

An advertising agency that serves a major radio station wants to estimate the mean amount of time that the station's audience spends listening to the radio daily. From past studies, the standard deviation is estimated as 45 minutes.

- a. What sample size is needed if the agency wants to be 90% confident of being correct to within  $\pm 5$  minutes?
- b. If 99% confidence is desired, what sample size is necessary?

### Answer

- a). The sample  $n$  is given by the formula

$$n = \left( \frac{Z_{\alpha/2} S}{E} \right)^2$$

Given that  $S = 45, E = 5, Z_{\alpha/2} = 1.645$

Thus  $n = 219.188$  ( from the above formula)

Thus the sample size required is 220

- b). Here  $Z_{\alpha/2} = 2.576$

Thus  $n = 537.4979$  (from the above formula)

Thus the sample size required is 538