1. Mark the following statement as correct or incorrect.

   “The p-value is the probability that the null hypothesis is true.”

   a.) This statement is correct.
   b.) This statement is not correct.

2. Mark the following statement as correct or incorrect.

   “Statistical significance is the same as practical significance.”

   a.) This statement is correct.
   b.) This statement is incorrect.

3. Is there a difference in the population mean flight delay from the Atlanta airport between Delta and Airtran? The 95% confidence interval of the difference is (-10, 2). What would be the true about the p-value for a two sided hypothesis test?

   a.) p-value < 0.05
   b.) p-value > 0.05
   c.) p-value = 0.05
4. Are weekend flight delays longer than weekday flight delays from the Atlanta airport? Let wk stand for weekend and wd stand for weekday. What is the appropriate alternative hypothesis?
   a.) Ha: μ_{wd} - μ_{wk} > 0
   b.) Ha: μ_{wd} - μ_{wk} < 0
   c.) Ha: \bar{x}_{wd} - \bar{x}_{wk} > 0
   d.) Ha: \bar{x}_{wd} - \bar{x}_{wk} < 0

5. Do more men than women use electronics on flights? One hundred randomly selected men (group 1) and one hundred randomly selected women (group 2) were asked if they used electronics on flights. Seventy five men and sixty four women said yes. What is the test statistic?
   a.) 0.0456
   b.) 0.05
   c.) 1.69
   d.) 1.73
   e.) 1.96

6. Do more women than men check their baggage on flights out of the Gainesville airport? One hundred randomly selected men (group 1) and two hundred randomly selected women (group 2) are asked if they checked their baggage on their last flight. Twenty five men and one hundred four women said yes. What is the pooled proportion used in the test statistic under the null hypothesis Ho:p_1-p_2=0?
   a.) 0.25
   b.) 0.385
   c.) 0.43
   d.) 0.52

7. A test of the null hypothesis versus a one sided alternative gives t = 1.81. The alternative hypothesis is Ha: μ > 10. With a sample size equal to 20, what would be the p-value?
   a.) p-value greater than 0.10
   b.) p-value between 0.025 and 0.05
   c.) p-value between 0.01 and 0.025
   d.) p-value between 0.05 and 0.10
Questions 8 - 12 Determine what type of statistical test should be used to answer each of the questions below. (You will only use each response one time.)

a.) One mean
b.) Comparing means of dependent samples
c.) Comparing two independent means
d.) Comparing two independent proportions
e.) Comparing proportions of dependent samples

8. What is the typical flight delay when flying out of the Atlanta airport?

9. Is there a difference in the flight delay flying out of Atlanta airport between Delta and AirTran?

10. Are more women than men gluten intolerant?

11. Is there a difference in how people feel about health insurance between this year and last year? Two hundred people were asked this year and last year if they approved or disapproved with how health insurance was dealt with in this country.

12. Is there a difference in how much people pay for health insurance between this year and last year? The same two hundred people were asked last year and then again this year how much they had spent per month on health insurance.

13. What value in a 95% confidence interval for the population relative risk would show that there was no statistically significance difference in risk?
   a.) 0
   b.) 1
   c.) \( \mu_o \)
   d.) \( p_0 \)
   e.) \( p_1-p_2 \)

14. A significance test was conducted at alpha level equal to 0.01 for the following hypothesis Ho: \( p_1-p_2 = 0 \) versus Ha: \( p_1-p_2 \neq 0 \). The p-value was 0.021. What is the probability of a Type I error?
   a.) 0
   b.) 0.01
   c.) 0.021
   d.) 0.05
15. What is a Type II error?
   a.) The error that occurs when rejecting Ho when Ho is true.
   b.) The error that occurs when rejecting Ho when Ho is false.
   c.) The error that occurs when failing to reject Ho when Ho is true.
   d.) The error that occurs when failing to reject Ho when Ho is false.

Questions 16 – 18 In 2010, the General Social Survey included a question that asked participants if they were supervised at work. Are more females (group 2) than males (group 1) supervised at work?

<table>
<thead>
<tr>
<th>Sample</th>
<th>X</th>
<th>N</th>
<th>Sample p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>366</td>
<td>487</td>
<td>0.751540</td>
</tr>
<tr>
<td>2</td>
<td>488</td>
<td>607</td>
<td>0.803954</td>
</tr>
</tbody>
</table>

Difference = p (1) - p (2)
Estimate for difference: -0.0524138
95% CI for difference: (-0.102117, -0.00271100)
Test for difference = 0 (vs not = 0): Z = -2.07  P-Value = 0.039

16. What type of samples would this be?
   a.) Independent Samples
   b.) Dependent Samples

17. Using the output above, what would be the p-value for the hypothesis statement to see if more females than males were supervised at work?
   a.) 0.020
   b.) 0.039
   c.) 0.078
   d.) 0.052
   e.) 0.98

18. Based on the 95% confidence interval given above only, what conclusion can we make? Answer by completing the following statement

“We are 95% confident that the population proportion . . .

   a.) for men and for women is not statistically significantly different.
   b.) for men and for women is the same.
   c.) for women is higher than for men by between 0.0027 to 0.102.
   d.) for men is higher than for women by between 0.0027 to 0.102.
Do people change their opinion about capital punishment in the UK? The same 220 people were asked if they supported capital punishment in 2010 and in 1997. The initial 220 people were randomly selected from UK citizens. The results are below.

<table>
<thead>
<tr>
<th>Capital Punishment in 1997</th>
<th>For</th>
<th>Against</th>
</tr>
</thead>
<tbody>
<tr>
<td>For</td>
<td>116</td>
<td>36</td>
</tr>
<tr>
<td>Against</td>
<td>8</td>
<td>60</td>
</tr>
</tbody>
</table>

19. What type of samples would this be?
   a.) Independent samples
   b.) Dependent samples

20. What was the sample proportion in 1997 of those who were for capital punishment?
   a.) 0.935  
   b.) 0.76   
   c.) 0.69   
   d.) 0.62   
   e.) 0.58   

21. What would be the correct alternative hypothesis?
   a.) $H_a: p_1 - p_2 \neq 0$
   b.) $H_a: p_1 - p_2 > 0$
   c.) $H_a: p_1 - p_2 < 0$
   d.) $H_a: p_1 - p_2 = 0$

22. Besides random sampling, what other assumptions need to be met?
   a.) The number of observed successes and failures in each year must be more than 30.
   b.) The number of observed successes and failures in each year must be more than 15.
   c.) The number of people that changed their viewpoint must be larger than 30.
   d.) The number of people that changed their viewpoint must be larger than 15.

23. What would be the test statistic?
   a.) 8.92 or -8.92
   b.) 4.22 or -4.22
   c.) 0.637 or -0.637
   d.) Almost zero
Questions 24 – 26 A new school program was interested in seeing if students improved on foreign language skills if they used a computer program to practice grammar. Five students were given a pretest, then required to log 10 hours on the computer software and then given a posttest. Below are the results.

<table>
<thead>
<tr>
<th></th>
<th>Student 1</th>
<th>Student 2</th>
<th>Student 3</th>
<th>Student 4</th>
<th>Student 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>80</td>
<td>75</td>
<td>52</td>
<td>45</td>
<td>56</td>
</tr>
<tr>
<td>Posttest</td>
<td>75</td>
<td>80</td>
<td>62</td>
<td>47</td>
<td>68</td>
</tr>
</tbody>
</table>

24. How do we check for the assumptions of normality of the population of differences in this case?
   a.) The sample size is large, so you don’t have to doubt that the population of differences is normally distributed.
   b.) Check for outliers by making a plot of the pretest score and the posttest scores.
   c.) Check for outliers by making a plot of the difference between the pretest and posttest scores.

25. What is the appropriate alternative hypothesis test to see if the students improved?
   Let the difference equal the pretest score minus the posttest score.
   a.) Ha: \( \bar{x} > 0 \)
   b.) Ha: \( \bar{x} < 0 \)
   c.) Ha: \( \mu_d < 0 \)
   d.) Ha: \( \bar{x}_d > 0 \)
   e.) Ha: \( \mu_d > 0 \)

26. What would be the 95% confidence interval for the population mean difference?
   a.) (-10.73, 1.13)
   b.) (-25.36, 15.757)
   c.) (-13.19, 3.59)
   d.) (-22.19, 12.59)
Questions 27 – 29 In 2004, the General Social Survey asked men and women how much time they had spent answering email in the past week. Below are the summary statistics.

<table>
<thead>
<tr>
<th></th>
<th>Men (group 1)</th>
<th>Women (group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.90</td>
<td>7.14</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>11.72</td>
<td>13.98</td>
</tr>
<tr>
<td>Sample Size</td>
<td>471</td>
<td>579</td>
</tr>
</tbody>
</table>

27. What is the point estimate of the difference between the population mean amount of time answering email for men and women?
   a.) -0.24
   b.) -2.26
   c.) -0.30
   d.) Unknown

28. The p-value equals 0.762 for the alternative hypothesis, Ha:µ1-µ2 ≠ 0. What do we know about the 95% confidence interval for µ1-µ2?
   a.) It will include 0.
   b.) It will not include 0.
   c.) It will include 1.
   d.) It will not include 1.

29. The p-value equals 0.762 for the alternative hypothesis, Ha:µ1-µ2 ≠ 0. Finish the following sentence.
   “With a p-value of 0.762, we have . . .
   a.) Strong evidence that the sample mean amount of time spent answering email is the same for men and women.
   b.) Strong statistically significant evidence that the population mean amount of time spent answering email is different for men and women.
   c.) No statistically significant evidence that the population mean amount of time spent answering email is the different for men and women.
   d.) No statistically significant evidence that the sample mean amount of time spent answering email is different for men and women.
Questions 30 – 31 In 2002, 379 women were asked on the GSS how many hours a week they spent on the computer answering work email, the sample mean was 7.92 and the sample standard deviation was 10.24. Is this evidence that it was more than 7 hours a week?

30. What is μ?
   a.) Unknown, the population mean number of hours that American women spend at work answering email per week
   b.) Unknown, the sample mean number of hours that American women spend at work answering email per week
   c.) 7.92, the population mean number of hours that American women spend at work answering email per week
   d.) 7.92, the sample mean number of hours that American women spend at work answering email per week

31. The p-value equals 0.04. What decision is made at 0.05 significance level?
   a.) Reject Ho
   b.) Fail to Reject Ho
   c.) Reject Ha
   d.) Fail to Reject Ha

32. Mark the following statement as correct or incorrect.

   “If the 95% confidence interval for μ₁-μ₂ includes two positive values, then both μ₁ and μ₂ are positive values.”
   a.) This statement is correct.
   b.) This statement is incorrect.

33. Suppose that a survey company asked 25 men how many hours they worked a week. Suppose that they were then going to make a 95% confidence interval based on these responses. What distribution would they use to get the critical value?
   a.) z
   b.) t with 26 degrees of freedom
   c.) t with 25 degrees of freedom
   d.) t with 24 degrees of freedom