HW #1

1. Prove that $\sqrt{3}$ is irrational.

Bonus (not required): prove that for all primes $p \geq 2, \sqrt{p}$ is irrational (among other things, this shows us that there exist an infinite number of irrational numbers, due to the infinitude of primes)

2. Recall that the **power set** of a set A is the set of all subsets (not necessarily proper) of A.

Prove using induction, that for any finite set A with $|A| = n$, $|P(A)| = 2^n$ $\forall n \geq 1$, where $P(A)$ denotes the power set of A.