## UNIT 8: BASIC STATISTICAL MEASURES

*Specific Objectives:*

1. To revise the basic concepts of mean, median, mode, standard deviation and variance.
2. To solve related problems.

| Detailed Content | Time Ratio | Notes on Teaching |
|---|---|---|
| **8.1 Basic Knowledge** | 3 | Teachers should revise with students the concepts of grouped and ungrouped data, organisation of data, presentation of data, measures of central tendency (mean, median and mode) and measures of dispersion (range, interquartile range, standard deviation, variance etc). In particular, calculation of mean and standard deviation (or variance) requires a more detailed elaboration. |
| **8.2 Calculation of Mean** | 1 | At this stage, students are expected to use the formulae $\bar{x} = \frac{\sum x}{n}$ (for ungrouped data) . and $\bar{x} = \frac{\sum fx}{n}$ (for grouped data) to deal with some harder problems.<br>*Example* 1<br>A set of *m* numbers has a mean of $\mu_1$. Another set of *n* numbers has a mean of $\mu_2$. Students are expected to find the mean for the combined set of *m* + *n* numbers.<br>*Example* 2<br>Let $\bar{x}$ be the mean of a set of *n* numbers. If each number $x_i$ ($i$ = 1, 2, 3, … , *n*) is transformed to $y_i = ax_i + b$. Students are expected to find the mean $\bar{y}$ of the transformed values. |
| **8.3 Calculation of Standard Deviation and Variance** | 4 | From the basic relation that variance = (standard deviation)$^2$, students could focus their attention to the techniques in manipulating the variance. The formulae $s^2 = \frac{\sum(x-\bar{x})^2}{n} = \frac{\sum x^2}{n} - \bar{x}^2$ (for ungrouped data) and $s^2 = \frac{\sum f(x-\bar{x})^2}{n} = \frac{\sum fx^2}{n} - \bar{x}^2$ (for grouped data) |

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| | | should be explained clearly and students are also expected to make use of them in solving problems.<br><br>*Example 1*<br><br>The heights of 22 boys in a class have a mean of 170 cm and a standard deviation of 10 cm. The heights of 18 girls in the same class have a mean of 160 cm and a standard deviation of 8 cm. Students are expected to calculate the mean height and the standard deviation of the whole class.<br><br>*Example 2*<br><br>The scores $x$ of 100 students in an examination have a mean of 4.6 and a standard deviation of 0.5. The scores are to be scaled by the formula $y = 10x + 4$. Evaluate the mean and the standard deviation of $y$. |
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