Assignment 6

1. Using the fact that $4 \times 15 = 60$, solve the equation $15x + 12 \equiv 3 \bmod 59$. Your solution should be a number x computed "modulo 59". It should be an integer between 0 and 58.
2. Find the first power of 3 that is congruent to 1 modulo 11, and use this information to find out the value of $3^{2014} \bmod 11$.
3. True or False: If n is a composite, then there are x, y such that $x \not\equiv 0 \bmod n$ and $y \not\equiv 0 \bmod n$ but $xy \equiv 0 \bmod n$.
4. True or False: For every prime $p > 3$ the equation $x^2 + 1 \equiv 0 \bmod p$ has a solution.
5. Find an x such that $x = 10 \bmod 13$ and $x = 5 \bmod 59$.