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### Lesson 8.3: Day 1: How much does an Oreo weigh?



Mrs. Gallas wanted to estimate the average weight of an Oreo cookie to determine if the average weight was less than advertised. She selected a random sample of 30 cookies and found the weight of each cookie (in grams). The mean weight was  $\bar{x} = 11.1921$  grams with a standard deviation of  $s_x = 0.0817$  grams. Make a 95% confidence interval to estimate the true mean weight of an Oreo.

1. What is the **point estimate** for the true mean? \_\_\_\_\_
2. Identify the population, parameter, sample and statistic.  
Population: \_\_\_\_\_ Parameter: \_\_\_\_\_  
Sample: \_\_\_\_\_ Statistic: \_\_\_\_\_
3. Was the sample a random sample? Why is this important?
4. What is the formula for calculating the standard deviation of the sampling distribution of  $\bar{x}$ ?
5. What condition must be met to use this formula? Has it been met?
6. In the formula for the standard deviation of the sampling distribution of  $\bar{x}$ , we don't know the value of  $\sigma$  (if we did, we would have known  $\mu$ ) so we will use  $s_x$  instead. Find the **standard error**.
7. Would it be appropriate to use a normal distribution to model the sampling distribution of  $\bar{x}$ ? Justify your answer.
8. When finding the margin of error for a confidence interval for a proportion we use  $z^*$ . For a mean we will use \_\_\_\_\_ as the critical value. Why???

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9. What  $t^*$  is needed for this confidence interval? Use **Table B** and the **degrees of freedom =  $n - 1$**  to find it.
  
10. Calculate the **margin of error** using  $t^*$  and the standard error.
  
11. Calculate the 95% confidence interval using **point estimate  $\pm$  margin of error**.
  
12. Interpret the interval.
  
13. Write a specific formula for a confidence interval for a population mean.
  
14. According to Nabisco, an Oreo weighs 11.3 grams. Does our confidence interval provide convincing evidence that the true average weight is less than 11.3 grams? Explain.

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## Lesson 8.3 Day 1– Constructing a Confidence Interval for $\mu$

Important ideas:

### Check Your Understanding

1. Use Table B to find the critical value  $t^*$  that you would use for a confidence interval for a population mean  $\mu$  in each of the following settings. If possible, check your answer with technology.
  - (a) A 96% confidence interval based on a random sample of 22 observations
  - (b) A 99% confidence interval from an SRS of 71 observations
2. Judy is interested in the reading level of a medical journal. She records the length of a random sample of 100 words. The histogram displays the distribution of word length for her sample. Determine if the conditions for constructing a confidence interval for a mean have been met in this context.

