Statistical Analysis Week 1 Homework

Please use proportions (decimals) and round to **4 decimals** places for your final answer. Show all your work for full credit. **Please turn in your homework by the beginning of class on Fridays**.

1. (8 pts) Results from a research trial found that surgery for a painful shoulder condition resulted in reduced pain and better physical function than treatment with just physical therapy. Researchers followed 803 patients, of whom 398 ended up getting surgery. After two years, of those who had surgery, 63% percent said they had a major improvement in their condition, compared with 29% among those who received nonsurgical treatment.
    a. What is the probability that a patient had surgery and experienced a major improvement in his or her condition?
    b. What is the probability that a patient received nonsurgical treatment and experience a major improvement in his or her condition?
    c. How would you utilize this information (from part a and b) to develop a marketing campaign for the surgical center performing the surgeries?

2. (8 pts) Suppose that 45 percent of a company's batteries are manufactured in Factory A, while 55 percent are manufactured in Factory B. The defect rates for the two factories are 35 percent for Factory A and 25 percent for Factory B. Suppose that we have a defective battery.
    a. Find the probability that the defective battery was manufactured by Factory A.
    b. Find the probability that the defective battery was manufactured by Factory B.
    c. You are an advisor for the company, and they have asked you to recommend which factory they should purchase their batteries from in the future, what factory would you recommend?
    d. Why?

3. (4 pts) Your marketing firm has 12 possible campaigns to deploy to customers, but you are only allowed to deploy 5 marketing campaign during the first quarter. How many possible combinations of the 12 campaigns are there for you to choose from?

4. (6 pts) There are three empty seats at a concert, but ten people showed up to try to get one of those three seats. If three people are picked at random to get the last three seats, what is the probability you and your two friends will get the tickets?