Hypothesis Testing For a Population Mean $\mu$

1. **Cost of Textbooks**
   The UNC System administration is hearing complaints from students and parents about the rising cost of textbooks. Financial aid officers from the 16 campuses agree that $300 per semester for textbooks is a critical “breakpoint” for students; when textbook costs exceed $300 per semester, a student's finances are significantly stressed. There is concern that $\mu$, the mean textbook cost per semester, is greater than $300. To evaluate the situation, a random sample of 25 students in the UNC System is selected and asked their textbook costs for the current semester; the costs are shown below. Use this data to test the hypothesis that mean textbook costs exceed $300.


   **Summary statistics:** $\bar{x} = 320.32$, $s = 54.03$

   **a. Hypothesis Test:** $H_0 : \mu =$  
   
   where $\mu =$

   test statistic:

   P-value =

   Conclusion in context of the problem:

   **b. Construct a 95% confidence interval for the mean cost $\mu$ of textbooks for all full-time students.**

   **95% confidence interval:**

   **Interpretation:**
2. The Academic Progress Rate (APR) is a statistic developed by the NCAA to assist them in determining if an athlete is making satisfactory progress towards a degree. If the APR for a particular sport at a school is below 925 (which is approximately equivalent to a 50% graduation rate), then that sport is subject to sanctions such as loss of scholarships or ineligibility for postseason tournaments.

The APR for all DI athletes is 974. The APR for the sweet 16 teams in the 2013 NCAA men's basketball tournament has mean $\bar{y} = 969.8$ and standard deviation $s = 28.7$. Consider these 16 APR's as a random sample of APR's from the 346 DI men's basketball teams. Is there evidence in the sample data that the APR for men's DI basketball is lower than the APR for all DI athletes?

<table>
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<tr>
<th>Mich</th>
<th>Kansas</th>
<th>Syrac</th>
<th>L'ville</th>
<th>Duke</th>
<th>Marquette</th>
<th>Oregon</th>
<th>Wichita St.</th>
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</thead>
<tbody>
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<td>995</td>
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<td>960</td>
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<th>Miami</th>
<th>Fl. Gulf Coast</th>
<th>Ohio St</th>
<th>Indiana</th>
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