Honors HW03. Morally DUE Mon Feb 28

In this HW Alice and Bob are doing Diffie Hellman with $p = 47$ and $g = 5$. You can verify that g IS a generator (you do not have to, but you could).

1. (35 points) Alice uses $a = 10$ and Bob uses $b = 11$. What is the shared secret key? Express as a number in $\{0, \ldots, 46\}$

2. (35 points) Alice uses $a = 11$ and Bob uses $b = 10$. What is the shared secret key? Express as a number in $\{0, \ldots, 46\}$

3. (30 points) If you did the problem correctly the last two answers were the same. Prove the following theorem:

   Thm Let p be a prime and g be a generator. Let $a, b \in \{0, \ldots, p-1\}$. Let $s_{a,b}$ be the shared secret key if Alice uses a and Bob uses b. Show that $s_{a,b} = s_{b,a}$.