UNIT 8 INTERVAL ESTIMATION FOR TWO POPULATIONS

Structure

8.1 INTRODUCTION

In the previous unit, we have discussed the method of obtaining confidence interval for population mean, population proportion and population variance for a population under study. There are so many situations where two populations exist and one wants to obtain the interval estimate for the difference or ratio of two parameters as means, proportions, variances, etc. For example, a company manufacturing two types of blubs and product manager may be interested to obtain the confidence interval for difference of average life of two types of bulbs, one may wish to obtain the interval estimate of the difference of proportions of alcohol drinkers in the two cities, a quality control engineer wants to obtain the interval estimate for the ratio of variances of the quality of the product, etc.

Therefore, it becomes necessary to construct the confidence interval for difference of means, proportions and ratio of variances of two populations. In this unit, we shall discuss how we construct confidence intervals for difference or ratio of the above mentioned parameters of two populations.

This unit comprises the following six sections. Section 8.1 introduces the need of confidence intervals for the difference or ratio of the parameters of two normal populations. Section 8.2 is devoted to method of obtaining the confidence interval for difference of two population means when population variances are known and unknown. Section 8.3 described the method of obtaining the confidence intervals for difference of two population proportions with examples, whereas the method of obtaining the confidence interval for ratio of population variances is explored in Section 8.4. Unit ends by providing summary of what we have discussed in this unit in Section 8.5 and solution of exercises in Section 8.6.

Objectives

After studying this unit, you should be able to:

• introduce the confidence intervals in case of two populations;

• describe the method of obtaining the confidence interval for difference of means of two normal populations when variances are known and unknown;

• describe the method of obtaining the confidence interval for difference of means of two normal populations when observations are paired;