

1. Suppose  $d = \gcd(30786, 41082)$ .
  - (a) Find  $d$
  - (b) Find  $k, l$  such that  $d = 30786 \cdot k + 41082 \cdot l$ .
2. For each of the following find  $a^{-1} \pmod{m}$  or explain why no such inverse exists. That is, find  $c$  such that  $ac \equiv 1 \pmod{m}$ .
  - (a)  $a = 25343, m = 52268$
  - (b)  $a = 10175, m = 2596671$ .
3. Decipher the message:  
  
CBXW ASDI XNSA  
  
knowing it was encoded with an affine cipher with key  $a = 5$  and  $b = 9$ .
4. (Wait until Wednesday) Break the message:  
  
DUMK ZTUH OKPT ELLK RUMK ZTUH  
  
knowing it was encoded with an affine cipher and contains the word(s) "affine".
5. (Wait until Wednesday) Find  $\phi(5232600)$
6.
  - (a) Get a picture of you with Natural World RA, PA (other than JuliAnne) or professor (other than me).
  - (b) Get a picture of a place to buy food on campus that you have never bought food at.