Powers mod Powers

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

1. Compute a^p for various values of a and p. What is your conjecture?

Find the remainders when you perform the following divisions. Try different values of a.

2. a^6 divided by 10?

3. a^9 divided by 15?

4. a^{13} divided by 21?

5. a^{2321} divided by 2419?