

Conditional Probability

Reading

Section

Practice Problems

2.6 (Page 116) 2.6.2

Notes

Marginal and Joint Probabilities

TODO Work in progress

Health	poor	fair	good	very good	excellent	Total
Female	394	1135	2953	3590	2359	10431
Male	283	884	2722	3382	2298	9569
Total	677	2019	5675	6972	4657	20000

Health	poor	fair	good	very good	excellent	Total
Female	0.01970	0.05675	0.14765	0.17950	0.11795	0.52155
Male	0.01415	0.04420	0.13610	0.16910	0.11490	0.47845
Total	0.03385	0.10095	0.28375	0.34860	0.23285	1.00000

Conditional Probability

The probability of an event *given another event* is called **conditional probability**. It is one of the hardest concepts to master.

$P(A|B)$ is the probability of A occurring, given that B does occur.

Think of it as “restricting the sample space”: Only outcomes in B matter; how many of those are also in A ?

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

Example: In the case of the 5-sided die, let us compute $P(A|B)$.

In words this says: Given the number is at least 4, what are the chances the number is even?

It will be: $\frac{P(4)}{P(4 \text{ or } 5)} = \frac{1/5}{2/5} = 1/2$.

Notice the difference between $P(A)$ and $P(A|B)$!!!