

Conditional Probability

Workshop

1. Consider a class with one midterm and a final exam. Suppose that 13% of the students in the class got an A on the midterm. Of those, 47% also got an A on the final exam. Of the students who did not get an A on the midterm, 11% got an A on the final exam.

(a) Draw a weighted tree diagram for this situation.

(b) What percent of students got an A on the final exam?

(c) What percent of the students who got A's on the final exam did not get an A on the midterm?

2. If I flip a fair coin four times, then here is the probability distribution for the number of heads I might get.

Outcome	0	1	2	3	4
Probability	6.25%	25%	37.5%	25%	6.25%

Let A be the event that I get *more* than 2 heads. Let B be the event that I get exactly 3 heads.

(a) Find $P(A)$.

(b) Find $P(B | A)$.

3. A poll from 2010 asked American's their opinion about global warming. Here are the results, for Democrats and Republicans.

	Earth is warming	Not warming	Don't know	Total
Conservative Republican	0.11	0.20	0.02	0.33
Moderate/Lib Republican	0.06	0.02	0.01	0.13
Moderate/Cons Democrat	0.25	0.06	0.01	0.34
Liberal Democrat	0.18	0.01	0.34	0.20
Total	0.60	0.07	0.06	1.00

- (a) What percent of the conservative Republicans believe the Earth is warming?
- (b) What percent of the people who believe that the Earth is warming are conservative Republicans?
- (c) What percent of the people in this poll were liberal Democrats?
- (d) Find $P(\text{Liberal Democrat} \mid \text{Believes the Earth is warming})$.

4. Suppose 80% of people like peanut butter, 89% like jelly, and 78% like both. Given that a random person likes peanut butter, what's the probability that they also like jelly?