

Exercise Two: Math Blackboard, Logic, Quantifiers and Alignment

The proposition $(P \vee Q) \vee (\sim P \wedge \sim Q)$ is a tautology because it is always true.

[To typeset some of the following symbols, you may need to use the Help menu. Also, try using the `\not` command]

$$\begin{aligned}\sim[(\exists n \in \mathbb{N})(\forall m \in \mathbb{N})(n \leq m)] &\iff (\forall n \in \mathbb{N})\sim[(\forall m \in \mathbb{N})(n \leq m)] \\ &\iff (\forall n \in \mathbb{N})(\exists m \in \mathbb{N})\sim(n \leq m) \\ &\iff (\forall n \in \mathbb{N})(\exists m \in \mathbb{N})(n \not\leq m)\end{aligned}$$

[Typeset the following. Then decide if the statements are equivalent.]

$$(\forall x \in \mathbb{R})(\exists y \in \mathbb{R})(x = -y)$$

$$(\exists y \in \mathbb{R})(\forall x \in \mathbb{R})(x = -y)$$