Tutorial Week 10 Questions

1. A political candidate runs for two offices, A and B. The probability that the candidate wins A is 0.70, wins B is 0.60, and wins both is 0.35. What is the probability that the candidate wins at least one office?

2. Currently the U.S. Senate consists of 80 male and 20 female senators. If a committee of 3 senators is formed, what is the probability that it is an all-male committee?

3. In a fictional school, 10% of students failed Mathematics, 12% of students failed English, and 2% failed both Mathematics and English. Are the students who failed Mathematics overrepresented, underrepresented or proportionally represented amongst the students who failed English?

4. Give an example of a relation on $\mathbb{N}$ that is

(a) reflexive and transitive, but not symmetric.

(b) transitive and symmetric, but not reflexive.

5. On $\mathbb{R}$, let the relation R be defined $xRy \Leftrightarrow x \leq y$. Prove or disprove that R is an equivalence relation. **6.** On $\mathbb{R}^2$, let the relation R be defined $(a, b)R(c, d) \Rightarrow 2a - b = 2c - d$. Prove that R is an equivalence relation. Write three elements of $[(1, 2)]$.