

### Session 4: Post Class Test

1. Looking at annual returns on real estate from 1928 to 2020, and breaking those returns down into classes, I have the following table:

Annual Return	Number of years
<-10%	2
-10% to -5%	3
-5% to 0%	10
0% to 5%	42
5% to 10%	22
10% to 15%	10
15% to 20%	2
>20%	2

- a. Draw a histogram of real estate annual returns from 1928 -2020
  - b. What can you learn about the data (central values, symmetry, tails) from this histogram?
2. The normal distribution remains the workhorse in statistical analysis. What of the following is true for normal distributions?
- a. The average of the data is equal to the median
  - b. 95% of the sample observations fall within two standard deviations of the average.
  - c. The skewness in the distribution is zero.
  - d. The kurtosis (fatness of tails) of the distribution is three.
  - e. All of the above
3. There are at least three other symmetric distributions in statistics that are alternatives to the normal distribution, the t distribution, the triangular distribution, and the uniform distribution. Assuming that you have data that is symmetric:
- a. When would you use a t distribution instead of a normal distribution?
  - b. When does a triangular distribution make sense instead of a normal distribution?
  - c. When would you use a uniform distribution instead of a normal distribution?
4. Assume that you are using a normal distribution on data that has much fatter tails, albeit symmetric, than allowed by a normal distribution. Which of the following would you expect to see in your sample data?
- a. The average will be skewed upwards by the fat tails
  - b. The average will be skewed downwards by the fat tails
  - c. The range on the distribution will be larger than you would expect to see in a normal distribution.
  - d. There will be more extreme outliers (data that is more than two or three standard deviations from the average) than you would expect to see in a normal distribution.
  - e. There will be fewer extreme outliers (data that is more than two or three standard deviations from the average) than you would expect to see in a normal distribution.
5. A lognormal distribution has an expected value, a standard deviation, and positive skewness. What is the relationship between the distribution's expected value, standard deviation and skewness?
- a. There is no link between the standard deviation and the skewness.
  - b. As the standard deviation goes up, the skewness will become more positive.
  - c. As the standard deviation goes down, the skewness will become more positive.

- d. As the expected value goes up, the skewness will become more positive.
- e. As the expected value goes down, the skewness will become more positive.