

Question # 1 (15 marks)

Many people today rely on the use of GPS's to navigate where they are going. It has become so popular that the need for physical maps is almost non-existent. GPS devices are being used for personal, business, government and military applications more so today than ever before. A local delivery company is considering equipping their fleet with GPS devices to improve efficiency and reduce costs. One of the major concerns of the delivery company is which GPS brand they want to purchase (Brand 1 or Brand 2). There are two popular brands on the market that can be fitted to their fleet measuring not only location but also the speed of the vehicle and idle time. The first performance measure the company will focus on in evaluating the two brands is the speed rating of the two GPS devices they are considering. Speed is measured by how quickly the GPS device transfers data to their corporate office (measured in seconds). The speed of Brand 1 is normally distributed with a mean of 49 seconds and a standard deviation of 10 seconds. The speed of Brand 2 is normally distributed with a mean of 45 seconds and a standard deviation of 11 seconds.

- A) Find the probability that Brand 2 will have a speed over 43 seconds.
- B) What is the probability that Brand 1 will have a speed of 48 seconds?
- C) Find the probability that the average of 9 randomly selected Brand 2 GPS devices, will have a speed less than 49 seconds but greater than 44 seconds.
- D) Find the probability that 5 randomly selected Brand 1 GPS devices will have a speed of more than 43 seconds.
- E) What is the probability that the average speed of Brand 1 GPS devices will exceed the average speed of Brand 2 GPS devices? n of Brand 1 = 15, n of Brand 2 = 20.
- F) The company that manufactures Brand 2 GPS devices claims that their GPS is so fast it is in the top 2.5% of the population. Find the minimum speed needed to be in the top 2.5%.

Question # 2 (15 marks)

Fraud online is a growing concern for many ecommerce storefronts. It has become such an issue for these businesses that they have started to use third-party companies to identify fraud on their online stores. One such company is called RiskPlus. RiskPlus claims that based on their experiences, the probability a transaction is fraudulent is 15%.

- A) 15 online transactions have been randomly selected. What is the probability that 3 of these transactions are fraudulent?
- B) 15 online transactions have been randomly selected. What is the probability that more than 5 of these transactions will be fraudulent?
- C) What is the expected number of fraudulent transaction?
- D) What is the standard deviation of fraudulent transactions?
- E) 3 online transactions have been randomly selected. What is the probability that exactly 2 of these transactions are fraudulent?

Question # 1 (Answer Key)

1A	0.5714
1B	0
1C	0.4685
1D	0.2013
1E	0.8686
1F	66.56

Question # 2 (Answer Key)

2A	0.2184
2B	0.0168
2C	2.25
2D	1.3829
2E	0.0574