

Show that

$$2^a \equiv 1 \pmod{2^a - 1} \quad (\text{This is almost trivial.})$$

Then what is $2^{ab} \equiv ? \pmod{2^a - 1}$.

Now to prove the theorem, do a proof by contradiction and say

Suppose n is not a prime, that is, $n = ab$.

Use the above congruence result.