

March 21, 2011
It is E370 Time!!!

☐ Announcements

- ✓ Formula 8.6 page 307 in auxiliary text contains a typo. The expression in the parentheses is two similar terms around a μ . The term on the right should be $\bar{X} +$.
- ✓ Lesson 14 learning object contains a matrix designed to help you organize information about the binomial, uniform, normal, standard normal and Student's t .
- ✓ In Lesson 16 Cool Downs question #6, there is a flow chart which should help you decide when to use Z and t .
- ✓ Part II of the team project is due in your lab this week.

- A question to get you thinking: What random variable is involved and how is it distributed?
The number of cargo cars carried by freight trains on Sodor Island is a normally distributed random variable with a mean of 110 and a standard deviation of 40.
 - ✓ What is the maximum number of cargo cars carried by the middle 70% of freight trains?
 - ✓ If 64 trains are selected randomly, what is the probability that their mean number of cargo cars will be at most 112?
 - ✓ The Institute for Sodor Railroad Development reports that freight trains on Sodor Island carry 120 cargo cars. What is the Z-score of the number of cargo cars carried by a Sodor Island train?

- What will we do today?
 - ✓ Practice random variable identification.
 - ✓ Practice using distributions of sample means and sample proportions.
 - ✓ Consider how confidence intervals estimate population parameters in an informative way.
 - ✓ Look at the parts of a confidence interval.

6. If X is a normally distributed random variable with a mean of 20 and a standard deviation of 3, what is the probability that the mean of a sample of size $n=36$ will be at least 18?

When a local Wal-mart advertises their oil change service, they state that customers typically wait only 55 minutes for the service. In actual fact, the service time is normally distributed, with a mean of 50 minutes and a standard deviation of 12 minutes.

7. If thirty-six customers waiting for an oil change are selected randomly at Wal-mart, what is the probability that their average waiting time is at most 58 minutes?
8. Approximately what is the probability that a randomly selected oil change customer has a Z-score of -2 for his waiting time?
9. An insomniac is a person who has difficulty falling asleep. A study of 225 insomniacs was paid for by the Serta Mattress Company. The study calculated that the average insomniac counted 350 sheep before falling asleep with a standard deviation of 144 sheep. Twenty-two percent of the sample means are at most what number of sheep counted on average?
10. Fifteen percent of divers or snorkelers are victims of unprovoked shark attacks. Thirty-five diver certification cards are drawn at random. Of thirty-five divers, how many divers would one expect to be shark attack victims?

11. Fifteen percent of divers or snorkelers are victims of unprovoked shark attacks. Thirty-five diver certification cards are drawn at random. What is the likelihood that the sample proportion of divers or snorkelers that was attacked by sharks is 0.2 or more?
12. A size of Twix candy bars is advertised as weighing 2.13 ounces. However, the weight of the candy bars is normally distributed with a mean of 2.20 ounces and a standard deviation of 0.4 ounces. What would be the mean weight of 100 Twix candy bars if the Z-score was 1.7?

The manager of the Big Hill Sand Company has determined that the daily demand for sand is a uniform random variable defined on the interval 0 to 10 tons.

13. The manager wishes to check the distribution of daily demand for sand and selects a sample of 30 days. What is the probability that mean daily demand for sand is greater than 5 tons?
14. If the manager staffs enough personnel and equipment to deliver 8 tons of sand on any day, how likely is it that the company will not be able to deliver all the sand ordered?

- ❑ Dr. Gupta of CNN's "Paging Dr. Gupta" reported that according to a national poll 48% of American adults report exceeding the recommended dose of over-the-counter (non-prescription) drugs. For samples of 49 adults, between what two values will approximately 95% of sample proportions symmetric around 48% lie?

- ❑ The Gallup organization conducted a poll about Halloween practices and beliefs in which 1005 adult Americans were asked if someone in their family would give out Halloween treats from the door of their home and 69% answered in the affirmative. What is the largest sample proportion of those 99% which are symmetric around 69%?

- ❑ The weight of Twix candy bars is normally distributed with a mean of 2.20 ounces and a standard deviation of 0.4 ounces. One sample of 49 Twix candy bars yielded a mean of 2.13 ounces. Is this sample mean an outlier?

- Confidence Intervals

- ✓ estimate with a selected precision.
- ✓ estimate parameters.
- ✓ use statistics as the best guess for the parameters.
- ✓ are generally a statistic plus and minus a margin of error.

- Our role is to decide how precise we want to be and to use whatever information we have to calculate the size of the precision.