Name: _____

Directions: Solve the following problems. Give supporting work/justification where appropriate.

1. [**2 parts, 5 points each**] Prove the following using either a direct proof or proof by contra-positive.

   (a) Let $x, y \in \mathbb{R}$. If $x + y$ is irrational, then x is irrational or y is irrational.

   (b) Let a and b be positive integers. Prove that if $a - b > 1$, then $a^2 - b^2$ is not prime. (Hint: what algebraic formulas apply to a difference of squares?)