1. **(20 pts)** If events $A$ and $B$ are disjoint, what is a simple expression for $P(A - B)$? Your answer should be something in the form $P(\_\_\_\_\_\_\_\_)$. **Don’t just give the final answer, write a brief explanation of it.** *Hint:* Think of a concrete example, like two disjoint events that could happen when you roll a die. Also, you may try drawing a Venn diagram.

2. **(20 pts)** Say 15% of the population is rich, 8% of the population is famous, and 6% of the population is both rich and famous. Define events $R = “$person is rich” and $F = “$person is famous” for some randomly selected person in the population. Write an expression for each of the following events using set operations involving the events $R$ and $F$. **Here you can just give the answer, and do not need to show any work.** *Example:* “The person is rich and famous” would be the event $R \cap F$.

   (a) The person is not rich.
   (b) The person is rich but not famous.
   (c) The person is either rich or famous (or both).
   (d) The person is neither rich nor famous.

3. **(20 pts)** Calculate the probabilities for each of the four events in the previous problem. **Show your steps, and state the name of the probability rules that you use.**

   *Example:* For the “rich and famous” event, the probability is $P(R \cap F) = 0.06$

4. **(20 pts)** Exercise 2.9 in the book.

5. **(20 pts)** In the above Exercise 2.9, part b, what are the probabilities of those three events: $A^c$, $A \cup (C \cap D)$, $A \cap D^c$? Use R to simulate this experiment and compute the (approximate) probabilities of these three events.