1. Bob publishes his public RSA parameters $(n, e) = (3953, 49)$
   (a) If Alice wants to send the message $x = 1729$ encrypted using RSA, what is the ciphertext?
   (b) Bob's private key is $d = 625$. If Bob receives the ciphertext $y = 1099$, what was the plaintext?

2. (a) Find $\phi(3)$, $\phi(5)$, and $\phi(7)$.
   (b) If p is prime, what is $\phi(p)$?

3. (a) Find $\phi(15)$, $\phi(21)$, $\phi(35)$, $\phi(9)$, and $\phi(25)$.
   (b) If $n = pq$ where $p \neq q$ are prime, what is $\phi(n)$?

4. Compute the following values with $p = 3$, $p = 5$, and $p = 7$:

$$a^{\phi(p)+1} \mod p \text{ for } a = 0, 1, \ldots, p-1$$

Compute these values using just a calculator, although you may verify your answers using the Mathematica notebook posted for today.

5. Compute the following values with $n = 15$, $n = 21$, $n = 35$, and $n = 9$:

$$a^{\phi(n)+1} \mod n \text{ for } a = 0, 1, \ldots, n-1$$

You will want to use the Mathematica notebook posted for today.