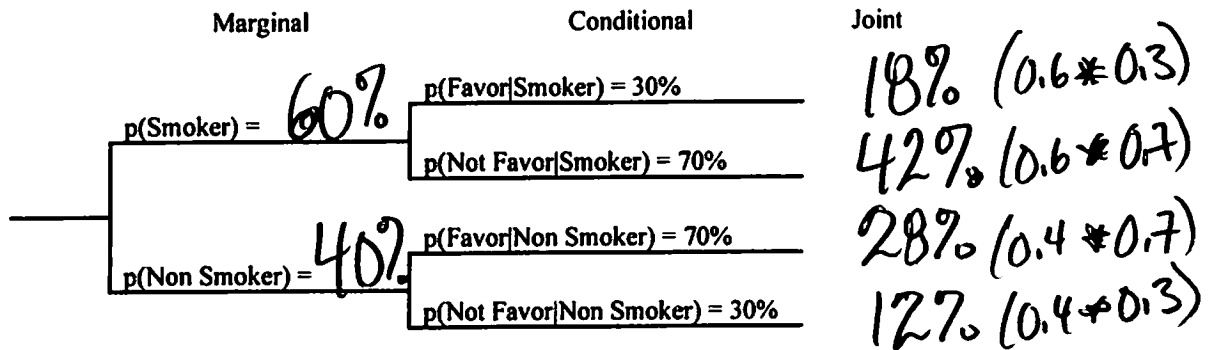


Quiz #1E

Please complete the following exam. Read all instructions carefully and answer each question asked. Calculations and notation are important but so are explanations and dialogue.

1. For the safety and health reasons, Japan Airliner Company is considering moving all flights to nonsmoking flights. However, the Board of Directors is going to take a vote and most of them are smokers. The Board of Directors consists of 40% nonsmokers and 60% of smokers. 70% of the nonsmokers and 30% of the smokers favor the nonsmoking policy (i.e., given a nonsmoker there is a 70% chance that they favor the nonsmoking policy and given a smoker there is a 30% chance that they favor the nonsmoking policy).

- a. Finish the probability tree that has been started



- b. Construct a probability table for this problem.

	FAVOR	NON FAVOR	
S	18%	42%	60%
NS	28%	12%	40%
	46%	54%	

- c. What is the percentage that is in favor of the policy?

$P(\text{FAVOR}) = 46\%$ from table

46% FAVOR
the Policy

- d. Determine the probability of a nonsmoker voting in favor of the nonsmoking policy (i.e., $p(\text{nonsmoker AND in favor of nonsmoking policy})$).

$P(\text{NS \& FAVOR}) = 28\%$ from table

28% ARE NONSMOKERS
& FAVOR THE
Policy

- e. Determine the probability given that a Board of Director member opposes the nonsmoking policy that that Board of Director member is a nonsmoker.

Need to use BAYES

$$P(\text{NS} | \text{NF}) = \frac{P(\text{NS \& NonFavor})}{P(\text{NON FAVOR})} = \frac{12\%}{54\%} \approx 22\%$$

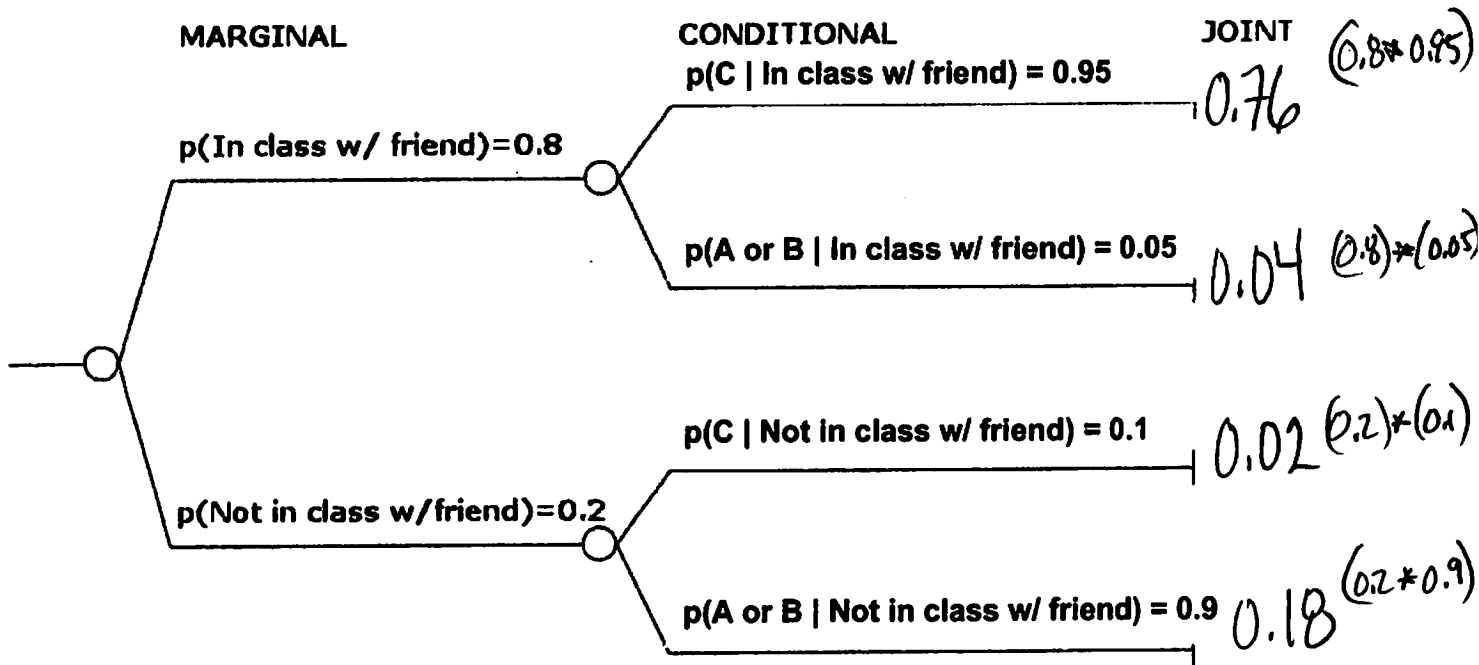
GIVEN A BOARD
MEMBER OPPOSES
POLICY, THE
PROB. THAT
THEY ARE A NONSMOKER
IS 22%

Quiz #1E

Please complete the following exam. Read all instructions carefully and answer each question asked. Calculations and notation are important but so are explanations and dialogue.

2. Jane knows that there is an 80% chance she will be in class with her best friend and a 20% chance that she will not be in class with her best friend. Given that she is in class with her best friend there is a 95% chance she will only get a C in the course. Likewise, given she is in class with her best friend there is a 5% chance she will get an A or B in the course. On the other hand, given she is not in class with her best friend there is a 90% chance that she will receive an A or B in the course. Likewise, given she is not in class with her best friend, there is a 10% chance she will receive a C in the course.

a. From this data finish the probability tree



b. Construct a probability table for this problem

	A or B	C	
In CLASS	0.04	0.76	0.80
Not In CLASS	0.18	0.02	0.20
	0.22	0.78	

c. From your probability table, determine the following probabilities:

- 1) The probability of being in class with her best friend given that she received an A or B?
- 2) What percentage of the time does Jane receive an A or B?

1) USE Bayes Rule $P(\text{In Class} | A \text{ or } B) = \frac{P(\text{In Class} \cap A \text{ or } B)}{P(A \text{ or } B)} \approx \frac{0.04}{0.22} \approx 18.2\%$
 % ABOUT 18.2% OF THE TIME GIVEN JANE GOT AN A OR B SHE WAS IN CLASS W/ FRIEND

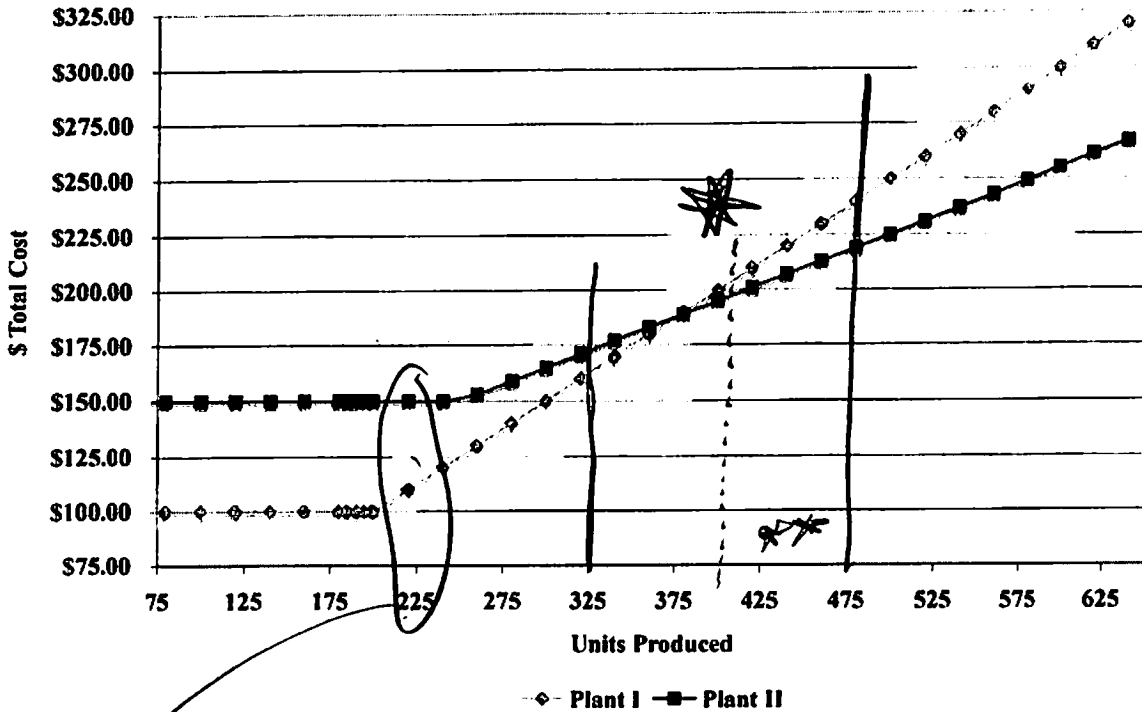
2) MARGINAL PROB FROM TABLE $P(A \text{ or } B) \approx 22\%$
 22% OF THE TIME JANE GETS AN A OR B

Quiz #1E

Please complete the following exam. Read all instructions carefully and answer each question asked. Calculations and notation are important but so are explanations and dialogue.

3. Given the following cost-volume break-even graph discuss the following:

Cost Volume Break-Even Plant I and Plant II



- a. Jimmy's boss wants to know which plant to buy from if they plan on using around 225 units on average. What plant would you recommend to Jimmy and his boss? Explain why you chose your answer.

*The lowest cost plant @ 225 units is Plant I.
 We can see this from the graph.*

- b. Jimmy's boss now informs him the number of units they plan on using has changed and it could be as high as 475 or as low as 325. What plant should Jimmy suggest the company buy from? Explain why you chose your answer.

*Now we are looking @ a range from 325 to 475.
 The crossover pt. lies a bit to left of the range.
 ∴ Plant II could be a lower cost plant on average.*

- c. Jimmy believes his boss numbers of units they will use, 325 to 475, but he knows his boss always under-compensates and the boss' estimates of the low number is usually not enough (i.e., 325 is more like 400). What do you recommend to Jimmy now? Explain why you chose your answer.

In this case Plant II is the lower cost plant over the entire range (400 to 475). Therefore choose Plant II.