Name: _____

Directions: Show all work. No credit for answers without work.

1. **[4 points]** Let $p = 41$ and note that p is prime. Use Fermat's Little Theorem and the fast power algorithm to find the inverse of 26 in $\mathbb{Z}_p$.

2. **[2 parts, 2 points each]** Let $a = 49$ and let $m = 113$.

   (a) Compute enough powers of a to determine the order of a in $\mathbb{Z}_m$. (Hint: the order of a is at most 10.)

   (b) Let $n = 372032$. Use part (a) to compute a^n in $\mathbb{Z}_m$.

3. **[2 points]** Let $p = 79$, and note that p is prime. According to Fermat's Little Theorem, what are the possible orders of elements in $\mathbb{Z}_p$?