

Name: \_\_\_\_\_

## AP Statistics Assignment 10.1 and 10.2 Confidence Intervals

1. What is a confidence Interval? What is the purpose of it? What does it want to capture?
2. When we create a confidence interval, one of the first things we do is to collect a random sample. Why do we do this? Explain:
3. What is the difference between a 90% confidence interval vs a 95% confidence interval? Please explain this is your own words
4. When we increase the level of confidence, ie: from 90% to 99%, does the width of the confidence interval increase or decrease? Why Please explain:
5. What is the difference between the Margin of Error vs Standard Error
6. Why do we multiply the Z-score by the standard error? Explain:
7. If the Margin of Error is 20, then what is the width of the confidence interval?
8. What is the difference between a Z-interval and T-interval?
9. What conditions must be met in order to create a confidence interval?

10. What does it mean to have a 99% level of confidence?
  
  
  
  
  
  
11. What does it mean when we are 95% confident that an interval  $[a,b]$  will capture the true population mean? Interpret this:
  
  
  
  
  
  
12. Why do we use the term “confidence” as opposed to “probability” when interpreting a confidence interval?
  
  
  
  
  
  
13. Why is it incorrect when we state that a confidence interval has a 95% probability of capturing the true population mean?
  
  
  
  
  
  
14. If the population distribution is skewed, what other condition must be met to create a confidence interval
  
  
  
  
  
  
15. When we are creating a confidence interval, are we using the population distribution or sample distribution? Explain:
  
  
  
  
  
  
16. The maximum allowed weight of check-in luggage at the YVR airport is 70lbs. Employees at the check in desk suggests that most luggage are overweight. In 2023, the average weight of all luggage was 71.3 lbs with a standard deviation of 2.1 lbs. In 2024, stricter penalties were implemented. A random sample of 120 luggage were tallied with an average weight of 70.1. Perform a test for the confidence interval.
  - a) State the parameters and statistics involved
  
  
  
  
  
  
  - b) Are we creating a Z-INTV or T-INTV? Explain:

- c) What conditions must be met to create a confidence interval? Explain
- d) What is the standard error? Why is it smaller than the standard deviation?
- e) What is the margin of error?
- f) Create a 95% confidence interval for the mean check-in luggage weight of 2024. Interpret this confidence interval
- g) Is the average weight of check-in luggage at the YVR airport in 2024 smaller due to stricter penalties implemented? Explain:

17. On average, most snow tires will have a stopping distance between 25 to 45 meters for vehicles travelling at 50km/h on snowy roads.  $[\sigma = 3.5m]$  The Michelin X-Ice Snow tire is recognized as one of the top brands in the industry. A random sample of 40 sets of M.X-Ice Snow tires were tested on snowy roads for their stopping distance travelling at 50km/h. The sample yielded an average of 26 meters. Create a 95% confidence interval for the stopping distance

- a) State the parameters and statistics involved
- b) Are we creating a Z-INTV or T-INTV? Explain:
- c) What conditions must be met to create a confidence interval? Explain

d) Create a 95% confidence interval for the mean check-in luggage weight of 2024. Interpret this confidence interval