

Transcript

Live Video – General Multiplication Rule

01. 00:00 / 00:07 - So our general multiplication rule, this is useful in certain circumstances. Not tremendously
02. 00:08 / 00:12 - useful in the kinds of the problems we've been looking at today with data. But it basically
03. 00:12 / 00:18 - says that if I need to find the probability of A and B that I can use one of these two
04. 00:18 / 00:25 - formulations. I can take the probability of B given A times the probability of A, since
05. 00:26 / 00:30 - A and B are completely interchangeable I can just swap then. So these two just come from
06. 00:30 / 00:34 - the fact that it doesn't really matter who is A and who is B. So whichever way you want
07. 00:34 / 00:39 - to think about it you get the same answer. And this just comes from rearranging the definition
08. 00:39 / 00:43 - that we had for conditional probability, hopefully we can see if I leave the A and B where it
09. 00:43 / 00:50 - is. And I move the probability A to the other side I get this first definition. And then
10. 00:50 / 00:54 - if I want to think about it with the A and B swap, and then just swap A and B everywhere
11. 00:54 / 01:00 - and solve again. And you'll see this numerator doesn't change by swapping A and B, everything
12. 01:00 / 01:04 - stays the same there. So the only thing here we're going to do is just prove that this
13. 01:04 / 01:10 - works for our data. This is not how I would solve any problem where have a two-way table
14. 01:10 / 01:15 - ever in a million years, just convincing you that the formula works. So I have the probability
15. 01:15 / 01:22 - A from before was 0.425, the probability of B given A from before is 0.581. We'll need
16. 01:22 / 01:28 - this for a comparison in a second. So if I want to find the probability of A and B, I
17. 01:28 / 01:35 - can use this first rule and do the probability of B given A which is 0.581 times the probability
18. 01:36 / 01:42 - of A which is 0.425, and when I multiply those together I get point 0.247 which is exactly
19. 01:42 / 01:47 - what we got before. Again that's I'm just trying to convince you that the rules aren't
20. 01:47 / 01:53 - Martian language they're just a way to write what we did in more complicated language most
21. 01:53 / 01:58 - of the time. If you want to convince yourself try it. So find these two probabilities we
22. 01:58 / 02:02 - didn't find we found the probability of B but we did not find the probability of A given
23. 02:02 / 02:08 - B. But we know this, so if you find A given B, you multiply it times B you get same thing
24. 02:08 / 02:13 - 0.247 very very exciting. Mostly will be good practice for finding the probability A given
25. 02:13 / 02:15 - B more than anything else.