

Which ones are decidable?

$\text{ACCEPTS}_{\text{TM}} =$

$\text{SELF-ACCEPTS}_{\text{TM}} =$

$\text{HALTS}_{\text{TM}} =$

$\text{SAT}_{\text{TM}} =$

$\text{NEQ}_{\text{TM}} =$

## Undecidable Languages

**Question:** Is there an explicit undecidable language?

**Diagonalizing against the set of all Turing machines**

**Theorem 1:**

**Theorem 2:**

**Proof:**

**Theorem 3:**

**Proof:**

**Theorem 4:**

**Proof:**

## **Reductions**

We say  $A$  reduces to  $B$  ( $A \leq B$ ) if we can do the following:

**Theorem 5:**

**Proof:**

**Theorem 6:**

**Proof:**