MAT 394 - PS2: Molecular and Human Genetics

1.) Describe three differences between DNA and RNA.

2.) Briefly explain the central dogma of molecular biology and then give one example that shows that this is not strictly true.

3.) Approximately how many base pairs in the human genome are contained in the exons of protein-coding genes?

4.) CFTRΔF508 is a mutation in the CFTR gene that is the leading cause of cystic fibrosis. Identify the location of the CFTR gene in the human genome and describe how ΔF508 alters the protein encoded by this gene. What is the frequency of this mutation in Caucasians? Provide a reference for your answers.

5.) Suppose that a population contains 100 haploid individuals and that 90 of these carry the nucleotide A at a particular position in the genome, while the remaining 10 carry the nucleotide G at that position. Calculate the nucleotide diversity π at this position.

6.) Why are STRs generally preferred to SNPs in forensic genetic analyses?