Using tables for solving conditional probability problems

1) Page 563 #23

Let *D* be the event that a child dies by age 10 and let *C* be the event that a child is from a consanguineous marriage. We are given $P(C)=0.50, P(D \text{ given } C')=0.16, \text{ and } P(D \text{ given } C)=0.21$. The four joint probabilities $P(D\cap C), P(D'\cap C), P(D\cap C'), \text{ and } P(D'\cap C')$ are in the table below. Those numbers are used to find $P(D) \text{ and } P(D')$.

Events	D	D'	Totals
C	$0.105\ (.21)(.50)$	$0.395\ (0.500-.105)$	$0.50=P(C)$
C'	$0.080\ (.08)(.50)$	$0.420\ (0.500-0.080)$	$0.50=P(C')\ (1-0.50)$
Totals	$0.185=P(D)$	$0.815=P(D)\ (1-0.185)$	1.00

All the probabilities in the table result from the compliment rule and multiplication rule.

a) We are asked for $P(D')$. $P(D')=0.815$, the total of the probabilities of the second column.

b) We are asked for $P(D'|C)=P(D' \text{ given } C)$. $P(D'|C)=\dfrac{P(D'\cap C)}{P(C)}=\dfrac{0.395}{0.500}=0.790$

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2) Page 569, Example Two

The table of the joint probabilities and totals is below.

Events	E	E'	Totals
F_1	0.3741	0.0559	0.43
F_2	0.0960	0.1440	0.24
F_3	0.2904	0.0396	0.33
Totals	0.7605	0.2395	1.00

As in the previous problem, each cell is a joint probability or simple probability and the multiplication and compliment rules were used to find them.

We are asked for $P(\text{married given has 1 or more children})=P(F_1|E)$.

$$P(F_1|E)=\frac{P(F_1\cap E)}{P(E)}=\frac{.3741}{.7605}=.491913\approx .4919$$