**# 2** (10 Points)

**An employee of a company is traveling to either England, Italy, or Spain. The employee can travel to only one country. There is a 50% chance the employee will go to England and a 20% chance to Italy.**

**Assume the chances of contracting COVID to be proportional to the prevalence of the disease in each country, given in the table below. For example, the chances of contracting COVID in England is 1200/1,000,000.**

|  |  |
| --- | --- |
|  | **Prevalence** |
|  | Cases |
|  |  |
|  | **Per Million** |
| **England** | 1200 |
| **Italy** | 1500 |
| **Spain** | 1600 |

**What are the chances that the employee will contract COVID while travelling?**

**ANSWER:**

P(Covid Positive)

= (1200/1000000)\*(50/100) + (1500/1000000)\*(20/100) + (1600/1000000)\*(30/100)

= 0.00138

Thus, there is 0.00138 chances that the employee will contract COVID while travelling.

**Assume that the employee has traveled to Europe and contracted COVID, what is the probability that he/she traveled to England?**

**ANSWER:**

P(England | Covid Positive)

= [P(Covid Positive | England)]\*[P(England) / P(Covid Positive)]

= **[**(1200/1000000)\*(50/100)**]** / **[**(1200/1000000)\*(50/100) + (1500/1000000)\*(20/100) + (1600/1000000)\*(30/100)**]**

= 0.4347

Thus, there is a chance of 0.4347 that the employee has traveled to England.