Applied Algebra

Instructions Please write your name in the upper right-hand corner of the page. Use complete sentences, along with any necessary supporting calculations, to answer the following questions.

1. Prove by induction that $\frac{1}{2} + \frac{1}{4} + \cdots + \frac{1}{2^n} = 1 - \frac{1}{2^n}$ for every positive integer n.

2. Suppose that a and b are positive integers. Explain why $\gcd(a^2, b^2)$ cannot be equal to 5.