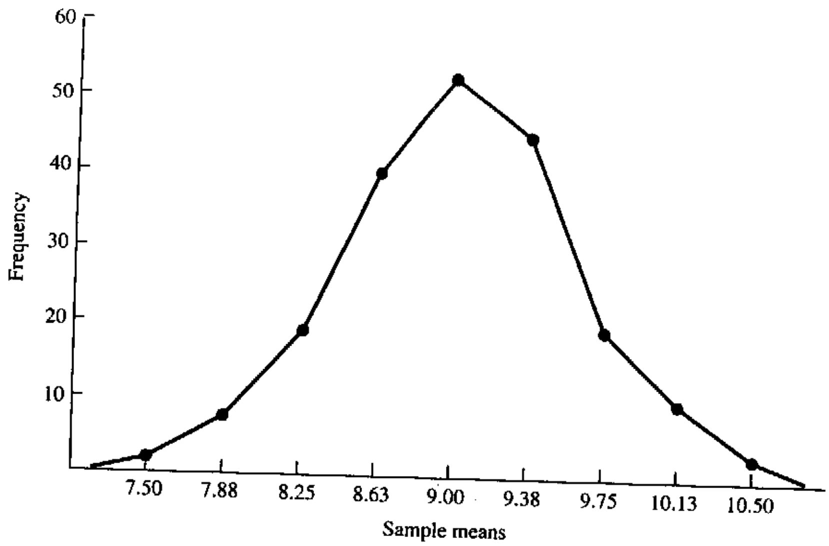


FIGURE 8.1 Empirical sampling distribution of 200 means from the population in Table 8.1. For each sample mean, $N = 8$.

The characteristics of a sampling distribution of the mean are:

1. Every sample is drawn randomly from a specified population.
2. The sample size (N) is the same for all samples.
3. The number of samples is very large.
4. The mean $\bar{X}$ is calculated for each sample.[4]
5. The sample means are arranged into a frequency distribution.

I hope that when you looked at Figure 8.1, you were at least suspicious that it might be the ubiquitous normal curve. It is. Now you are in a position that educated people often find themselves: What you learned in the past, which was how to use the normal curve for scores (X), can be used for a different problem—describing the relationship between $\bar{X}$ and μ.

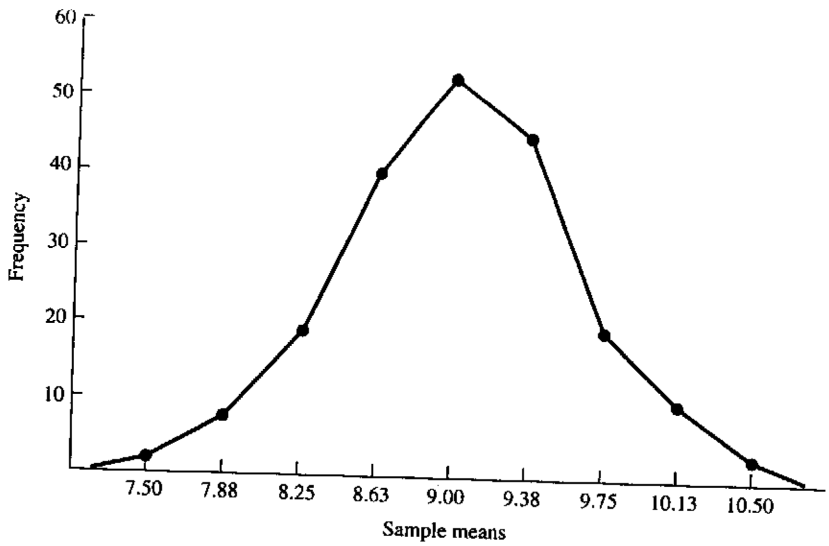
Of course, the normal curve is a theoretical curve, and I presented you with an empirical curve that only appears normal. I would like to let you prove for yourself that the form of a sampling distribution of the mean is a normal curve, but, unfortunately, that requires mathematical sophistication beyond that assumed for this course. So I will resort to a time-honored teaching technique—an appeal to authority.

Central Limit Theorem

Central Limit Theorem
The sampling distribution of the mean approaches a normal curve as N gets larger.

The authority I appeal to is mathematical statistics, which proved a theorem called the **Central Limit Theorem:**

For any population of scores, regardless of form, the sampling distribution of the mean approaches a normal distribution as N (sample size) gets larger. Furthermore, the sampling distribution of the mean has a mean (the expected value) equal to μ and a standard deviation (the standard error) equal to $\sigma/\sqrt{N}$.



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