EXERCISES IN STATISTICS

Series A, No. 10

1. A horticulturist considers that a batch of seeds is worth sowing if 50% of the resulting flowers are going to be pure white. To test the worth of a particular batch, he sows eight seeds with the intention of sowing the remainder if at least four of the eight plants have white flowers. Find the probability of his making a wrong decision (a) if 25% of the seeds are of the white variety, and (b) if 75% of the seeds are of the white variety.

2. In the previous election, 65% of the poll voted for the Progressive Party. In a recent opinion survey, 280 out of 400 people have said that they intend to vote for the Progressive Party. Is there any substantial evidence to suggest that the party has increased its support? Hint: use the fact that

$$\left(\frac{x}{n} - p\right) \Big/ \sqrt{\frac{pq}{n}}$$

   is distributed approximately as a standard normal variate.

3. Imagine that a random sample of size 160 is drawn from a normal population where the standard deviation is 25 in order to test the null hypothesis that the mean is 104 against the alternative that it is 100. Calculate the probability of a Type II error in a one-tailed test with a 5% significance level. What sample size is required for the probability of the Type II error to be 0.05?