

### Answer on Question #46082 – Math – Statistics and Probability

A survey was conducted in a slum locality of 2000 families by selecting a sample of size  $n = 800$ . It was revealed that 180 families were illiterates. Find the probable limits of the illiterate families in the population of  $N = 2000$ .

#### Solution

The level of significance is not given. Then we can use  $3\sigma$ -limits. Hence, the probable limits for the proportion in the population are:

$$p \pm 3\sigma = p \pm 3\sqrt{\frac{pq}{n}}.$$

The probable limits of the illiterate families in the population of  $N = 2000$  are

$$\begin{aligned} N\left(p \pm 3\sqrt{\frac{pq}{n}}\right) &= 2000\left(\frac{180}{800} \pm 3\sqrt{\frac{\frac{180}{800}\left(1 - \frac{180}{800}\right)}{800}}\right) = 2000(0.225 \pm 3 \cdot 0.015) = 2000(0.225 \pm 0.045) \\ &= (360; 540). \end{aligned}$$

**Answer: (360; 540).**