Consider Exercise 3.52

Recall that in this exercise 358 abortion providers were classified according to case load (< 50 or >= 50) and whether their patients were permitted to take the prescribed drug at home or were required to take the drug in the abortion facility (yes or no). We were given data in a table like the one below.

	Number of Abortions		
Permit Drug at Home	Fewer than 50	50 or More	Totals
Yes	170	130	300
No	48	10	58
Totals	218	140	358

We define two events as follows:

H = the event that drug use is permitted at home
F = the event that fewer than 50 abortions are performed

Calculate the following probabilities:

***P*(H) = ______ ;   *P*(F) = ______ ;   *P*(H ∩ F) = *P*(F ∩ H) = ______**

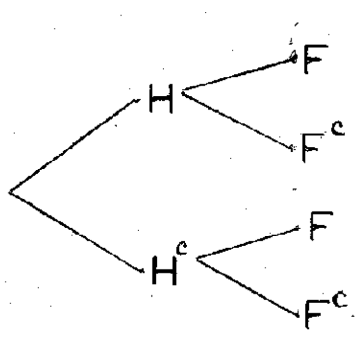
By Definition 3.8, events F and H are not *mutually exclusive* because ______________________.

We now calculate the following conditional probabilities.

The probability of F given H, denoted by *P*(F | H), is _____ . We could use the conditional probability formula on page 138 of our text. Note that P(F | H^C) = ______

Comparing *P*(F), *P*(F | H) and *P*(F | H^C) we note that the occurrence or nonoccurrence of H affects the probability that F will occur. By Definition 3.9, events F and H are said to be *dependent* events because _________________________.

We illustrate this situation with a tree diagram.



P(H ∩ F) = _______

P(H ∩ F^C) = _______

P(H^C ∩ F) = _______

P(H^C ∩ F^C) = _______

We note some more conditional probabilities.

***P*(F^C | H) = _____________**

P(F^C | H^C) = ___________

We now consider another example.

Suppose an experiment consists of tossing a fair die twice and observing the number of dots on the uppermost face. If one or two dots appear on a toss we will call the result a success and denote that result with an "S." Otherwise we will call the result a failure and denote that result with an "F." We will represent our sample space $\mathcal{S}$ as follows:

$$\mathcal{S} = \{ SS, SF, FS, FF \}$$

Associate probabilities to sample points .

Sample Point	Probability
SS	
SF	
FS	
FF	

Consider the events

A: { A success occurs on the first toss }

B: {A success occurs on the second toss}

As with the previous example, we can represent this situation with a tree diagram.

Calculate the following probabilities and assign appropriate weights on the branches and paths.

$P(A)$ = _____ $P(B)$ = _____ $P(A \cap B)$ = _____ $P(B \mid A)$ = _____ $P(B \mid A^C)$ = _____

$P(A^C)$ = _____ $P(B^C)$ = _____ $P(B^C \mid A)$ = _____ $P(B^C \mid A^C)$ = _____

Comparing P(B), P(B | A) and P(B | A^C) we note that the occurrence or nonoccurrence of A does not affect the probability that B will occur. By Definition 3.9, events B and A are said to be *independent* events because __________________________.