## 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 $\operatorname{gcd}\left(a^{2}, b^{2}\right)$ cannot be equal to 5 .
