Math 255 - Spring 2022
Euler's theorem
10 points

This homework invites you to perform some computations using Euler's theorem. I will do an example in Monday's class (March 21) which you might want to refer to before starting work on this.

For each problem, please show your work and ensure that you use Euler's theorem to obtain your answer for full credit.

1. (3 points) What is the remainder when 2022^{2022} is divided by 35?

2. (3 points) What is the last digit of 2022^{2022}?
   (Note that $\gcd(2022, 10) \neq 1$ so you cannot directly apply Euler's theorem. Try combining it with the Remainder Theorem.)

3. (4 points) For any integer a, show that a and a^{4n+1} have the same last digit.
   (Note that you may not assume that $\gcd(a, 10) = 1$.)