Some questions have been adapted from Statistics: The Art and Science of Learning from Data, 3rd ed, by Agresti & Franklin.

1. Don’t even open this until you are told to do so.

2. Remember to turn your phone off now.

3. Please turn your hats around backwards or take them off.

4. Please put your backpack and other things along the walls or at the front of the room.

5. You need a gray, 81/2 × 11” scantron, pencil, calculator and you may have 5 sheets of notes.

6. There are 20 multiple-choice questions on this exam, each worth 5 points. There is partial credit. Please mark your answers clearly. Multiple marks will be counted wrong.

7. You will have 60 minutes to finish this exam.

8. If you have questions, please write out what you are thinking on the back of the page so that we can discuss it after I return it to you.

9. If you are caught cheating or helping someone to cheat on this exam, you both will receive a grade of zero on the exam. You must work alone.

10. When you are finished please make sure you have filled in your name and marked your FORM (A, B, C or D) and 20 answers, then turn in JUST your scantron.

11. Good luck!
1. If \( x \sim N(14, 3^2) \), what is \( P(8.6 < X < 10.9) \)?

A. 0.1156  
B. 0.1874  
C. -0.1156  
D. 0.77  
E. 0.7794

2. More than 75% of Americans answer yes when asked, “Do you favor cracking down against illegal gun sales?” What are possible problems with this poll?

A. The question is leading so there is most likely a response bias.  
B. The question is leading so there is most likely a non-response bias.  
C. There is sampling bias because of undercoverage.  
D. There is sampling bias due to voluntary response.  
E. There is bias due to not asking enough Texans.

3. The information in the table above is from a survey conducted by Gallaudet University. The topic was whether their alumni felt prepared for their chosen occupation. According to this data, how likely is a Well prepared Graduate student?

<table>
<thead>
<tr>
<th>Undergrad</th>
<th>Graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very well</td>
<td>20</td>
<td>39</td>
</tr>
<tr>
<td>Well</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td>Some</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td>Not at all</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>92</td>
<td>90</td>
</tr>
</tbody>
</table>

A. 40/66  
B. 40/90  
C. 40/182  
D. 66/182  
E. 90/182

4. Still referring to the table, how likely is an undergraduate to be at least Well prepared?

A. This information is not given.  
B. 20/92 * 26/92  
C. 20/59 + 26/66  
D. 46/182  
E. 46/92

5. Again, according to the table, what is \( P(\text{Graduate — Some}) \)? Yes, you need to know this notation.

A. 0.09  
B. 9/36  
C. 9/90  
D. 9/182  
E. 9/36 * 9/90

6. The barplot above is of the same data as the previous table. Which of the following is true?

A. Graduate is skewed to the right and undergraduate is more symmetric.  
B. There is some relationship between feeling prepared and level of education (UG vs. G).  
C. Graduate students are much more pleased with their education since very few feel underprepared.  
D. All of the above are true.  
E. None of the above are true.

7. If the 5-Number-Summary for a dataset are: -1.66,-1.5,-1.05,-0.76,1.53, which of the following best describes the distribution?

A. skewed left, no outlier(s)  
B. skewed right with outlier(s)  
C. skewed right, no outlier(s)  
D. normal with outlier(s)  
E. uniform

8. Which of the following is true about experiments and observational studies?

A. Because they can’t prove causation, observational studies aren’t very useful because establishing cause and effect is central to science.  
B. Experiments eliminate all confounding variables, so they can always prove causation.  
C. Another reason observational studies aren’t reliable is that they can’t use randomization.  
D. All of the above are true.  
E. None of the above are true.

9. A local restaurant has an average daily profit of $340 with a standard deviation of $60. How likely is it that the restaurant only makes $200 one day?

A. The data is not normal, so we can’t calculate it.  
B. That would be an outlier, so it shouldn’t happen.  
C. 0.9901  
D. It should only happen about 2.33% of the time.  
E. It should only happen about 1% of the time.
10. Which of the following is true?

A. Stemplots are only useful when you need to see the actual values in a distribution.
B. A uniform distribution can never have outliers.
C. You can only use $z$-scores with normal distributions.
D. You can use pie charts and bar plots for all categorical data. They are interchangeable.
E. None of the above are true.

11. Which of the following is true about the data above? Assume all the values within a bin are equal to the number on their lower left, i.e., all the observations in the first bin are equal to 2.6.

A. It's approximately normal with mean $= 3.1$.
B. The IQR $= 0.2$.
C. The standard deviation is $0.16 \pm 0.01$
D. All of the above are true.
E. Only A and B are true.

12. What’s a simple random sample? A SRS of size $n$ is one that

A. has every $n^{th}$ observation.
B. has $n$ observations from each population.
C. has $n\%$ of the population.
D. has every possible sample of $n$ equally likely.
E. has every possible value equally likely.

13. I want to show that Aggies have higher starting salaries than the rest of the state. Which of the following would help me prove my point?

A. ask only Engineers and Business majors since they usually make more
B. use the mean instead of the median since the data will be skewed to the right
C. compare last May’s class with the data available from 2010
D. select only graduates with a GPR over 3.0
E. All of the above would inflate the average most likely proving my point.

14. Say I wanted to use Euros instead of dollar so I could compare with Europe. Which of the following is true? 1 euro $= 1.35US$ dollars or 1 US dollar $= 0.74$ euros

A. the mean in euros would be 1.36 times the mean in dollars
B. the median would stay the same
C. the standard deviation would stay the same
D. Two of the above are true.
E. None of the above are true.

15. Still talking salaries, who got the better (higher within their major) salary? Jerry is an engineer is making $74K$ where the mean is $68K$ with standard deviation $5K$. Betty is a finance major making $70K$ where the mean is $65K$ with standard deviation $3K$. (I’m just making up these numbers. I don’t know the true ones.)

A. Jerry’s making more, so he got the better deal.
B. Betty’s got the better deal.
C. They’re both above the average, so it doesn’t matter.
D. Jerry’s making more above the mean, so he got the better deal.
E. You can’t compare the different disciplines.

16. Ok, one more. Suzie is an engineer, so she should get offered $68K on average (with standard deviation $= 5K$). How likely is she to get at least $80K$?

A. There’s less than 1% chance.
B. Of course she will, firms are trying to better their male to female ratio.
C. She’s a female. There’s no way she’ll get above the average.
D. There’s a 2.4% chance.
E. There’s a 97.6% chance.
17. The boxplots above represent body temperature for a group of males and females. Which of the following is true about this data?

A. On average, females have a higher body temperature than males.
B. The lower three female body temperatures shouldn’t be outliers since they’re no lower than some of the males.
C. Male body temperature is more consistent than female.
D. All of the above are true.
E. Only two of the above are true.

18. A newspaper takes a list of 1000 people who have subscribed the longest and sends them a questionnaire asking “Given the extremely volatile performance of the stock market as of late, are you willing to invest to save for retirement?” Based on the 50 people who responded, only 10% said yes. Which of the following is true about this survey? It suffers from

A. response bias because of the way the question is worded.
B. non-response bias.
C. undercoverage.
D. sampling design. It’s a volunteer sample, not a random one.
E. All of the above are correct.

19. What is $z^*$ such that $P(-z^* < Z < z^*) = 0.65$ where $Z \sim N(0, 1^2)$?

A. 0.7422
B. 0.39
C. 0.175
D. 0.93
E. 0.57

20. How much does a Double Stuf Oreo weigh? The table above is a supposed distribution of the weights of 79 oreos. Using the Category 1, what is the 5-Number-Summary for this data?

A. 1,5,5,6,10
B. 1,4,5,6,10
C. 0,2,5,5,7,5,10
D. 1,2,5,5,7,5,9
E. 1,4,5,6,9, there’s a category with 0 frequency