Math 10 – Independence/Bayesian Statistics **gw8 answers**

1. A poll of American registered voters was taken by Politico/Morning Consult in November, 2017 after the Las Vegas mass shooting, in which 58 concertgoers were murdered by a single gunman. The poll asked the question, "Do you support or oppose stricter gun laws in the United States? The results of the poll, cross-tabulated by gender, are shown in the contingency table.

	Strong Support	Somewhat Support	Somewhat Oppose	Strong Oppose	Don't Know	Total
Male	350	208	127	191	54	930
Female	476	250	130	136	73	1065
Total	826	458	257	327	127	1995

   a. Combine the strong and somewhat groups for both support and oppose, and fill in the missing boxes.

	Support	Oppose	Don't Know	**Total**
Male	558	318	54	930
Female	726	266	73	1065
Total	1284	584	127	1995

   b. What percentage of all registered voters support (strong or somewhat) stricter gun laws?

      1284/1995 = 0.643 or 64.3%

   c. What percentage of males support (strong or somewhat) stricter gun laws?

      558/930 = 0.60 or 60%

   d. What percentage of females support (strong or somewhat) stricter gun laws?

      726/1065 = 0.682 or 68.2%

   e. Are gender and support of stricter gun laws independent events? Explain

      They are dependent events since P(Support) ≠ P(Support|Male) and P(Support) ≠ P(Support|Female)

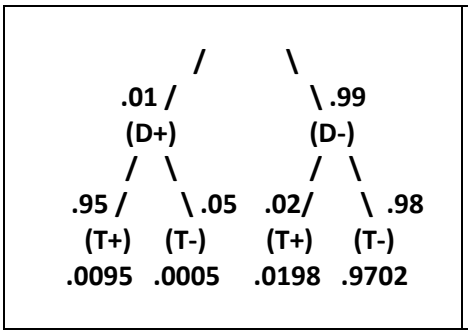
2. The probability a student arrives late to class is 20% on Monday and 10% on Tuesday. Assume being late on these days are independent events.
    a. Find the probability the student is late both Monday and Tuesday.

        (.2)(.1)=.02=2%

    b. Find the probability the student is late either Monday or Tuesday (or both days).
        .2+.1-.02=.28 = 28%

3. 1% of the population of a country has disease X. A test for the disease has been developed that has a 95% of correctly detecting the disease (true positive). However, the test will come out positive in 2% of people who do not have disease X (false positive).

    a. Construct a tree diagram where the first set of branches are people with and without the disease, and the 2nd set is whether or not they test positive.
    b. From the tree diagram create a contingency table.



	T+	T-	total
D+	95	5	100
D-	198	9702	9900
total	293	9707	10000

P(D+|T+) = 95/293=32.4%

    c. What percentage of the population will test positive for disease X? **2.93%**
    d. If a person tests positive, what is the probability that the person really has disease X?
        .0095/.0293=32.4%