Stat 2470, 1/20 Discussion Questions　　　　Name ____________________

Instructions: Attempt to answer these questions by reading the textbook or with online resources before coming to class on the date above.

1. What is the notation for a conditional probability? How would you describe when a conditional probability should be used in your own words?

probability of A given B = $P(A|B)$

if I know B is true, what is the probability of A in this circumstance?

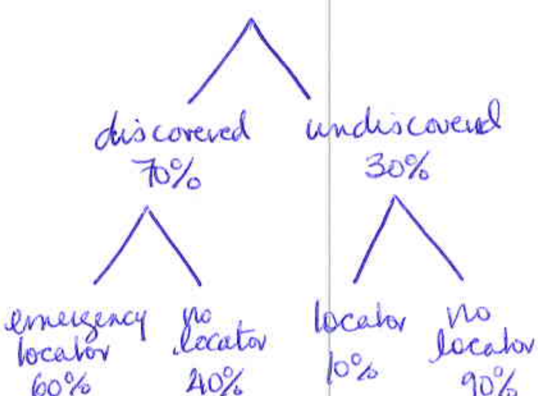
2. What is the formula for calculating a conditional probability from the intersection?

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

3. What is Bayes' Theorem?

$$P(A_j|B) = \frac{P(A_j \cap B)}{P(B)} = \frac{P(B|A_j) \cdot P(A_j)}{\sum_{i=1}^{k} P(B|A_i) \cdot P(A_i)} \qquad j = 1, \ldots k$$

4. Work through problem ~~#55~~ #60 in Section 2.4. Build a tree diagram to help you answer this question.



part a $\dfrac{.3 * .10}{.70 * .6 + * .3 * .10} = .0\overline{6}$ or 6.7%

part b $\dfrac{.7 * .4}{.70 * .4 + .3 * .9} = .\overline{509}$ or 51%

5. What is the definition of two events that are independent? In notation, and in your own words.

two events are independent if $P(A|B) = P(A)$
which is to say knowing that B has happened does not give us any new information about A happening (not more or less likely than before)

6. When can the multiplication rule for the intersection be used?

when A & B are independent

$$P(A \cap B) = P(A) \cdot P(B)$$

7. Describe three events that are mutually independent.

Coin tosses, die rolling, pulling a card from a deck

8. Can you think of three events, two of which are independent but one of which is dependent on both the others?

toss a coin; select a card from a well-shuffled deck; w/o replacing first card, select another card.

complementary events are always dependent