Due date: February 7 (in the beginning of the class period)

1. (10 points) Decrypt the following message which was created using the Caesar (shift by 3) cipher:

   LORY HWKHQDPHRIKRQRU

2. (10 points) (Taken from Washington-Trappe 2.13.1) Caesar wants to arrange a secret meeting with Marc Antony, either at the Tiber (the river) or at the Coliseum (the arena). He sends the ciphertext:

   EVIRE

   The message was encrypted using a shift cipher; however, Antony does not know the key, so he tries all possibilities. Where will he meet Caesar?

3. (10 points) Compute the following:
   
   (a) 4321 MOD 26
   (b) -45 MOD 8
   (c) 111 MOD 62
   (d) -63 MOD 7
   (e) 186 MOD 4

4. (20 points) (Taken from Washington-Trappe 2.13.3) Encrypt howareyou using the affine function

   \[ 5x + 7 \pmod{26} \]

   What is the decryption function? Check that it works.

5. (20 points) (Taken from Washington-Trappe 2.13.5)

   The following ciphertext was encrypted using an affine cipher mod 26

   CRWWZ

   The plaintext starts ha. Decrypt the message.
6. (20 points) Eve intercepts the following ciphertext created using a substitution cipher:

CBKGS RGKCDMGR TKUSWHUCSRDXN, TGK CXR ZMCTKDFDXG PURGM 
FUXTKSQFKDUX, KJG PUIDG’T TJUK UXG BSCPG CK C KDPG, PUIDXN KJG 
PURGMT UB KJG FJCSCFKGST TMDNJKMW KU NDIG KJG DPZSGTDDUX UB 
PUIGPGXK DX KJG BDXCM BDMP.

Decrypt this message.