Name:

Pid: $\qquad$

1. Show that if $a, b \in \mathbb{Z}$, then $a^{2}-4 b+2 \neq 0$.

## Solution:

2. Show that there are irrational numbers $a$ and $b$ such that $a^{b}$ is rational.

## Solution:

3. We denote by $\{0,1\}^{n}$ sequences of 0 's and 1's of length $n$. Show that it is possible to order elements of $\{0,1\}^{n}$ so that two consecutive strings are different only in one position.

## Solution:

4. Let us define $n!$ as follows: $1!=1$ and $n!=(n-1)!\cdot n$. Show that $n!\geq 2^{n}$ for any $n \geq 4$.

## Solution:

