Name: _____ Business Data Analysis
Date: 201-316-VA

In Class Exercise # 9: Rules of probability

1. **Bread and Cheese**

   In 1381, anti-German mobs in England killed anyone who couldn't say 'bread and cheese' in an English accent.

   At a wine-and-cheese event, there are 100 people in attendance. 40 have cheese on their plates, 25 have bread on their plates, and 15 have both bread and cheese on their plates. Find the probability that a person chosen at random

   (a) has cheese or bread on their plates.

   (b) has either cheese or bread on their plates, but not both.

   (c) has bread on their plates given that they also have cheese on their plates.

   (d) does not have cheese on their plates, if they have bread on their plates.

2. **Don't Take Away Our Drinks**

   Last year, Belgian MPs were told that they would no longer be served free beer during parliamentary sessions. The decision came after an ethics committee report found that a) most workplaces don't serve beer for free, and b) readily available alcohol was making some MPs "quite unpleasant" to work with[1].

   The table showing how each MP voted on the motion to stop serving free beer at work based on their political affiliation.

	In Favour	Against
Government	8	75
Opposition	7	59

   Assuming that each MP could vote either in favour of the motion or against it, what is the probability that a randomly selected MP

   (a) is from the Opposition?

[1] https://www.politico.eu/article/belgian-mps-to-pay-for-alcohol-parliament-beer-wine/

(b) is from the Opposition and voted against the motion?

(c) is in favour of the motion?

(d) is in favour of the motion if they are from the Opposition?

(e) is from the Government given that they voted in favour of the motion?

3. **Cats and Dogs**

A recent poll in the UK found that 36% of dog owners describe themselves as being "very happy" compared to only 18% of cat owners.

In a group of 1 000 people, 400 own a cat, 250 own a dog, and 150 own a cat and a dog. Determine the probability that a person selected from this group

(a) owns a cat or a dog

(b) owns a cat or a dog but not both

(c) owns a dog, if they own a cat

(d) does not own a cat given that they own a dog.