**Session 4 Questions**

**Q1: A 2012 poll suggests that Maharashtra has the highest obesity rate among Indian states, with 23.5% of Maharashtrian being obese. Assuming that the obesity rate stayed constant, what is the probability that two randomly selected Maharashtrian are both obese?**

P(Maharashtrian obese) = 0.235

P(Both Maharastrian are obese) = 0.235\*0.235= 0.055225

**Data: The World Values Survey is an ongoing worldwide survey that polls the world population about perceptions of life, work, family, politics, etc. The most recent phase of the survey that polled 77,882 people from 57 countries estimates that 36.2% of the world’s population agrees with the statement “Men should have more right to a job than women.” The survey also estimates that 13.8% of people have a university degree or higher, and that 3.6% of people fit both criteria.**

A: Men should have more right to a job than women – Yes

B: having a university degree or higher

|  |  |  |  |
| --- | --- | --- | --- |
| Statement/University | Yes to Statement (Event A) | No to Statement (Event A’) | Total |
| University+ (Event B) | 0.036 | 0.102 | 0.138 |
| Less than University (Event B’) | 0.326 | 0.536 | 0.862 |
| Total | 0.362 | 0.638 | 1 |

**Q2: Are agreeing with the statement “Men should have more right to a job than women” and having a university degree or higher disjoint events?**

Disjoint events means that if one event occurs, other can’t occur. But here we can see, P(A and B) = 0.036. So, events are not disjoint.

**Q3: What is the probability that a randomly drawn person has a university degree or higher or agrees with the statement about men having more right to a job than women?**

This means that we are being asked probability of P(A or B) = P(A) +P(B) – P(A and B)

**P(A or B)** = P(A) +P(B) – P(A and B) = 0.362 + 0.138 – 0.036 = **0.464**

**Q4: What percent of the world population do not have a university degree and disagree with the statement about men having more right to a job than women?**

This means that we are being asked probability of P(A’ and B’) = 0.536 (Refer the table)

**Q5: Does it appear that the event that someone agrees with the statement is independent of the event that they have a university degree or higher?**

For events to be independent, P(A and B) = P(A)\*P(B)

So, P(A and B) = 0.036

P(A)\*P(B) = 0.362\*0.138 = 0.05

So, events are not independent.

**Q6: What is the probability that at least 1 in 5 randomly selected people agree with the statement about men having more right to a job than women?**

We have to find 1-P(none of 5 selected agree with the statement) = 1 – (0.638)^5 = 0.8943

**Q7: As of 2009, Swaziland had the highest HIV prevalence in the world. 25.9% of this country's population is infected with HIV. The ELISA test is one of the first and most accurate tests for HIV. For those who carry HIV, the ELISA test is 99.7% accurate. For those who do not carry HIV, the test is 92.6% accurate. If an individual from Swaziland has tested positive, what is the probability that he carries HIV?**

This question is based on Baye’s theorem.

A: Test is positive

B: HIV positive

P(B) = 0.259

P(B’) = 1-P(B) = 0.741

P(A|B) = 0.997

P(A|B’) = 1-0.997 = 0.003

P(A’|B’) = 0.926

P(A|B’) = 1-0.926 = 0.074

We have to find P(B|A)

P(B|A) = = = 0.82484