

**CSCI 283 - Computer Security I - Fall 2003**  
**George Washington University**

**Number theory and examples of the use of cryptography**  
24 September 2003

- A. Calculate  $3^{11} \bmod 7$  efficiently. How many multiplications did you need?
- B. Write down the sequence of steps in a digital signature creation and verification.
- C. How does a replay attack work when Alice and Bob obtain session keys from a KDC as described in class?
- D. Write down the sequence of steps in a public key authentication protocol.
- E. You are to design the cryptographic protocols for a system for copyright protection using what you have learnt in this class. Design the entire system and describe it concisely.