GSBA 545 MSBA Quiz 1 Practice

For questions 1 – 3. Marshall Farms is a family-owned business with a land mass of 100km^2. The season is beginning, and the family head, Andrew, has a critical decision to make: to cultivate soybeans or rice. He tasked his eldest son, Andrew Jr (AJ), to gather some data on expected returns and variability of each crop under different scenarios.

- AJ estimates that if there is enough rain (which has a probability of 0.6), the return on soybeans could be as high as 20%. However, in case of low rain (which has a probability of 0.4), the return could be as low as 5%.
- In case of enough rain, the return on rice could be only 15%, whereas in the case of low rain (better for rice), the return could be 25%. [The expected return on rice is 19% and the standard deviation is 4.90%.]

1. What is the expected value for the returns on the *soybean* crop?
   a) 7.35% b) 12.5% c) 14% d) 50% e) 60%

2. What is the standard deviation of returns for the *soybean* crop?
   a) 7.5% b) 7.35% c) 14% d) 54% e) Cannot be determined.

3. Which crop is *relatively* less risky and why?
   a) The rice crop because its coefficient of variation is 0.258.
   b) The soybean crop because it has a lower mean.
   c) The rice crop because it has a lower standard deviation.
   d) The soybean crop because its coefficient of variation is 0.525.
   e) The soybean crop because its coefficient of variation is 1.905.

4. Which of the following graphs is for qualitative data?
   a) Histogram b) Bar Chart c) Time series plot d) Stem and leaf e) Scatterplot

5. The average lateness for one of the top airline companies is 10 minutes. The standard deviation of the lateness measure is calculated as 3. An airplane arrived 8.5 minutes after the stated arrival time. Calculate the Z-score for this particular airplane's lateness.
   a) –0.500 b) 0.500 c) –0.167 d) 0.167 e) 0.309

6. The price-to-earning ratio for firms in a given industry is distributed according to normal distribution. In this industry, a firm with a standard normal variable value of Z = 1:
   a) Has an above average price-to-earning ratio.
   b) Has a below average price-to-earnings ratio.
   c) Has an average price-to-earnings ratio.
   d) May have an above average or below average price-to-earnings ratio.
   e) Should hurry up and file for bankruptcy.

7. If a population distribution of income is skewed to the right, then, given a random sample from that population, one would expect that the
   a) median would be greater than the mean.
   b) mode would be equal to the mean.
   c) median would be less than the mean.
   d) median would be equal to the mean.
   e) Some people are just making way too much money.

8. Find the z-score for a IQ test score of 142 when the mean is 100 and the standard deviation is 15.
   a) 42 b) 2.8 c) 18.78 d) 1.27 e) -2.8

For questions 9 – 10. The average time a subscriber spends reading the local newspaper is 49 minutes. Assume the standard deviation is 16 minutes and that the times are normally distributed.

9. For the 10% who spend the least time reading the paper, how many minutes do they spend?
   a) 28.52 b) 46.51 c) 51.49 d) 53.00 e) 69.48

10. Complete the following statement: Only 20% of the individuals read for more than _____ minutes.
   a) 36.72 b) 23.28 c) 25.84 d) 35.56 e) 62.44

For questions 11 – 15. Suppose customers arrive to a food truck in accordance with a Poisson process with rate 19 per hour. Suppose one crepe takes you exactly three minutes to make, and that customers are served in the order they arrive.

11. What distribution is appropriate for understanding the amount of time between customers arriving to the food truck and what is the parameter value for that distribution?
   a) Normal b) Uniform c) Exponential d) Binomial e) Discrete

12. What is the expected amount of time between customer arrivals?
   a) 19 mins b) 3 mins c) 3.158 mins d) 0.3167 mins e) 2 mins

13. What is the standard deviation of waiting times?
   a) 19 mins b) 3 mins c) 3.158 mins d) 0.3167 mins e) 2 mins

14. What Excel formula should you use to calculate the probability there will be less than 3 minutes between customers?
   a) EXPON.DIST(3,0.317,1) b) EXPON.DIST(3,0.317,0) c) EXPON.DIST(3,3.158,1)
   d) POISSON.DIST(3,3.158,1) e) POISSON.DIST(3,0.317,0)

15. What Excel formula should you use to calculate the probability more than 24 customers arrive in an hour?
   a) 1 – EXPON.DIST(24,3.158,1) b) POISSON.DIST(24,0.317,1)
   c) 1 – POISSON.DIST(24,3.158,0) d) 1 – POISSON.DIST(24,19,1)
   e) POISSON.DIST(24,3.158,1)

For questions 16 – 18. In a small city, the number of automobile accidents occur with a Poisson distribution at an average of three per week.

16. What is the expected number of days between accidents?
   a) $2\frac{1}{3}$ days b) 3 days c) $\frac{1}{3}$ days d) $\frac{1}{9}$ days e) 1 day

17. What Excel formula should you use to calculate the probability that there are at most 2 accidents occur in any given week?
   a) POISSON.DIST(2, 2.33, 1) b) EXPON.DIST(2, 3, 1) c) 1 – EXPON.DIST(1, 2.33, 1)
   d) POISSON.DIST(2, 3, 1) e) 1 – POISSON.DIST(1, 3, 1)

18. What Excel formulation is appropriate to calculate the probability that there is at least two weeks between any 2 accidents?

a) 1 – EXPON.DIST(2, 3, 1) b) EXPON.DIST(2, 3, 1) c) 1 – POISSON.DIST(1, 3, 1)
d) 1 – EXPON.DIST(2, 0.4286, 1) e) 1 – POISSON.DIST(14, 0.4286, 1)

For questions 19 – 21. Ace Heating and Air Conditioning Service finds that the amount of time a repairman needs to fix a furnace is uniformly distributed between 1.5 and four hours.

19. What are the mean and standard deviation of the repair times?

a) $\mu = 2.75$ and $\sigma = 0.7217$ b) $\mu = 2.75$ and $\sigma = 0.5208$ c) $\mu = 1.25$ and $\sigma = 0.7217$
d) $\mu = 1.25$ and $\sigma = 0.5208$ e) $\mu = 2.75$ and $\sigma = 0.2083$

20. Find the probability that a randomly selected furnace repair requires more than two hours.

a) 0.80 b) 0.20 c) –0.80 d) 0.33 e) 0.75

21. The longest 25 percent of furnace repair times take at least how long? (In other words: find the minimum time for the longest 25 percent of repair times.)

a) 3.375 hrs b) 0.75 hrs c) 0.625 hrs d) 1.875 hrs e) 4 hrs