HW 4
EAS 595 – Fall 2018
Due Friday November 16 (9am)
Submission through UBLearn

1-A cargo van can transport a maximum of 3900 lbs payload. Suppose a customer asks you to transport 40 boxes. From previous experiences working with this customer, you know that the weight of boxes follows a distribution with a mean $\mu = 97$ lbs and standard deviation $\sigma = 5$ lbs.

a. What is the probability that you can transport all the boxes with this cargo van?

2-From past experience, it is known that the time of completion of a manual assembly of product A follows a distribution with a mean $\mu = 2.4$ days and standard deviation of $\sigma = 2.0$ days. You have received an order for 100 items of Product A. You will make $10,000 profit if the order is completed in less than 200 days, $6,000 if it is completed between 200 and 250 days and you will loss $4,000 if it takes more than 400 days to complete the order.

a.What is the expected value of your profit/loss?

3-You have designed a classifier that provides an average accuracy of 80% with a standard deviation of 16% when it is tested against 100 samples.

a. What is the probability that the classifiers accuracy will be in the interval of (79, 81)?

b. Calculate the 95% confidence interval.

4-The amount of regular unleaded gasoline purchased every week at a gas station follows the normal distribution with mean 50000 gallons and standard deviation 10000 gallons. The starting supply of gasoline is 74000 gallons, and there is a scheduled weekly delivery of 47000 gallons.

a. Find the probability that, after 11 weeks, the supply of gasoline will be below 20000 gallons.
b. How much should the weekly delivery be so that after 11 weeks the probability that the supply is below 20000 gallons is only 0.5%?

5-A very volatile stock rises 70% or drops 50% in price, with equal probabilities and with different days independent. Suppose a hedge fund manager always invests half of her current fortune into the stock each day. Let Yn be her fortune after n days, starting from an initial fortune of $Y0 = 100$.

What happens to Yn as $n \rightarrow \infty$?