Instructions:
Write the answers and show all your work in the blue books. There are 5 problems. Make sure you do all 5.

Problem 1. (2 points) An engineer made three measurements of a voltage, obtaining 3 slightly different measurements due to random error. He found $\bar{x} = 10.5$ V and $s = 0.1$ V for the mean and standard deviation of his sample of $n = 3$ measurements. Afterwards, he noticed that the voltmeter did not "zero out," i.e., all of his measurements were 5 volts too high. If the data were adjusted by subtracting 5 volts from each measurement, what would be the corrected values of $\bar{x}$ and $s$?

Problem 2. (5 points) Make a stem and leaf diagram of the following data. Find the median. Do the data appear to be normal? (Be sure to explain what normal means.)

6.2, 11.5, 8.6, 10.9, 4.1, 7.2, 12.2, 8.4, 7.9, 9.1, 10.0, 11.6, 8.2, 10.2, 9.6, 8.2, 11.1, 11.3, 10.4, 6.2, 6.7, 9.4, 9.9, 8.6, 8.5 (1)

Problem 3. (6 points) The men’s cross country coach knows that only about 60% of his team will train over the summer. The coach also knows that if a runner does not train, he will get sick after the first race with probability 0.8. If he trains, he will be sick anyway with probability 0.2.

a. What is the probability that a randomly chosen runner will be sick after the first race?

b. If a runner is sick, what is the probability he did not train?

Problem 4. (6 points) Let $A$ and $B$ be two events such that $P(A) = 0.2$ and $P(B) = 0.7$. Find $P(A^cB^c)$ if the events are

a. disjoint (note: $A^c$ and $B^c$ are not disjoint,) and

b. independent.
Problem 5. (4 points) An urn contains 10 black and 10 white balls. A random sample of size 3 is withdrawn. What is the probability all 3 balls have the same color, if the sampling is done

a. without replacement, and,

b. with replacement.