Powers mod Powers

Main Question: What is the remainder when you divide a^p by p?

1. Compute a^p and its remainder when divided by p, for various values of a and p. Everyone should do at least 5, and then share with the group. As a group, discuss any patterns you see and form a conjecture.

Find the remainders when you perform the following divisions. Try different values of a. You should first guess what the value is based on your conjecture and then verify (or refute) your guess.

2. a^6 divided by 10?

3. a^9 divided by 15?

4. a^{13} divided by 21?

5. a^{2321} divided by 2419?

Discuss in your groups: how might we think about the main question here in terms of group theory? What would we need to prove (about groups)?