7. Quantifiers, translating between math and English

Quantifiers to close an open statement.

Open statement: $P(x)$ for $x \in U$
Universal quantifier: $\forall\, x \in U\,,\ P(x)$
"For all x in U, $P(x)$ holds"
Existential quantifier: $\exists\, x \in U\,.\ P(x)$
"There exists x in U such that $P(x)$ holds"

Example:

Open statement: $x^2 > 0$ for $x \in \mathbb{R}$
False statement: $\forall\, x \in \mathbb{R}\,,\ x^2 > 0$
"The square of every real number is positive"
True statement: $\exists\, x \in \mathbb{R}\,.\ x^2 > 0$
"There is a real number whose square is positive"