

Solutions to homework 0:

1. (a) $\exists a \in \mathbb{Z}, ((6 \mid a \wedge 8 \mid a) \wedge 48 \nmid a)$. This statement is true choose $a = 24$, which is divisible by 8 and 6.
(b) $\forall x \in \mathbb{Z}$ such that $(x \leq 84)$ or
(c) $\forall x, y \in \mathbb{R}$ such that $(x^2 < y^2 \vee x > y)$.
2. For $a \in \mathbb{R}$, we define the set $S_a = \{x \in \mathbb{R} : (x \geq 0) \wedge (x < a - 2)\}$.
3. (a)
(b)
4. $\forall a \in \mathbb{Z}, \exists b \in \mathbb{Z}$ such that $a^b + b^2 \equiv 1 \pmod{3}$.

Proof: