Negations

Negation examples

- x and y are both even. $(\sim (P(x) \wedge Q(x)))$

More examples

The square of every real number is non-negative. $(\forall x \in \mathbb{R}, x^2 \geq 0)$.

There is an integer y so that $y^2 = 20$. $(\exists y \in \mathbb{Z}, y^2 = 20)$

Still more

For every real number x there is a real number y so that $y^3 = x$.
$(\forall x, \exists y, y^3 = x)$

Conditionals

- $P \implies Q$ is equivalent to $\sim P \vee Q$.
- $\sim (P \implies Q)$ is equivalent to $P \wedge \sim Q$.

If I own a car, I am from South Dakota.

More examples

For every positive real number ϵ, there is a positive integer M for which $x > M$ implies $|f(x) - b| < \epsilon$.

Note implicit "for all x" in the implication.

Negation:

There is a positive real number ϵ so that for all positive integers M there is an $x > M$ and $|f(x) - b| \geq \epsilon$.