Chapter 8: Estimating with Confidence

|  |  |
| --- | --- |
| Key Vocabulary: | one-sample t statistic |
| confidence interval | robust |
| margin of error | power |
| interval | law of large numbers |
| confidence level | upper *p* critical value |
| a level C confidence interval | *p*-value |
| degrees of freedom | statistically significant |
| standard error | significance level |
| t distribution | ZInterval, TInterval |

8.1 Confidence Intervals: The Basics (pp.468-480)

1. Define point estimate.
2. A confidence interval takes the form of : “**estimate** $\pm $ **margin of error**”

where: estimate =

 margin of error =

1. What is the difference between confidence level and interval?
2. In a sampling distribution of $\overline{x}$, why is the interval of numbers between $\overline{x}\pm 2s$called a *95% confidence interval*?

**CYU Page 476**

 1.

 2.

 3.

1. When does the margin of error get smaller?
2. State the three **conditions for constructing a confidence interval** for $μ$.
*
*
1. Why is it best to have high *confidence* and a small *margin of error*?
2. What happens to the *margin of error* as *z*\* gets smaller? Does this result in a higher or lower confidence level?
3. What happens to the *margin of error* as *n* gets larger? By how many times must the sample size *n* increase in order to cut the *margin of error* in half?
4. Explain how to find a *level C confidence interval* for an SRS of size *n* having unknown mean $μ$and known standard deviation $σ$.

8.2 Estimating a Population Proportion (pp.484-495)

1. In statistics, what is meant by a *sample proportion:*$\hat{p}$?

**CYU Page 487**

 1.

 2.

1. Give the mean and standard deviation for the sampling distribution of $\hat{p}$?
2. How does the standard deviation differ from standard error for the sampling distribution of $\hat{p}$?
3. How do you calculate the standard error of $\hat{p}$?
4. What does z\* represent?
5. What is the value of z\* for a 95% confdence interval? Include a sketch.
6. What is the value of z\* for a 90% confdence interval? Include a sketch.
7. What conditions must be met in order to use *z procedures* for inference about a proportion?
8. Describe how to construct a level C confidence interval for a population proportion.

**CYU Page 490**

 1.

 2.

 3.

 4.

1. What formula is used to determine the sample size necessary for a given margin of error?

**CYU Page 494**

1.

2.

8.3 Estimating a Population Mean (pp.499-519)

1. Explain how to find a *level C confidence interval* for an SRS of size *n* having unknown mean $μ$and known standard deviation $σ$.

**CYU Page 501**

1. Describe the similarities between a *standard normal distribution* and a *t distribution* How do you calculate the *degrees of freedom* for a *t distribution*?
2. Describe the differences between a *standard normal distribution* and a *t distribution*.

**CYU Page 507**

 a)

 b)

 c)

1. What is the *standard error* of the sample mean $\overline{x}$?
2. How does the *standard deviation* differ from the *standard error* of the sample mean $\overline{x}$?
3. What happens to the *t distribution* as the *degrees of freedom* increase?
4. How would you construct a level C confidence interval for $μ$ if $σ$ is unknown?
5. What are the conditions that must be met to use a one-sample t interval for a population mean?
6. When calculating an interval what should you use when the df needed is not on the table?

**CYU Page 511**

 1.

 2.

 3.

 4.

1. What does it mean if an inference procedure is **robust**?
2. Is the t procedure robust against outliers?
3. If the size of the SRS is less than 15, when can we use *t procedures* on the data?
4. If the size of the SRS is at least 15, when can we use *t procedures* on the data?
5. If the size of the SRS is at least 30, when can we use *t procedures* on the data?