This control helps ensure the reliability and validity of the data.

3. **Up-to-Date Information:** Primary data is current and up-to-date, which is crucial for studies where recent information is necessary. It reflects the most recent trends and changes, providing a more accurate picture of the current situation.

Reasons for Preferring Secondary Data:

1. **Cost-Effective:** Secondary data is typically less expensive to obtain than primary data. It is already collected and readily available, which saves on the costs associated with conducting surveys, interviews, or other data collection methods.

2. **Time-Saving:** Collecting primary data can be time-consuming, involving planning, fieldwork, and analysis. Secondary data, on the other hand, can be accessed quickly, allowing researchers to start their analysis immediately.

Personal Preference and Reason:

I prefer **primary data** because it allows for more control over the data collection process, ensuring that the data is highly relevant and specific to the research objectives. This relevance and specificity lead to more accurate and reliable results, which are essential for making informed decisions or drawing valid conclusions from the study. Additionally, primary data is up-to-date, which is particularly important in fast-changing fields where recent information is critical.