

Consider the process of repeatedly taking SRSs of size  $n$  from a heavily left-skewed population distribution with mean  $\mu$  and standard deviation  $\sigma$  and calculating the sample mean  $\bar{x}$

- (a) What is the *mean* of the sampling distribution of  $\bar{x}$
- (b) What is the *standard deviation* of the sampling distribution of  $\bar{x}$
- (c) What is the *shape* of the sampling distribution of  $\bar{x}$

An opinion poll asks a sample of 500 adults (an SRS) whether they favor giving parents of school-age children vouchers that can be exchanged for education at any public or private school of their choice. Each school would be paid by the government on the basis of how many vouchers it collected. Suppose that in fact 45% of the population favor this idea.

- (a) What is the mean of the sampling distribution of  $\hat{p}$ , the proportion of adults in samples of 500 who favor giving parents of school-age children these vouchers
- (b) What is the standard deviation of  $\hat{p}$ ?
- (c) Explain why you can use the formula for the standard deviation of  $\hat{p}$  in this setting.
- (d) Check that you can use the normal approximation for the distribution of  $\hat{p}$ .
- (e) What is the probability that more than half of the sample is in favor?

A study of college freshmen's study habits found that the time (in hours) that college freshmen use to study each week is approximately normally distributed with a mean of 7.2 hours and a standard deviation of 5.3 hours.

- (a) Can you calculate the probability that a randomly chosen freshman studies more than 9 hours
- (b) What is the shape of the sampling distribution of the mean  $\bar{x}$  for samples of 55 randomly selected freshman
- (c) What are the mean and standard deviation for the average number of hours  $\bar{x}$  spent studying by an SRS of 55 freshman?
- (d) Find the probability that the average number of hours spent studying by an SRS of 55 student is greater than 9 hours.