**HW 5 - Using Tree Diagrams Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*1. An airline offers discounted tickets to customers who buy tickets early (more than 30 days ahead of time). The company has noticed that 60% of its customers take advantage of the “early-bird” fares, while 25% purchase regular fares, and 15% are “last-minute” customers (less than 48 hours before the flight). They have also figured out that the no-show rate among “early-bird” purchasers is 30%, and only 8% among regular fare customers, and 2% among last-minute customers.*a) Create a tree diagram of this situation:

b) What is the probability of being a no-show (overall)?

c) What is the probability of being a no-show AND a last minute customer?

d) What is the probability of being a no-show AND an early-bird customer?

e) Given that you have a no-show in a certain seat, what is the probability of that person being a last-minute customer?

f) Given that you have a no-show in a certain seat, what is the probability of that person being a regular-fare customer?

g) Given that you have a person show up for a certain seat, what is the probability of that person being an early-bird customer?

*2. A cancer clinic gives free cancer test. It is known that 2% of the people that come into the clinic have cancer. It is known the test comes up positive in 98% of people with cancer; it is known the test comes up positive in 3% of people without cancer.*

a) Create the tree diagram:

b) What is the probability that someone tests positive given that they have cancer?

c) What is the probability that someone tests positive given that they don’t have cancer?

d) What is the probability that someone tests negative given that they have cancer?

e) What is the probability that someone tests negative given that they don’t have cancer?

f) What is the probability that someone tests positive? Negative?

g) What is the probability that someone has cancer given that they test positive? *(This is called the accuracy of the test)*

h)What is the probability that someone doesn’t have cancer given that they test positive? *(this is called a false positive)*

i) What is the probability that someone has cancer given that they test negative?

*3. There are 2 textbook making companies, A and B. It is known that 1% of company A’s books are defective. It is known that 2% of company B’s books are defective. CB South gets 38% of its books from company A and the rest from company B. Make the tree diagram below, then answer the questions:*

a) What is the probability that a book is NOT defective?

b) If a book is not defective, what’s the probability that it came from company B?

c) If we open a book and it **IS** defective, what’s the probability that is from company A?

d) If we open a book and it **IS** defective, what’s the probability that is from company B?

*4. A VCR manufacturer receives 70% of its parts from factory A and the rest from factory B. Suppose that 3% of the output from A are defective, while only 2% of the output from B are defective.*

1. What is the probability that a received part is defective?
2. If a randomly chosen part is defective, what is the probability that it came from factor A? From factory B?

*5. A particular football team Is known to run 30% of its plays to the left and 70% to the right. A linebacker on an opposing team notes that the right guard shifts his stance most of the time (80%) when plays go to the right and that he uses a balanced stance the rest of the time. When plays go left, the guard takes a balanced stance 90% of the time and the shift stance the remaining 10%. What is the probability that a play will go to the left if the guard is balanced?*

*6. Ninety percent of the insulators produced by a company are satisfactory. The company hires an inspector. The inspector checks all the insulators and correctly classifies an item 95% of the time. Items classified as good are shipped and those classified defective are scrapped.*

1. What percentage of items will be classified as good?
2. What percentage of items *shipped* can be expected to be good?

*7. When the male students at Middle Creek HS were asked, 50% said they do not date someone from Middle Creek. When the female students were asked, 40% said they do not date someone from*

*Middle Creek. The male students at Middle Creek make up 52% of the school population. What is the probability that a randomly selected student*

 a. does not date someone from Middle Creek?

 b. is female and does not date someone from Middle Creek?

 c. is a male given they date someone from Middle Creek?

*8. A survey of FVHS students found that 36% said that they would be interested in going to Jupiter. Of those who wanted to go to Jupiter, 60% were not seniors. Of those who did not want to go to Jupiter, 30% were seniors. What is the probability that a randomly selected*

 a. Student wanted to go to Jupiter?

b. Student was a senior and wanted to go to Jupiter?

 c. Student was a senior?

 d. Student didn’t want to go to Jupiter given that he was a senior?