**Problem 1:** In a class there are two sections A and B. In section A there is $12$ female and $18$ male students. In section B there are $20$ female and $15$ male students. The teacher picks a section at random and then picks a student at random in that section. Compute

1. Probability that the student chosen is a female.
2. The conditional probability that the student is in section B given that she is a female

**Problem 2:** A doctor is called to see a sick child.

The doctor has prior information that 90% of sick children in that neighborhood have the flu, while the other 10% are sick with 1 measles.

Let $F$ stand for an event of a child being sick with flu and $M$ stand for an event of a child being sick with measles. Assume for simplicity that there no other maladies in that neighborhood.

A well-known symptom of measles is a rash $R$. Assume that the probability of having a rash if one has measles is $P(R \mid M) = 0.95$. However, occasionally children with flu also develop rash, and the probability of having a rash if one has flu is $P(R \mid F) = 0.08$. Upon examining the child, the doctor finds a rash. What is the probability that the child has measles?