

CHAPTER 7: SAMPLING DISTRIBUTIONS

Key Vocabulary:

- parameter
- statistic
- sampling variability
- sampling distribution
- unbiased
- central limit theorem
- law of large numbers

Calculator Skills:

- $\text{randNorm}(\mu, \sigma, \text{\#trials})$



7.1 WHAT IS A SAMPLING DISTRIBUTION

1. Explain the difference between a *parameter* and a *statistic*?
2. What is *sampling variability*?
3. Explain the difference between μ and \bar{x} , and between p and \hat{p} ?
4. What is meant by the *sampling distribution* of a statistic?
5. When is a statistic considered *unbiased*?
6. How is the size of a sample related to the *spread* of the sampling distribution?

7.2 SAMPLE PROPORTIONS (PP. 432-439)

1. In an SRS of size n , what is true about the sampling distribution of \hat{p} when the sample size n increases?
2. In an SRS of size n , what is the mean of the sampling distribution of \hat{p} ?
3. In an SRS of size n , what is the standard deviation of the sampling distribution of \hat{p} ?
4. What happens to the standard deviation of \hat{p} as the sample size n increases?
5. When does the formula $\sqrt{\frac{p(1-p)}{n}}$ apply to the standard deviation of \hat{p} ?
6. When the sample size n is large, the sampling distribution of \hat{p} is approximately normal. What test can you use to determine if the sample is large enough to assume that the sampling distribution is approximately normal?

7.3 SAMPLE MEANS (PP. 442-454)

1. What symbols are used to represent the mean and standard deviation of the sampling distribution of \bar{x} ?
2. What is the mean of the sampling distribution of \bar{x} , if \bar{x} is the mean of an SRS of size n drawn from a large population with mean m and standard deviation s ?
3. What is the standard deviation of the sampling distribution of \bar{x} , if \bar{x} is the mean of an SRS of size n drawn from a large population with mean m and standard deviation s ?
4. To cut the standard deviation of \bar{x} in half, you must take a sample _____ times as large.
5. When should you use $\frac{\sigma}{\sqrt{n}}$ to calculate the standard deviation of \bar{x} ?
6. If the population distribution is Normal, what can be said about the sampling distribution of \bar{x} ? Does sample size matter?
7. What does the **Central Limit Theorem** say about the shape of the sampling distribution of \bar{x} , no matter what shape the population distribution has?
8. How large does a sample need to be to use the CLT if the distribution of the population is not normal?