1. **Do not open this exam until you are told to do so.**

2. There are 20 multiple-choice questions on this exam, each worth the same amount. Please mark your answers **clearly** on a GRAY Scantron sheet. Multiple marks will be counted wrong.

3. You **must mark** your Scantron form with
   (a) Your NAME and UIN.
   (b) Your correct SECTION (Thursday 11:10 is 507, 12:45 is 508, 2:20 is 509, and 3:55 is 510).
   (c) This test FORM (A, B, C, or D).
   (d) Your Form letter which is above.

4. You will have only 50 minutes to finish this exam.

5. You may use the following:
   (a) One $8\frac{1}{2} \times 11$ formula sheet (both sides) of your own making.
   (b) A copy of the Percent Curve handout.
   (c) A copy of the $Z$ tables.
   (d) A copy of the recap of Week 1 & 2.
   (e) A stand-alone calculator, i.e., one that cannot communicate with the internet or anything outside itself.

6. You must put all possessions besides, the materials listed and your scantron, pencil(s) and eraser, along the walls or at the front of the room out of everyone else’s way. This includes cell phones, which must be turned off.

7. If you have questions, please write out what you are thinking on this test so that we can discuss it after your results are returned to you.

8. 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.

9. When you are finished please make sure you have marked your Section and Form and have an answer for every question, then turn in your scantron and show your ID.

10. Good luck!
1. If $X \sim N(30, 6^2)$, how likely are you to get an observation above 35?

   A. 0.8333  
   B. 0.1667  
   C. 0.97  
   D. 0.7987  
   E. 0.2033

2. Which of the following is true about these boxplots?

   A. They have the same distribution.  
   B. They have the same 5-Number Summary.  
   C. They have the same mean and standard deviation.  
   D. All of the above are correct.  
   E. Only two of the above are true.

3. If we took samples of size 20 from a population of normal data with mean $\mu = 8$ and standard deviation $\sigma = 3$, the distribution of the sample means would

   A. be normal with mean $\mu = 8$ and standard deviation $\sigma = 3$.  
   B. be normal with mean $\mu = 8$ and standard deviation $\sigma = 3/\sqrt{20}$.  
   C. be normal with mean $\mu = 8/\sqrt{20}$ and standard deviation $\sigma = 3/\sqrt{20}$.  
   D. have a mean $\mu = 8$ and standard deviation $\sigma = 3/\sqrt{20}$ but not be quite normal since $n$ is only 20.  
   E. have a mean $\mu = 8$ and standard deviation $\sigma = 3$ but not be quite normal since $n$ is only 20.

4. Jamie and Jo are both in a first semester statistics course, however, Jamie is taking it at Easy U and Jo is at A&M. Jamie made an 80 on the first exam and Jo only got a 75. The mean at Easy U was 82 with $s = 1.25$ and at A&M it was 78 and 2. Who actually had the best performance?

   A. Jamie since 80 is better than 75.  
   B. Jamie  
   C. Jo  
   D. Neither, since both made below average.  
   E. The did relatively the same.

5. Which of the following is/are true?

   A. Normal quantile plots are the only plots in which we can always determine if a distribution is approximately normal.  
   B. Boxplots are the only plots in which we can always determine if there are outliers.  
   C. Stemplots are the only plots in which we can always calculate the mean.  
   D. All of the above are true.  
   E. Only two of the above are true.

6. The 5-Number Summary for ankle length is: 0.5, 7, 9, 10, 20. Which of the following best describes this distribution?

   A. The shape is approximately symmetric and there are 2 outliers.  
   B. The shape is approximately normal and there is at least 1 outlier on each end (min and max).  
   C. The shape must be normal since there is at least 1 outlier on each end (min and max).  
   D. The shape is skewed right since 20 is further from 9 than 0.5 is, i.e., it’s not symmetric.  
   E. There must be an error since no one could have an ankle circumference of a half inch.

7. If we have a distribution with a mean of 60 and a standard deviation of 8, approximately what proportion of the observations will fall between 44 and 68?

   A. 68%  
   B. 81.5%  
   C. 95%  
   D. 70.5%  
   E. We can’t determine it.

8. What can we say about the distribution above?

   A. min is 5, $Q_1$ is 15, $\bar{x}$ is 20, $Q_3$ is 20, max is 25  
   B. min is 5 or 6, $Q_1$ is 15 or 16, $\bar{x}$ is 20 or 21, $Q_3$ is 21 or 22, max is 25 or 26  
   C. min is 5, $Q_1$ is 15, $\bar{x}$ is 20, $Q_3$ is 21, max is 25  
   D. min is 5-7.5, $Q_1$ is 15-17.5, $\bar{x}$ is 20-22.5, $Q_3$ is 20-22.5, max is 25-27.5  
   E. We need the actual values to determine these numbers.
9. Referring to the previous histogram, what would be true if the minimum value was 0, i.e., at least 5 was subtracted from the minimum only?
   A. The mean and standard deviation would be 5 less.
   B. The mean and standard deviation would be smaller.
   C. The mean and median would be smaller.
   D. The standard deviation and IQR would stay the same.
   E. None of the above are correct.

10. Which of the following is an example of a simple random sample?
   A. Using a list of all possible participants, pick a random name in the list and then add a random number to that position to find the next name, add another random number to find the next name, etc. until you have your sample.
   B. Using a list of all possible participants, pick a random name in the list, add a random number to that position to find the next name, continue by adding that same number until you have your sample.
   C. Throw all the names in a hat and draw out the desired number of names.
   D. All of the above are examples of a simple random sample.
   E. None of the above is an example of a simple random sample.

11. Suppose you’re buying long-stemmed roses for Valentine’s Day. The florist claims that the average length of her roses is 18 inches with a standard deviation of 2 inches. If the distribution is actually approximately normal, how likely are you to get a rose no longer than 12 inches?
   A. 0.0013
   B. 0.0026
   C. 0.0087
   D. 0.0074
   E. You’re allergic to roses, so you go buy chocolates instead.

12. The sample size $n$ affects
   A. whether the distribution is normal or not.
   B. whether the distribution (sample) is biased or not.
   C. whether we can use the 68-95-99.7% Rule or not.
   D. All of the above are true.
   E. None of the above are true.

13. Describe the distribution above. ‘sd’ stands for standard deviation
   A. shape = normal, center = 8, sd = 2
   B. shape = normal, center = 8, sd = 6
   C. shape = normal, center = 8, sd = 3
   D. shape = symmetric, center = 8, sd = 6
   E. shape = normal, center = 8, sd can’t be determined

14. The LSAT (the entrance exam for law school) is scored on a scale of 120-180. The average score is about 150, but you should score well over 160 to get into one of the top 25 law schools. If the distribution is approximately normal and the standard deviation for the exam is 6, how likely are you to get into one of the top 25 schools?
   A. You have about a 1.67% chance.
   B. You have about a 4.75% chance.
   C. You have about a 0.675% chance.
   D. You have about a 6.75% chance.
   E. You have about a 47.5% chance.

15. Say we know four Aggies who took the LSAT. How likely is their average score to be over 160?
   A. It will be the same as for one of them.
   B. It will be four times more likely.
   C. It will be four times less likely.
   D. It’ll be half as likely ($\sqrt{4}$).
   E. It’ll be more than 100 times less likely.

16. Still talking about the LSAT, how high must you score to be in the top 15%? Remember the distribution is $N(150, 6^2)$
   A. 150 + 0.15 * 6
   B. 150 + 0.85 * 6
   C. 150 + 1.04 * 6
   D. 150 – 1.04 * 6
   E. 150 + 0.15 * 1.04
17. Given a dataset with 35 observations, what would happen if each was multiplied by 12?
   A. The mean and the median would be 12 times larger.
   B. The standard deviation and range would be 12 times larger.
   C. The IQR would not be larger since $Q_1$ and $Q_3$ would change the same amount.
   D. All of the above are true.
   E. Only two of the above are true.

18. Which of the following is true?
   A. Unbiasedness is more important than a small variance for an estimate (statistic) because it means that we’re at least on target.
   B. Minimum variance is more important than unbiasedness because, no matter what, we’ll be ‘close’ to the correct number.
   C. As long as we take a large enough sample, it doesn’t matter if we have an unbiased estimate.
   D. As long as we take a random sample, we will have an unbiased estimate.
   E. None of the above are true.

Frequency table results for Size:

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19. What is the correct 5-Number Summary for the data in the table above?
   A. 1, 7, 13.5, 20, 26
   B. 0.0385, 0.3846, 0.5384, 0.8076, 0.9999
   C. 6.625, 6.875, 7.125, 7.375, 7.625
   D. 6.625, 6.8625, 7.1, 7.375, 7.625
   E. 6.625, 7, 7.125, 7.375, 7.625

20. This is in the notes, but we didn’t talk about it. What is $z^*$ such that $P(-z^* < Z < z^*) = 0.65$ and $Z \sim N(0, 1^2)$
   A. 0.385
   B. 0.3711
   C. 0.7422
   D. 0.935
   E. 0.6368

1E,2B,3B,4C,5C,6E,7E,8D,9E,10A,11A,  
12E,13A,14B,15E,16C,17E,18E,19E,20D