1. Find $\bar{a}$, the inverse of $a$ modulo $m$, when
   (a) $a = 3$ and $m = 8$
   (b) $a = 7$ and $m = 10$
   (c) $a = 12$ and $m = 19$.

2. What is the remainder when $2015^{2016}$ is divided by 11?

3. The converse of Fermat’s Little Theorem is not true, i.e. when $a^{m-1} \equiv 1 \pmod{m}$, we cannot necessarily conclude that $m$ is a prime. Complete the following steps to construct a counterexample.
   (a) Show that 341 is not a prime.
   (b) Show that $2^{10} \equiv 1 \pmod{341}$. (*Hint: compute $2^{10}$ directly. Euler’s theorem would not help you here.*)
   (c) Show that $2^{340} \equiv 1 \pmod{341}$. 