Problem 5: Prime Powers

Let a and b integers that are not divisible by a prime p. Prove the following statements:

1. If $a^p \equiv b^p \mod p$ then $a \equiv b \mod p$
2. If $a^p \equiv b^p \mod p$ then $a^p \equiv b^p \mod p^2$

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted.

Posting Date 10/23/2021. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 by e-mail or hard-copy by 4 pm on Friday, Nov 5, 2021. An email submission must be a single pdf file. Hard copy submissions must be dropped in the file holder at my office door (Hayes 319) and must include a time stamp.